Echtzeitsysteme

Introduction to the Tool Environment

Prof. Dr. Jörg Friedrich

Table of Contents

1 Introduction

In the course of the project you will have to work with a number of tools:

1. Subversion for configuration management and version control
2. Visual C++ (even though we are just programming in C) or another development environment for Windows systems.
3. Freescale Codewarrior Integrated Development Environment for the embedded system
4. Track+ for project management and issue tracking
5. Documentation tools (Word, Visio, UML tools you like)

This document describes the installation and basic usage of the Subversion and Codewarrior systems, and give a short introduction on how to use Track+. It is assumed that you are familiar with Visual C++ and the Office documentation tools.

2 Subversion

Setting up Subversion

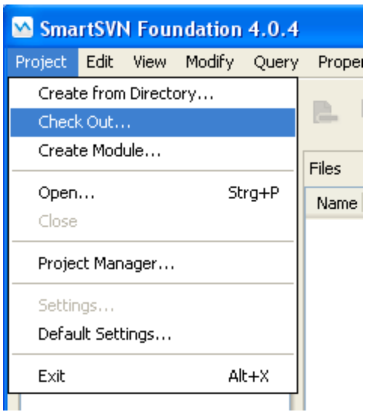
All documents and source code shall be controlled using the Subversion software. Subversion requires a server, where all controlled documents reside, and one or more clients. The server has already been set up for you, so you do not have to be concerned about it.

There are a number of clients for Subversion available. You can use any of them. We directly support the SmartSVN client which you can download from http://www.syntevo.com/smartsvn/download.html. The installation is straight forward using the Windows installer.

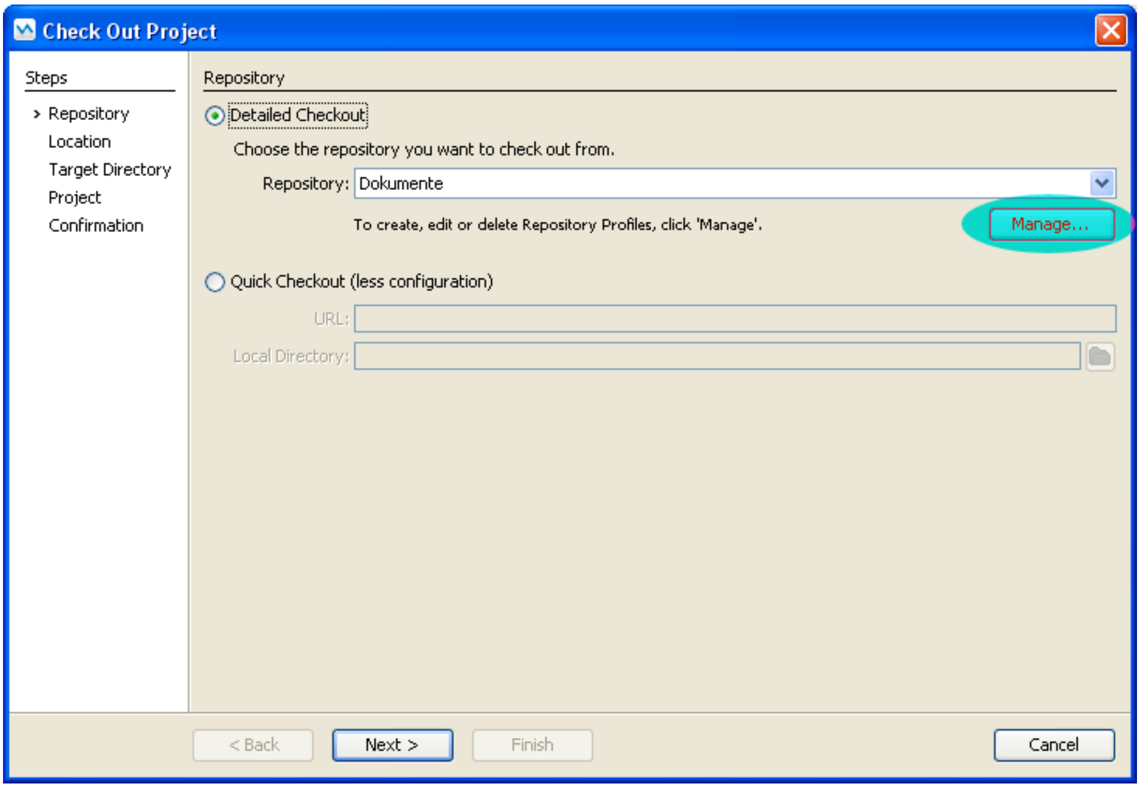
To connect to the repository on the server, perform the following steps.

You start by checking out a working copy to your local directory. If you are using more than one computer you have to do this for each computer.

Select menu entry Project > Check Out…



A wizard appears that will guide you through all required setup steps. First select the proper repository. Click on “Manage…”.



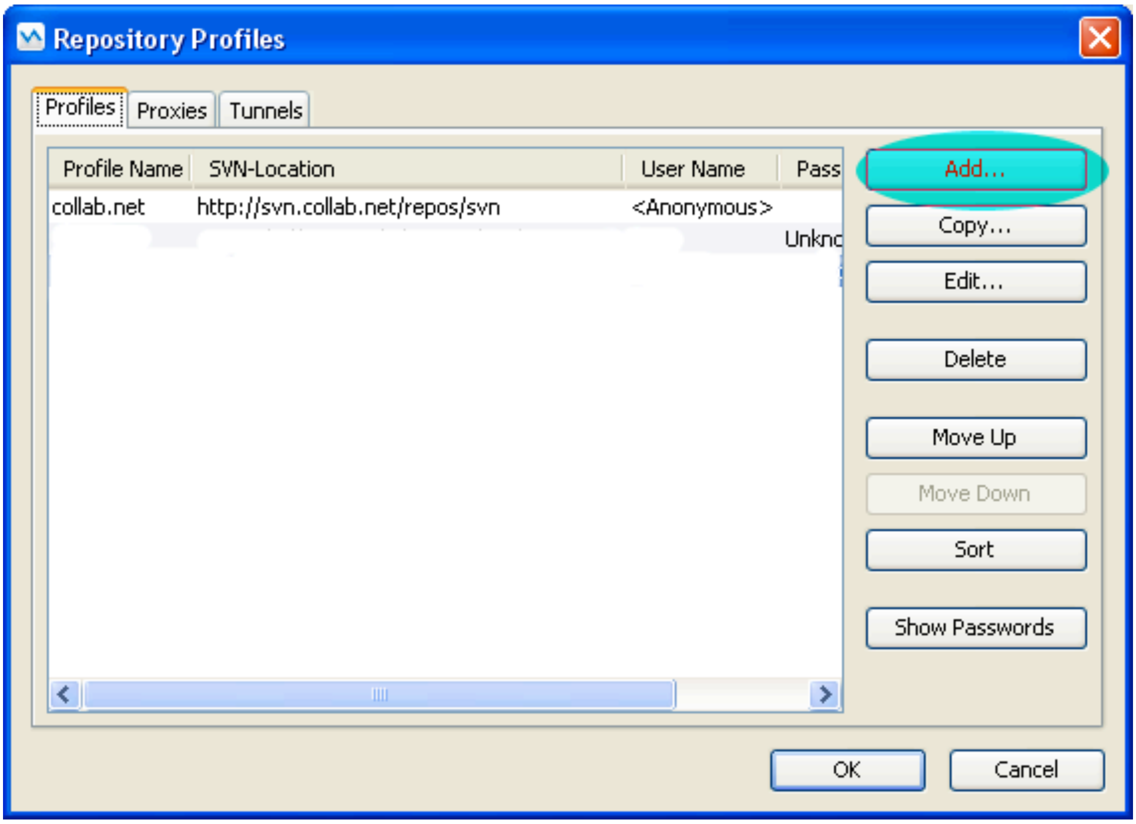
● Detailed Checkout

Choose the repository you want to check out from.

Repository: Dokumente

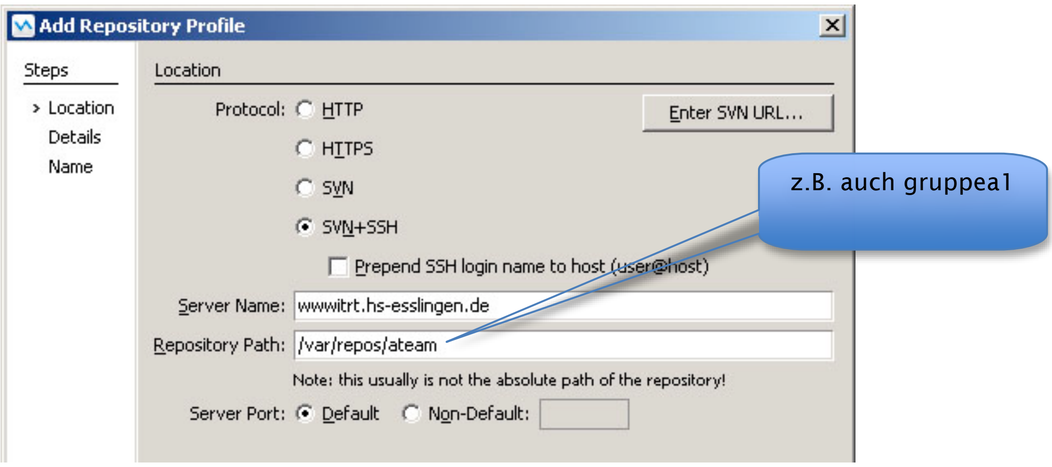
○ Quick Checkout (less configuration)

Create a new repository profile by clicking on the “Add…” button.



Profile Name	SVN-Location	User Name	Pass
collab.net	http://svn.collab.net/repos/svn	<Anonymous>	
			Unknc

To access the repository on the server you have to specify an access method. Our server is configured to use SVN+SSH and a private/public key pair. The server name is wwwitrt.hs-esslingen.de. The repository path depends on in which team you are. The following example shows the ateam, but in your semester naming may differ (e.g., gruppea1, etc.). So for gruppea1 the repository path is /var/repos/gruppea1. For gruppeb2 it would be /var/repos/gruppeb2, and so on.



