HCL