Add Repository Profile

Steps: › Location, Details, Name

Location

Protocol: ○ HTTP ○ HTTPS ○ SVN ● SVN+SSH

□ Prepend SSH login name to host (user@host)

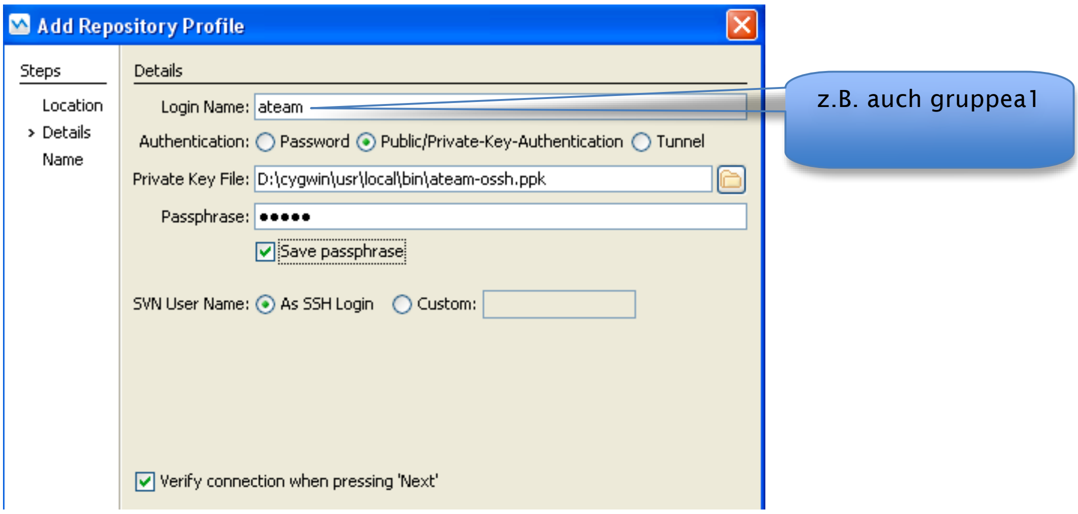
Server Name: wwwitrt.hs-esslingen.de

Repository Path: /var/repos/ateam

Note: this usually is not the absolute path of the repository!

Server Port: ● Default ○ Non-Default:

Click on the “Next” button. Enter the login name (ateam, bteam, and so on). Select Public/Private-Key-Authenticaation. You have been provided a private key file by your instructor. Enter the location of that file into the Private Key File field. You have been provided the password for the private key file. Enter the passphrase and select “Save passphrase”, so you do not have to enter the password again and again. Select the SVN User Name As SSH Login option. Select “Verify connection when pressing ‘Next’”. Click on the “Next” button.



Add Repository Profile

Steps: Location, › Details, Name

Details

Login Name: ateam

Authentication: ○ Password ● Public/Private-Key-Authentication ○ Tunnel

Private Key File: D:\cygwin\usr\local\bin\ateam-ossh.ppk

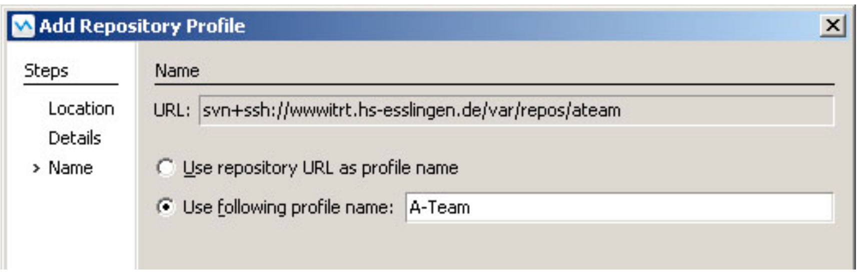
Passphrase: •••••

☑ Save passphrase

SVN User Name: ● As SSH Login ○ Custom:

☑ Verify connection when pressing 'Next'

If you used the right key file and passphrase, you should now be connected to the repository server. Give this connection a name (you can use any you like). Click on the “Finish” button.



Add Repository Profile

Steps: Location, Details, › Name

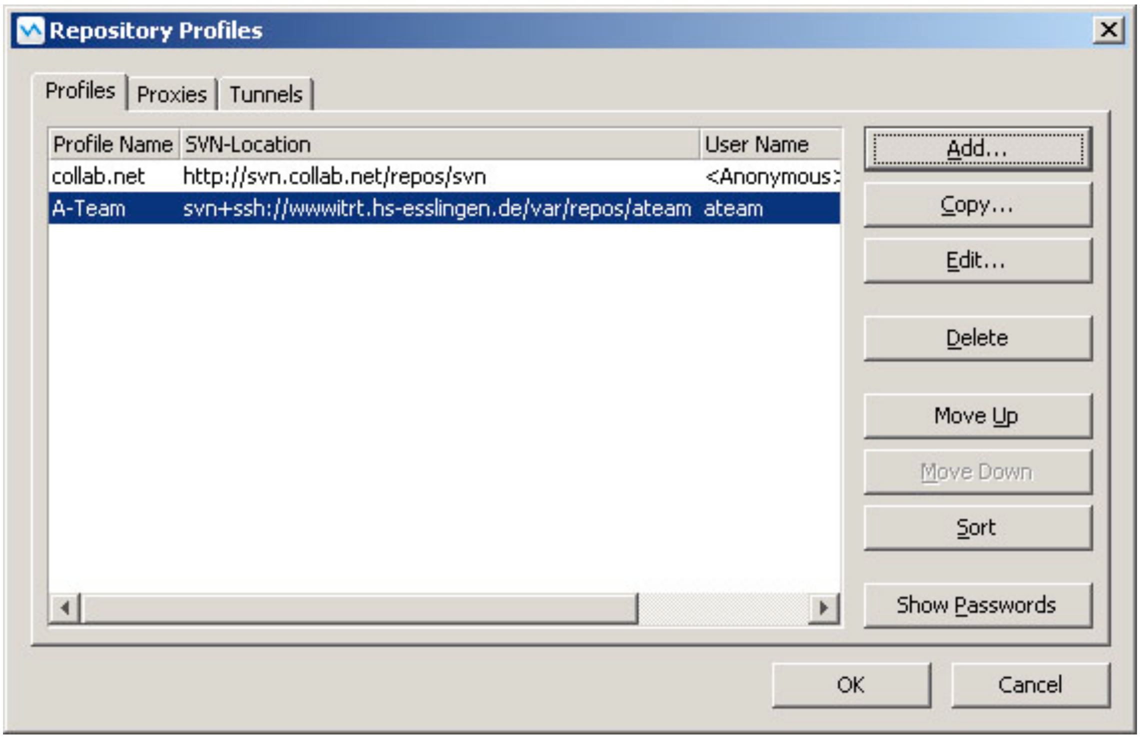
Name

URL: svn+ssh://wwwitrt.hs-esslingen.de/var/repos/ateam

○ Use repository URL as profile name

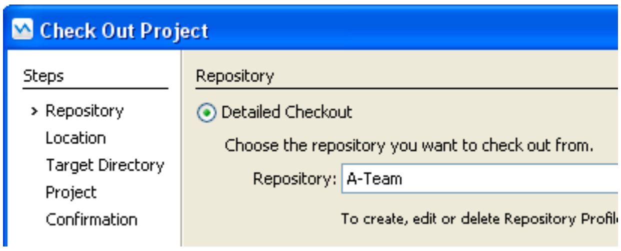
● Use following profile name: A-Team

Once the connection to the repository is established, the check out process can continue. Select the just established repository for the check out.



Profile Name	SVN-Location	User Name
collab.net	http://svn.collab.net/repos/svn	<Anonymous>
A-Team	svn+ssh://wwwitrt.hs-esslingen.de/var/repos/ateam	ateam

Click on the “OK” button. On the screen below click on the “Next” button.



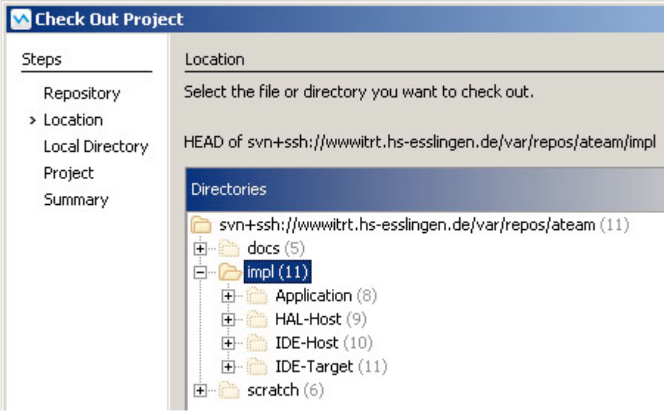
● Detailed Checkout

Choose the repository you want to check out from.

Repository: A-Team

To create, edit or delete Repository Profil

Select the top directory for the location you want to check out, as shown below.

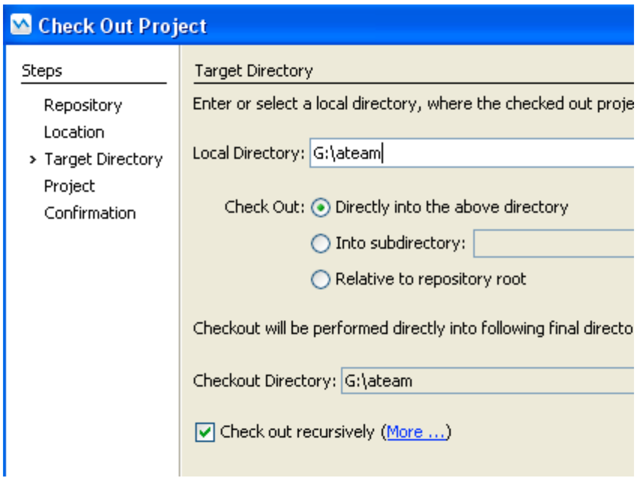


Select the file or directory you want to check out.

HEAD of svn+ssh://wwwitrt.hs-esslingen.de/var/repos/ateam/impl

```
svn+ssh://wwwitrt.hs-esslingen.de/var/repos/ateam (11)
⊞ docs (5)
⊟ impl (11)
    ⊞ Application (8)
    ⊞ HAL-Host (9)
    ⊞ IDE-Host (10)
    ⊞ IDE-Target (11)
⊞ scratch (6)
```

Select your working directory. This can be anywhere on your client computer.



Check Out Project

Target Directory

Enter or select a local directory, where the checked out proje

Local Directory: G:\ateam

Check Out: ● Directly into the above directory

○ Into subdirectory:

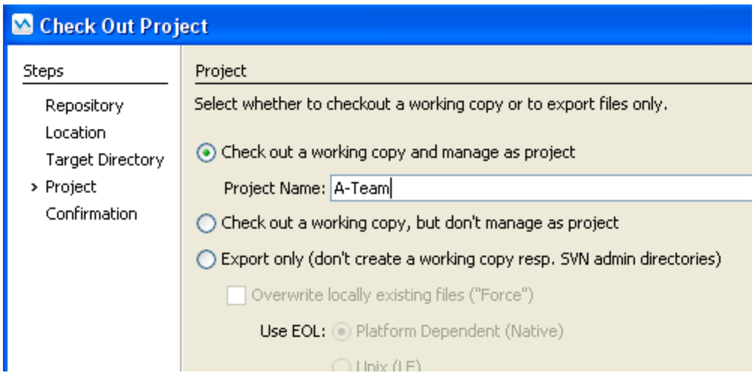
○ Relative to repository root

Checkout will be performed directly into following final directo

Checkout Directory: G:\ateam

☑ Check out recursively (More ...)

Create a SmartSVN-Project. This will save you time when you want to work with the repository again.



Check Out Project

Project

Select whether to checkout a working copy or to export files only.

● Check out a working copy and manage as project

Project Name: A-Team

○ Check out a working copy, but don't manage as project

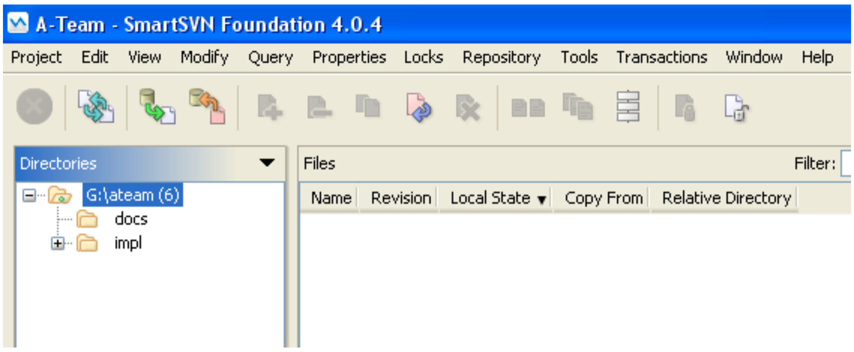
○ Export only (don't create a working copy resp. SVN admin directories)

□ Overwrite locally existing files ("Force")

Use EOL: ● Platform Dependent (Native)

○ Unix (LF)

Now you are done and are ready to check in and check out files and directories. There is already a structure on the repository server which you find in your local working directory.

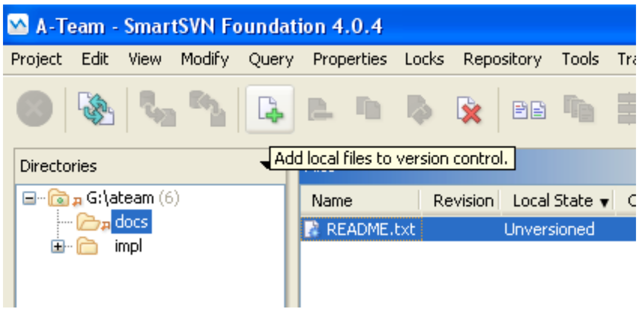


A-Team - SmartSVN Foundation 4.0.4

G:\ateam (6)
docs
impl

Adding Files

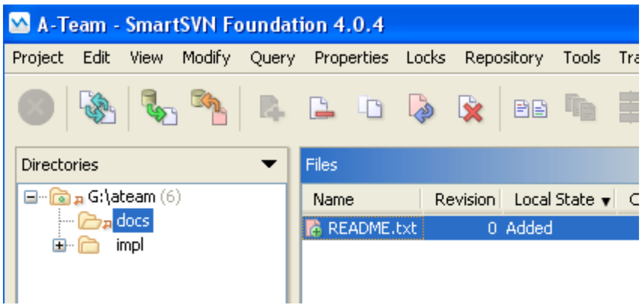
To add a file you first create it using the IDE or a documentation tool in your local working directory (in the example below in the “docs” directory. Select the file in the SmartSVN client and click on the icon with the green plus sign.


A-Team - SmartSVN Foundation 4.0.4
Project Edit View Modify Query Properties Locks Repository Tools Tra
Directories
G:\ateam (6)
docs
impl

Add local files to version control.

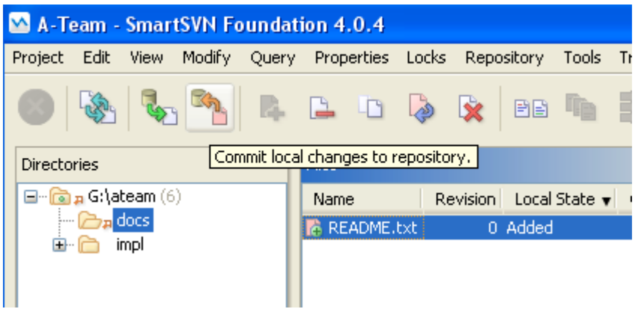
Name	Revision	Local State
README.txt		Unversioned

The new file has been locally marked as a file that should be added to the repository. The icon in front of the file name has changed. Please note that the file is still only local, it has not been copied to the repository server.


A-Team - SmartSVN Foundation 4.0.4
Project Edit View Modify Query Properties Locks Repository Tools Tra
Directories
G:\ateam (6)
docs
impl
Files

Name	Revision	Local State
README.txt	0	Added

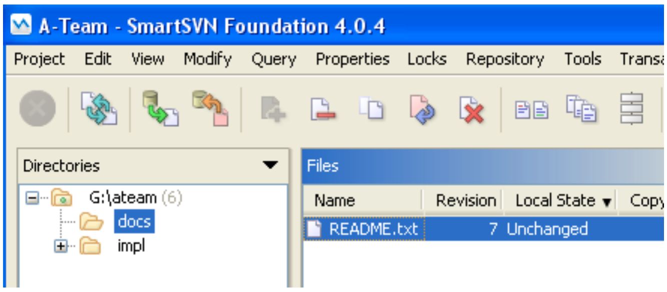
To copy the file to the repository server, you need to “commit” it. Select the file and click on the commit button in the toolbar.


A-Team - SmartSVN Foundation 4.0.4
Project Edit View Modify Query Properties Locks Repository Tools Tr
Directories
G:\ateam (6)
docs
impl

Commit local changes to repository.

Name	Revision	Local State
README.txt	0	Added

The file is now being sent to the repository server and gets a new revision number. The icon in front of the file name indicates that the file is now under version control, and identical to the version on the server at the time of the last compare.

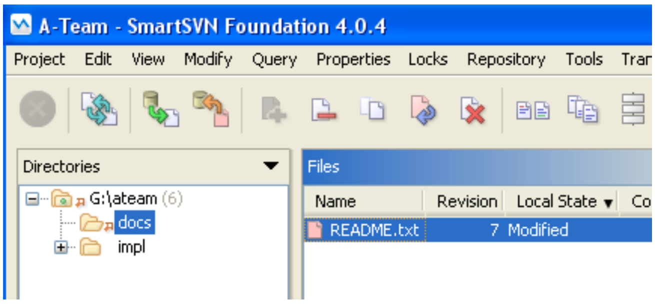

A-Team - SmartSVN Foundation 4.0.4
Project Edit View Modify Query Properties Locks Repository Tools Transa
Directories
G:\ateam (6)
docs
impl
Files

Name	Revision	Local State	Copy
README.txt	7	Unchanged	

If you want to create and commit new directories, you can do likewise. You can add and commit entire directories including all subdirectories and files.

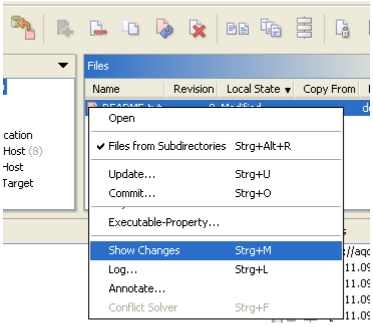
Changing Files

To change a file you simply modify it with the appropriate tool. You do not have to worry about the file being under version control. In our example, we have modified the file README.txt using a standard text editor. In the SmartSVN client there are a number of hints that the file was changed (icon in front of the file, directory containing the modified file is marked differently).

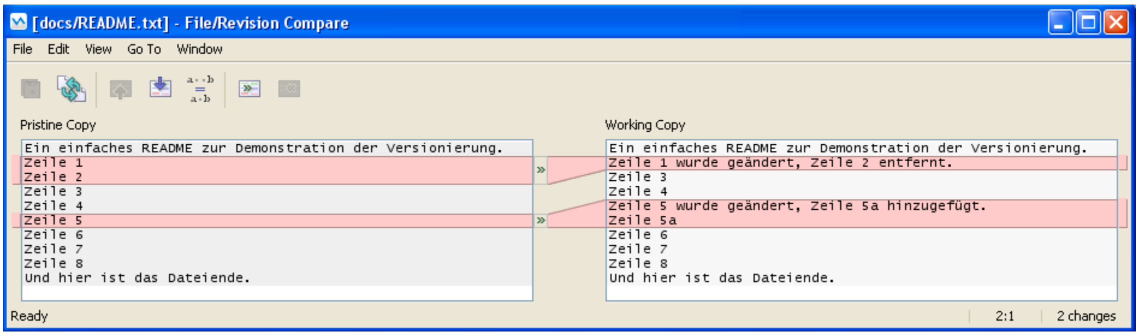

A-Team - SmartSVN Foundation 4.0.4
Project Edit View Modify Query Properties Locks Repository Tools Trar
Directories
G:\ateam (6)
docs
impl
Files

Name	Revision	Local State	Co
README.txt	7	Modified	

Right click on the file name and select menu entry “Show Changes”.



A new editor window opens where you can compare your local revision with the revision on the server, your local revision is based on.


[docs/README.txt] - File/Revision Compare
File Edit View Go To Window
Ready
2:1
2 changes

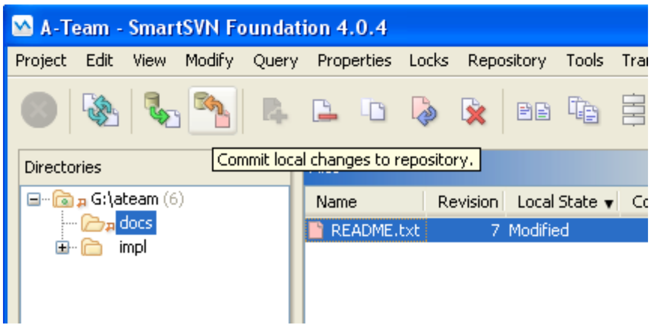
Pristine Copy

```
Ein einfaches README zur Demonstration der Versionierung.
Zeile 1
Zeile 2
Zeile 3
Zeile 4
Zeile 5
Zeile 6
Zeile 7
Zeile 8
Und hier ist das Dateiende.
```

Working Copy

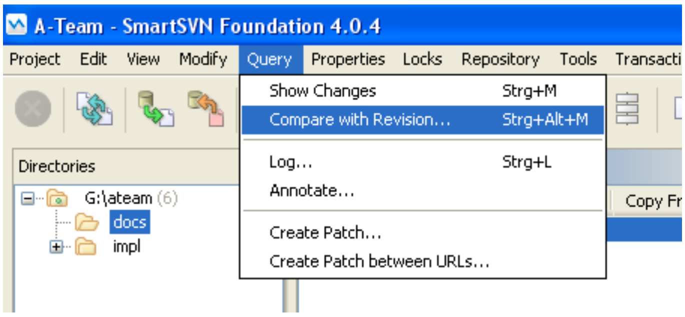
```
Ein einfaches README zur Demonstration der Versionierung.
Zeile 1 wurde geändert, Zeile 2 entfernt.
Zeile 3
Zeile 4
Zeile 5 wurde geändert, Zeile 5a hinzugefügt.
Zeile 5a
Zeile 6
Zeile 7
Zeile 8
Und hier ist das Dateiende.
```

To commit your changes to the server, select the file or files you like to upload to the server and click on the commit button in the toolbar.

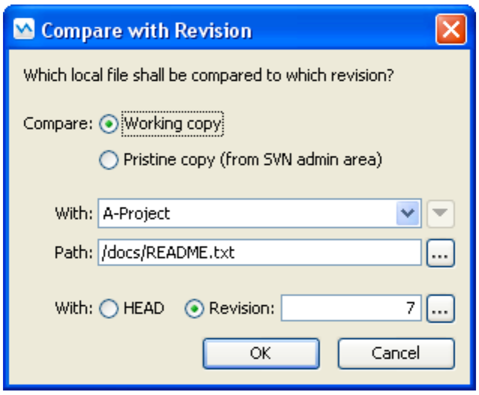

A-Team - SmartSVN Foundation 4.0.4
Project Edit View Modify Query Properties Locks Repository Tools Tra
Commit local changes to repository.
Directories
G:\ateam (6)
docs
impl
Name Revision Local State Co
README.txt 7 Modified

Unless there was a conflict, i.e. somebody else had already uploaded a modified version of your file in the meantime, your file is now uploaded to the server and marked as unmodified locally.

You can always compare your local revision to any revision on the server you like. This is helpful if you need to know what you have changed, for example compared to the status of last week. To compare your local revision with any previous revision select menu entry Query > Compare with Revision….


A-Team - SmartSVN Foundation 4.0.4
Project Edit View Modify Query Properties Locks Repository Tools Transacti
Show Changes Strg+M
Compare with Revision… Strg+Alt+M
Log… Strg+L
Annotate…
Create Patch…
Create Patch between URLs…
Directories
G:\ateam (6)
docs
impl
Copy Fr

You can select which local revision you want to compare with the remote revision. Locally you always have two revisions: your working copy, and the revision your working copy is based on (pristine copy). The latest revision on the server is called the HEAD.


Compare with Revision

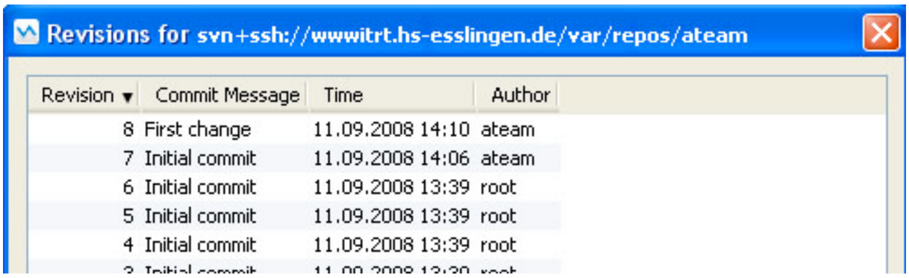
Which local file shall be compared to which revision?

Compare: ● Working copy
○ Pristine copy (from SVN admin area)

With: A-Project
Path: /docs/README.txt

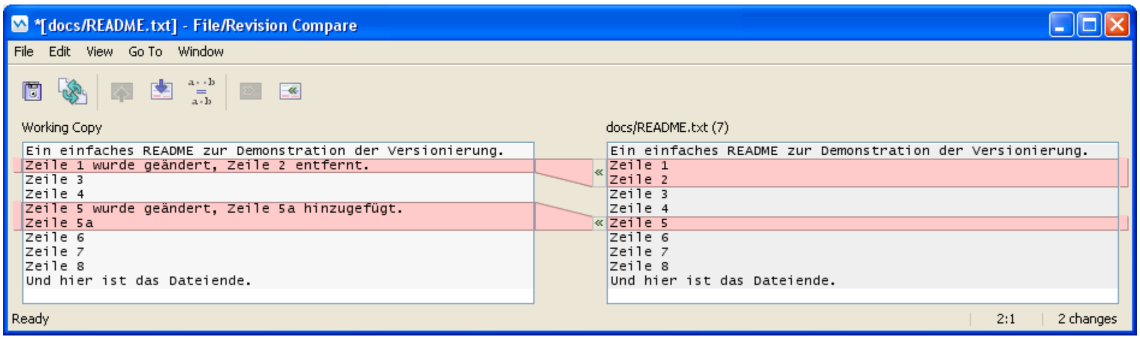
With: ○ HEAD ● Revision: 7

You can get a list of all revisions on the server by clicking on the … right to the Revision field. Select the revision you want to compare against. You also see in this window that it might be quite helpful to have good commit messages.


Revisions for svn+ssh://wwwitrt.hs-esslingen.de/var/repos/ateam

Revision	Commit Message	Time	Author
8	First change	11.09.2008 14:10	ateam
7	Initial commit	11.09.2008 14:06	ateam
6	Initial commit	11.09.2008 13:39	root
5	Initial commit	11.09.2008 13:39	root
4	Initial commit	11.09.2008 13:39	root
3	Initial commit	11.09.2008 13:39	root

Once you have selected a remote revision, the compare editor opens and you can see the differences between the two revisions. This does not work that well for binary files, though.



Working Copy

```
Ein einfaches README zur Demonstration der Versionierung.
Zeile 1 wurde geändert, Zeile 2 entfernt.
Zeile 3
Zeile 4
Zeile 5 wurde geändert, Zeile 5a hinzugefügt.
Zeile 5a
Zeile 6
Zeile 7
Zeile 8
Und hier ist das Dateiende.
```

docs/README.txt (7)

```
Ein einfaches README zur Demonstration der Versionierung.
Zeile 1
Zeile 2
Zeile 3
Zeile 4
Zeile 5
Zeile 6
Zeile 7
Zeile 8
Und hier ist das Dateiende.
```

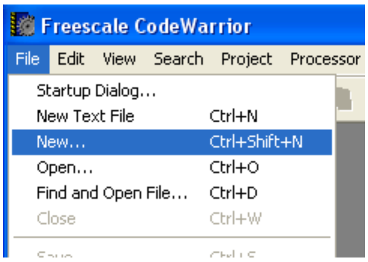
3 Freescale Codewarrior

Download and Installation

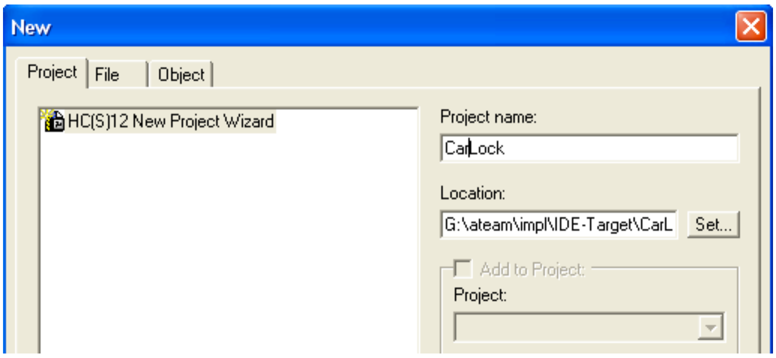
The Freescale CodeWarrior development environment can be freely downloaded from the Freescale website (search for the HCS12(X) Special edition). The installer has a size of about 300 MByte. Simply download the installer and execute it on your computer.

Creating a Project

To create a new project using the CodeWarrior select menu entry File > New…



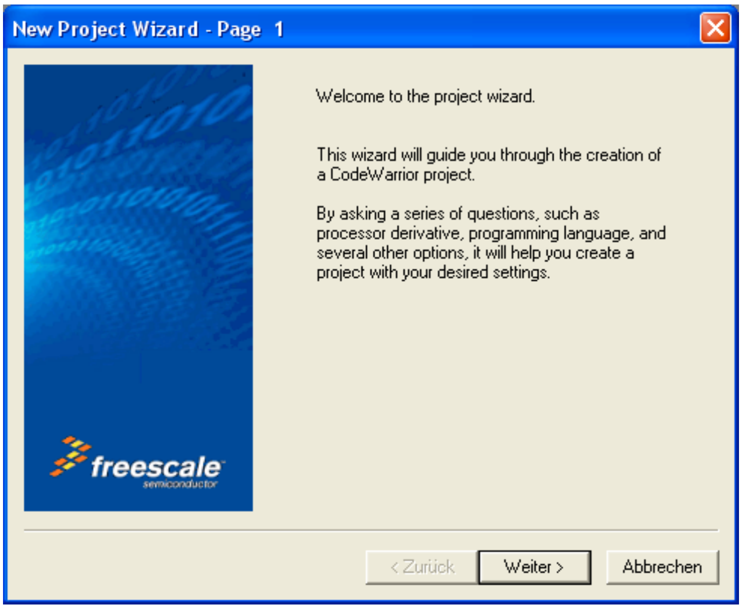
Give the project a name and a location. As the location make sure you use the Subversion working directory, and in there the subdirectory “IDE-Target”.



Project name: CarLock

Location: G:\ateam\impl\IDE-Target\CarL

Follow through the following screens.

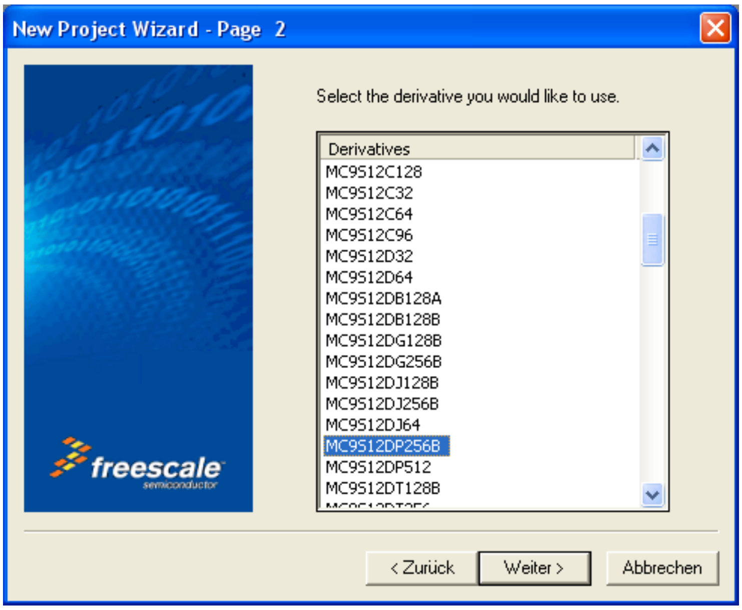


Welcome to the project wizard.

This wizard will guide you through the creation of a CodeWarrior project.

By asking a series of questions, such as processor derivative, programming language, and several other options, it will help you create a project with your desired settings.

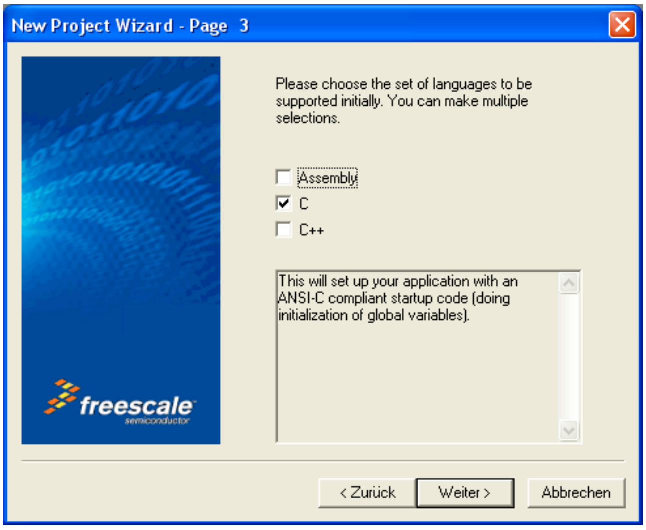
Choose the processor derivative. The derivative is printed on the microcontroller. We have MC9S12DP256B and MC9S12DG256B.



Select the derivative you would like to use.

Derivatives
MC9S12C128
MC9S12C32
MC9S12C64
MC9S12C96
MC9S12D32
MC9S12D64
MC9S12DB128A
MC9S12DB128B
MC9S12DG128B
MC9S12DG256B
MC9S12DJ128B
MC9S12DJ256B
MC9S12DJ64
MC9S12DP256B
MC9S12DP512
MC9S12DT128B

We only develop C projects, no assembly and no C++.

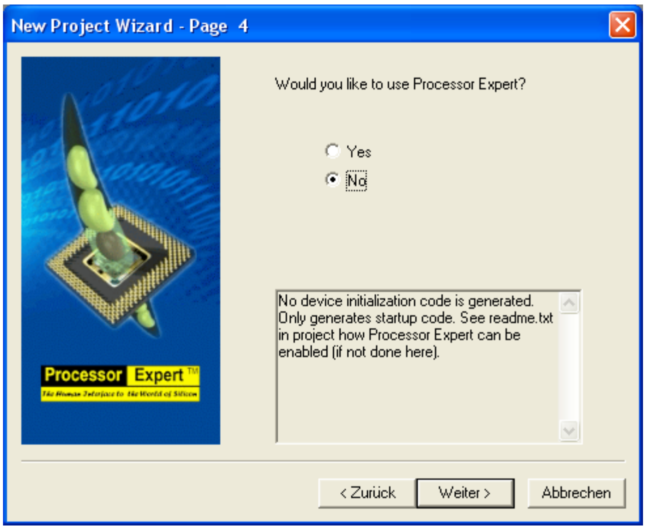


New Project Wizard - Page 3

Please choose the set of languages to be supported initially. You can make multiple selections.

- ☐ Assembly
- ☑ C
- ☐ C++

This will set up your application with an ANSI-C compliant startup code (doing initialization of global variables).

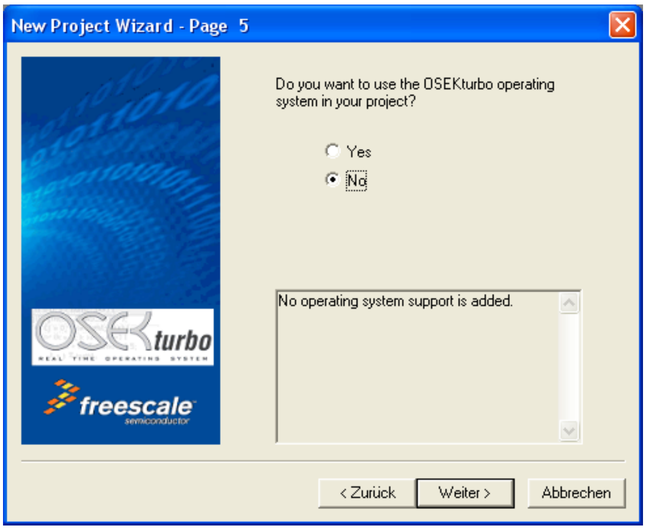


New Project Wizard - Page 4

Would you like to use Processor Expert?

- ○ Yes
- ● No

No device initialization code is generated. Only generates startup code. See readme.txt in project how Processor Expert can be enabled (if not done here).

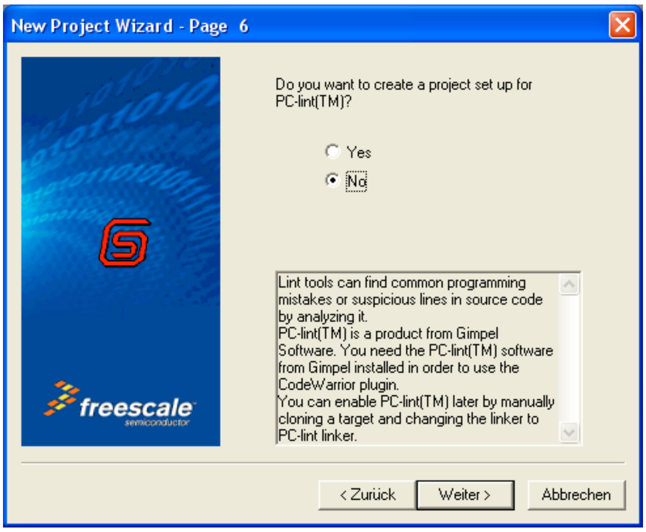


New Project Wizard - Page 5

Do you want to use the OSEKturbo operating system in your project?

- ○ Yes
- ● No

No operating system support is added.



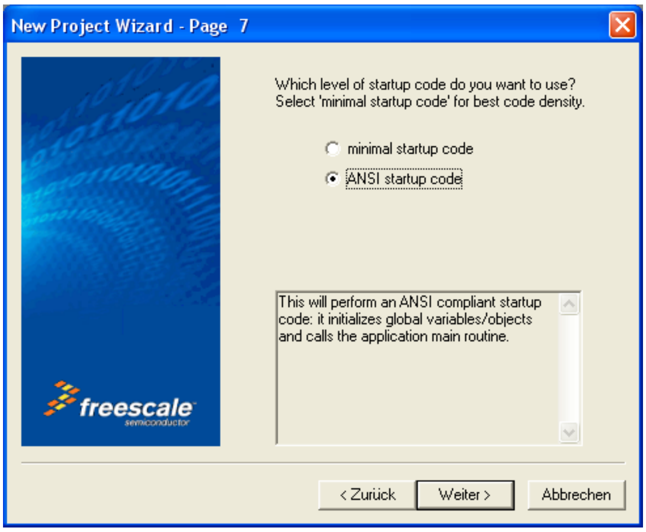
New Project Wizard - Page 6

Do you want to create a project set up for PC-lint(TM)?

○ Yes

● No

Lint tools can find common programming mistakes or suspicious lines in source code by analyzing it.
PC-lint(TM) is a product from Gimpel Software. You need the PC-lint(TM) software from Gimpel installed in order to use the CodeWarrior plugin.
You can enable PC-lint(TM) later by manually cloning a target and changing the linker to PC-lint linker.



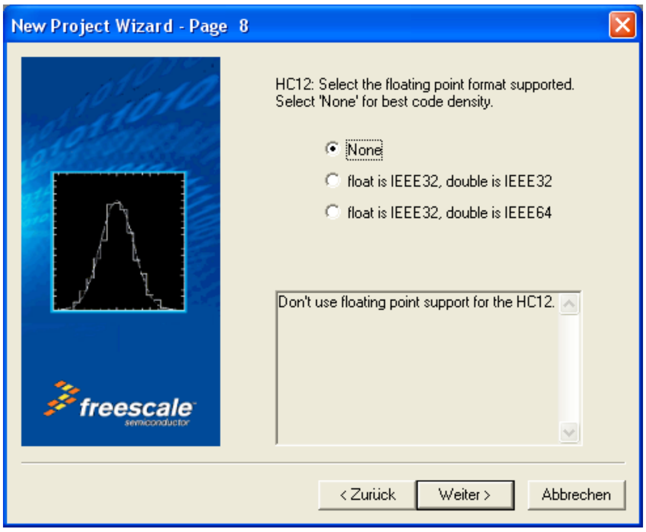
New Project Wizard - Page 7

Which level of startup code do you want to use?
Select 'minimal startup code' for best code density.

○ minimal startup code

● ANSI startup code

This will perform an ANSI compliant startup code: it initializes global variables/objects and calls the application main routine.



New Project Wizard - Page 8

HC12: Select the floating point format supported.
Select 'None' for best code density.

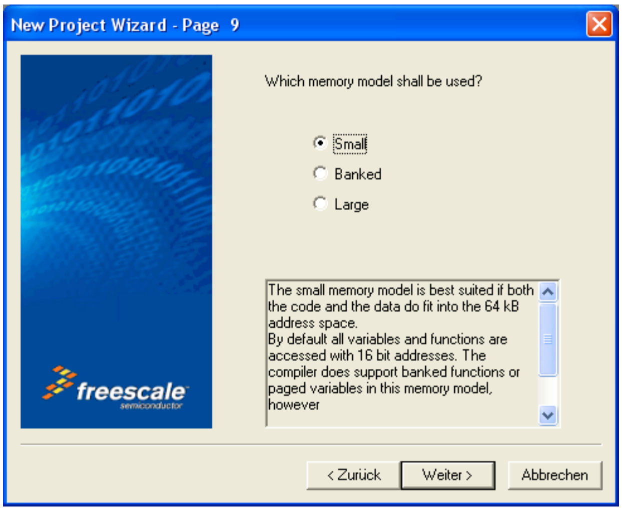
● None

○ float is IEEE32, double is IEEE32

○ float is IEEE32, double is IEEE64

Don't use floating point support for the HC12.

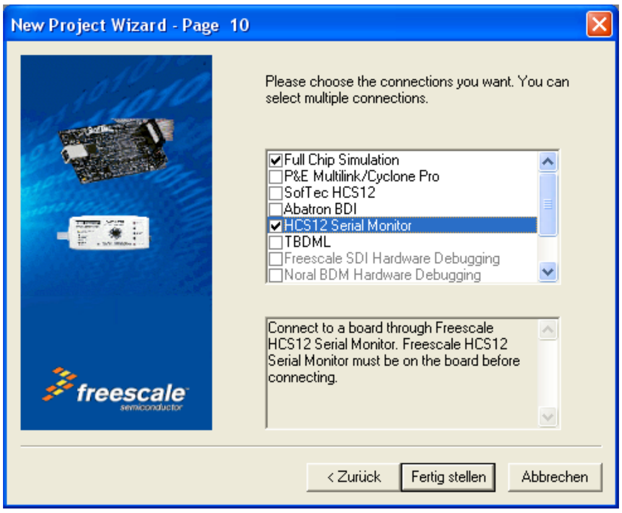
The following setting is quite important, you will get strange effects if you do not configure the Small memory model.



Which memory model shall be used?

● Small
○ Banked
○ Large

The small memory model is best suited if both the code and the data do fit into the 64 kB address space.
By default all variables and functions are accessed with 16 bit addresses. The compiler does support banked functions or paged variables in this memory model, however

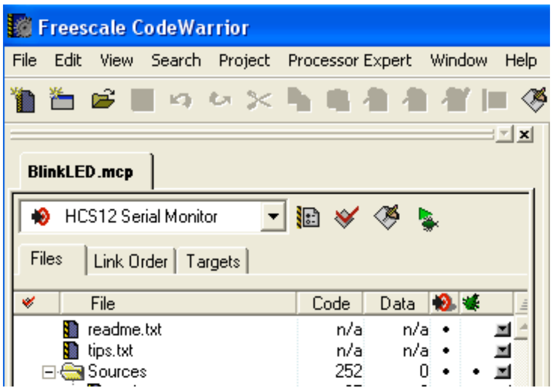


Please choose the connections you want. You can select multiple connections.

☑ Full Chip Simulation
□ P&E Multilink/Cyclone Pro
□ SofTec HCS12
□ Abatron BDI
☑ HCS12 Serial Monitor
□ TBDML
□ Freescale SDI Hardware Debugging
□ Noral BDM Hardware Debugging

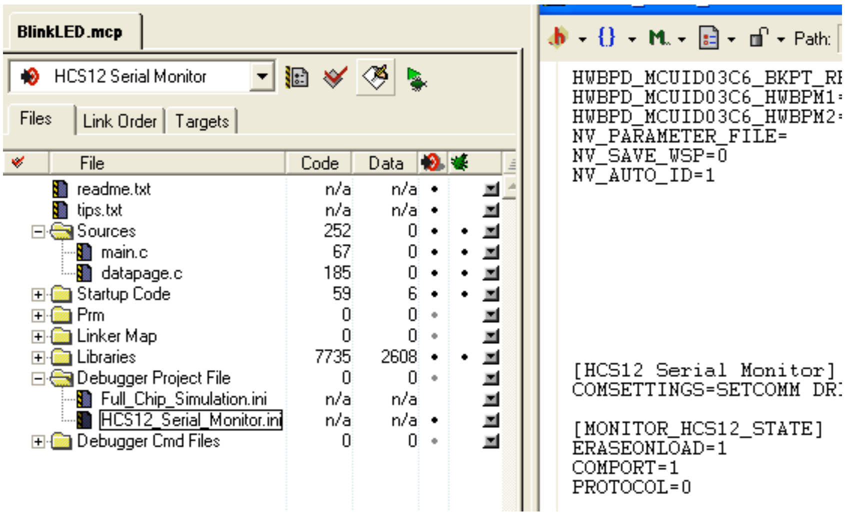
Connect to a board through Freescale HCS12 Serial Monitor. Freescale HCS12 Serial Monitor must be on the board before connecting.

The project is now being created. There are two “targets”, one for the full chip simulator and one for the HCS12 SerialMonitor. You use the first one if you do not have a board available, and you use the second one, if you want to connect to the hardware. Since we do not simulate using the Full Chip Simulator we only need to configure the SerialMonitor.



File	Code	Data
readme.txt	n/a	n/a
tips.txt	n/a	n/a
Sources	252	0

When you start the debugger the first time using the little green arrow shown in the figure above, it will ask you for a COM port. Here you need to enter the right number (on a regular PC typically COM1, if you are working with an USB to COM converter you need to look the number up in your system control panel.



File	Code	Data
readme.txt	n/a	n/a
tips.txt	n/a	n/a
Sources	252	0
main.c	67	0
datapage.c	185	0
Startup Code	59	6
Prm	0	0
Linker Map	0	0
Libraries	7735	2608
Debugger Project File	0	0
Full_Chip_Simulation.ini	n/a	n/a
HCS12_Serial_Monitor.ini	n/a	n/a
Debugger Cmd Files	0	0

```
HWBPD_MCUID03C6_BKPT_RI
HWBPD_MCUID03C6_HWBPM1=
HWBPD_MCUID03C6_HWBPM2=
NV_PARAMETER_FILE=
NV_SAVE_WSP=0
NV_AUTO_ID=1







[HCS12 Serial Monitor]
COMSETTINGS=SETCOMM DR:

[MONITOR_HCS12_STATE]
ERASEONLOAD=1
COMPORT=1
PROTOCOL=0
```

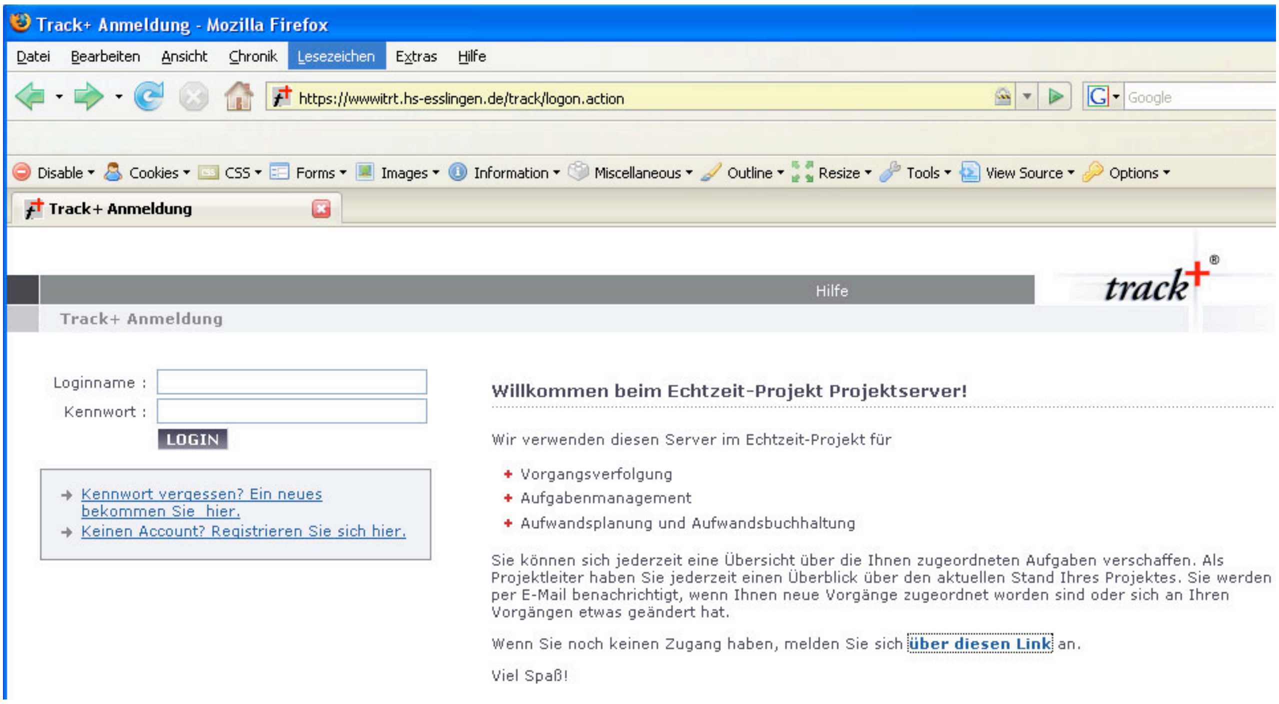
You can change the COM port any time by editing the file “HCS12-Serial-Monitor.ini, modifying the COMPORT parameter as shown above.

You must not have any source files in your IDE-Target folder. Therefore you have to create all files in the appropriate directories in either the impl\Application folder or the imp\HAL-Target folder. You must remove the main.c file from the CodeWarrior project and add the main.c you create in the impl\Application folder.

4 Track+

Getting your account

Before you can start using the Track+ system you have to register. Go to https://wwwitrt.hs-esslingen.de/track. When you enter a user name, it is best to choose the same name as on other systems.



Track+ Anmeldung

Loginname :

Kennwort :

LOGIN

→ Kennwort vergessen? Ein neues bekommen Sie hier.
→ Keinen Account? Registrieren Sie sich hier.

Willkommen beim Echtzeit-Projekt Projektserver!

Wir verwenden diesen Server im Echtzeit-Projekt für

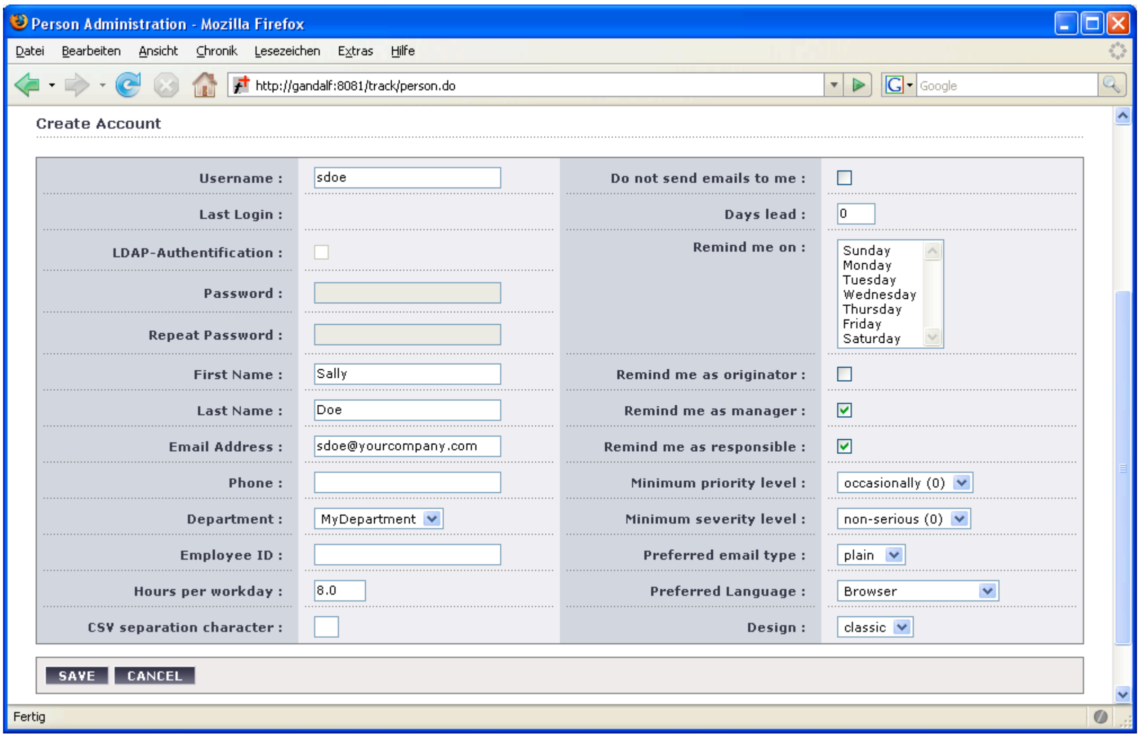
- Vorgangsverfolgung
- Aufgabenmanagement
- Aufwandsplanung und Aufwandsbuchhaltung

Sie können sich jederzeit eine Übersicht über die Ihnen zugeordneten Aufgaben verschaffen. Als Projektleiter haben Sie jederzeit einen Überblick über den aktuellen Stand Ihres Projektes. Sie werden per E-Mail benachrichtigt, wenn Ihnen neue Vorgänge zugeordnet worden sind oder sich an Ihren Vorgängen etwas geändert hat.

Wenn Sie noch keinen Zugang haben, melden Sie sich über diesen Link an.

Viel Spaß!

You have to enter first and last name, and a valid e-mail address. The initial password will be sent to this e-mail address. Also select HTML as your preferred e-mail type, and 8.0 as working hours per day. The rest is optional.



Person Administration - Mozilla Firefox
Datei Bearbeiten Ansicht Chronik Lesezeichen Extras Hilfe
Google
Fertig

http://gandalf:8081/track/person.do

Create Account

Username :	sdoe	Do not send emails to me :	□
Last Login :		Days lead :	0
LDAP-Authentification :	□	Remind me on :	Sunday Monday Tuesday Wednesday Thursday Friday Saturday
Password :			
Repeat Password :			
First Name :	Sally	Remind me as originator :	□
Last Name :	Doe	Remind me as manager :	☑
Email Address :	sdoe@yourcompany.com	Remind me as responsible :	☑
Phone :		Minimum priority level :	occasionally (0)
Department :	MyDepartment	Minimum severity level :	non-serious (0)
Employee ID :		Preferred email type :	plain
Hours per workday :	8.0	Preferred Language :	Browser
CSV separation character :		Design :	classic

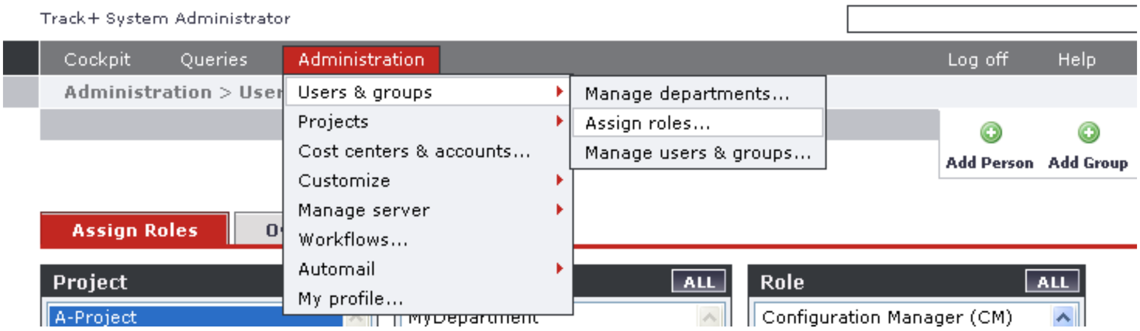
SAVE CANCEL

If you are a project administrator for your team, see the instructor to obtain project administrator privileges for your project. All others shall see their project administrator to obtain access rights in their projects, depending on the role they assume.

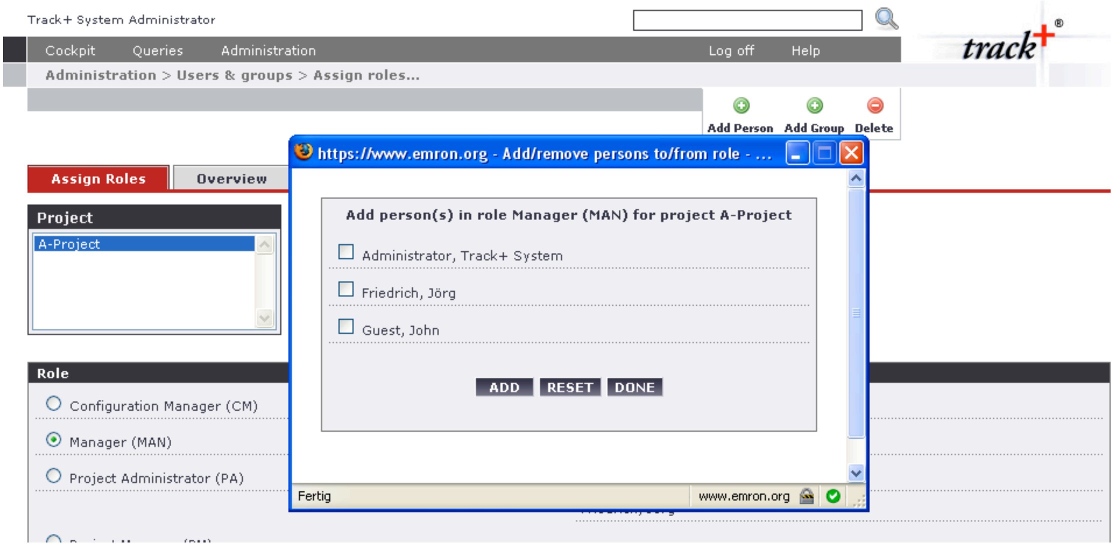
Directly after registration you should change your password. You can log in, but you do not have any rights to create issues or see any existing issues. First you must have a role assigned in your project before you can actually use the system.

Assigning Roles To Users

As a project administrator, go to menu entry Administration > Users & groups > Assign roles…



Select a role from the list, using one of the radio buttons. Click on the “Add Person” tool bar icon. A popup window appears with a list of users. Select the user(s) you want to assign this role to.


Track+ System Administrator
Cockpit
Queries
Administration
Log off
Help
track+
Administration > Users & groups > Assign roles...
Add Person
Add Group
Delete
Assign Roles
Overview
https://www.emron.org - Add/remove persons to/from role - ...
ADD
RESET
DONE
Fertig
www.emron.org

Project

A-Project

Add person(s) in role Manager (MAN) for project A-Project

- □ Administrator, Track+ System
- □ Friedrich, Jörg
- □ Guest, John

Role

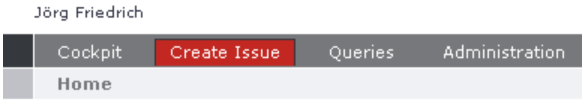
- ○ Configuration Manager (CM)
- ● Manager (MAN)
- ○ Project Administrator (PA)

Click on the Add button. If desired, add select another role and add users to it. A single user can assume any number of roles.

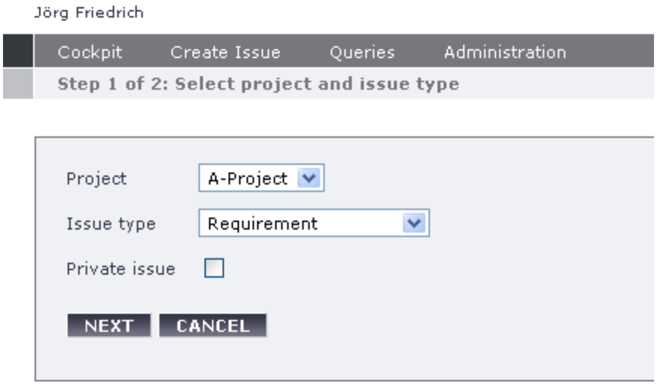
Creating Issues

Once you have been assigned proper roles, you are ready to create new issues. Creating issues is a two step process: first you have to select the project and issue type for the new issue, and then you have to fill in more details.

To create a new issue, click on the „Create Issue“ menu entry. A new screen appears with a list of projects you have access to, and a list of issue types.



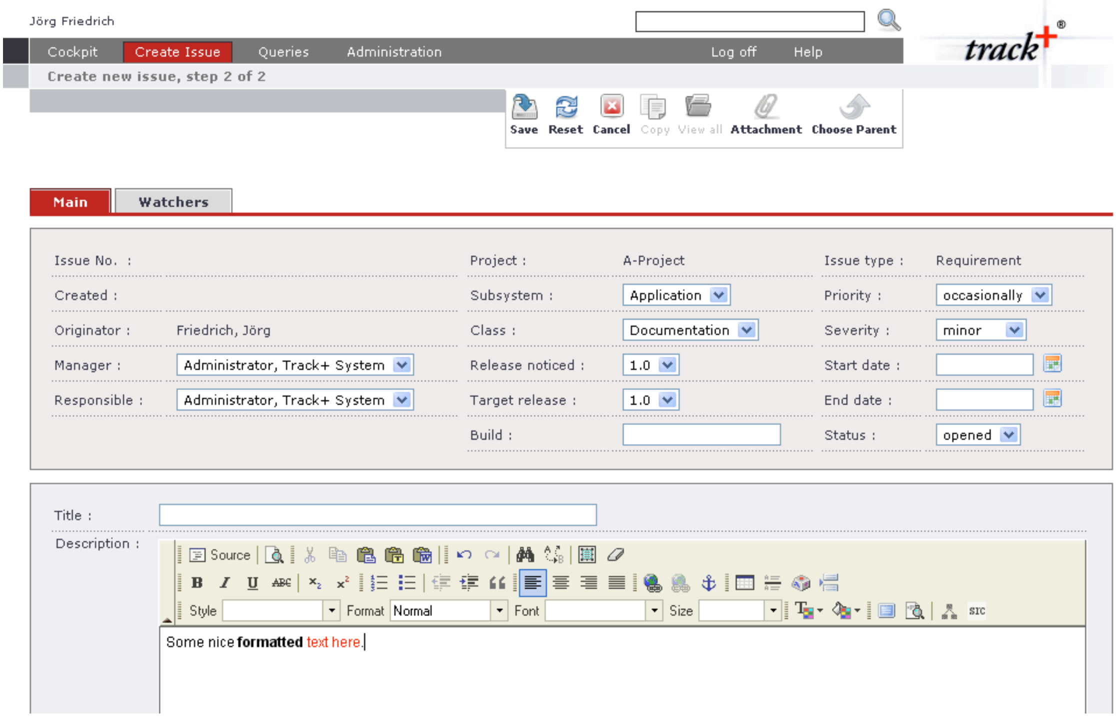
Typically you can only select one project. Choose a proper issue type. If you want to hide the issue and keep it private, select the “Private issue” check box.



Step 1 of 2: Select project and issue type

Project	A-Project
Issue type	Requirement
Private issue	□

On the next screen you can fill in a number of details. Some fields are required, like the issue title. Please note that this screen is completely configurable, even specific for each project and issue type.



Issue No. :		Project :	A-Project	Issue type :	Requirement
Created :		Subsystem :	Application	Priority :	occasionally
Originator :	Friedrich, Jörg	Class :	Documentation	Severity :	minor
Manager :	Administrator, Track+ System	Release noticed :	1.0	Start date :	
Responsible :	Administrator, Track+ System	Target release :	1.0	End date :	
		Build :		Status :	opened

Title :

Description : Some nice **formatted** text here.

Each issue must have a person who is responsible for it, and one person that manages it.

The description field permits to use a number of tags for formatting. Please consult the online help if you want to know more about these possibilities.

For each issue it is possible to keep others informed on changes to it. To this purpose each issue has two lists associated with it: a list of consulted and a list of informed.

Consulted are those people that may have to give input to resolve an issue. Informed are those people that have to require information from this issue to do their own work.

The list of consulted and informed can be modified on the tab labeled „Watchers“.

It is possible to add any number of attachments to an issue. It is also possible to create an issue hierarchy be selecting parents for an issue or to create a child for an issue.

Once you are done filling out the details, click on the „Save“ button in the toolbar.

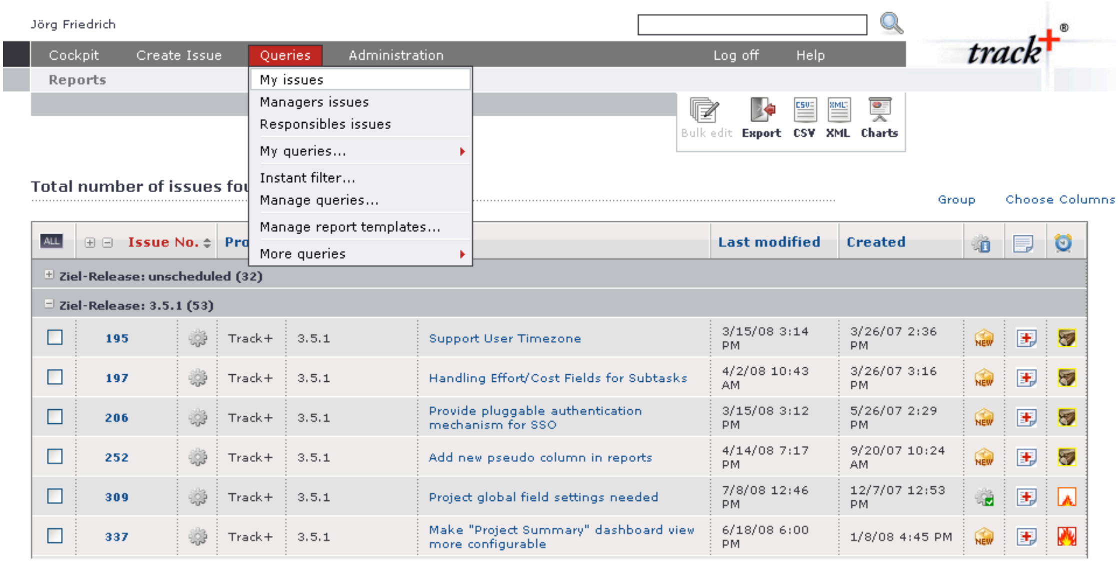
Getting an Overview

Once you or others have created a number of issues, you may want to get an overview. This overview you get by means of filters. Only issues that pass all filter criteria will be shown in the issue overview.

There are a number of predefined filters you can use, or you can create your own filters. Filters are accessed via menu „Queries“. There are three filters directly shown in the menu.

My issues shows all issues where you are either originator, responsible, or manager. Only issues that have not been closed are shown.

Responsible issues shows all issues you are currently responsible for. Managers issues shows all issues you are currently the manager of.



Total number of issues fou

ALL	Issue No.	Pro				Last modified	Created
Ziel-Release: unscheduled (32)							
Ziel-Release: 3.5.1 (53)							
□	195		Track+	3.5.1	Support User Timezone	3/15/08 3:14 PM	3/26/07 2:36 PM
□	197		Track+	3.5.1	Handling Effort/Cost Fields for Subtasks	4/2/08 10:43 AM	3/26/07 3:16 PM
□	206		Track+	3.5.1	Provide pluggable authentication mechanism for SSO	3/15/08 3:12 PM	5/26/07 2:29 PM
□	252		Track+	3.5.1	Add new pseudo column in reports	4/14/08 7:17 PM	9/20/07 10:24 AM
□	309		Track+	3.5.1	Project global field settings needed	7/8/08 12:46 PM	12/7/07 12:53 PM
□	337		Track+	3.5.1	Make "Project Summary" dashboard view more configurable	6/18/08 6:00 PM	1/8/08 4:45 PM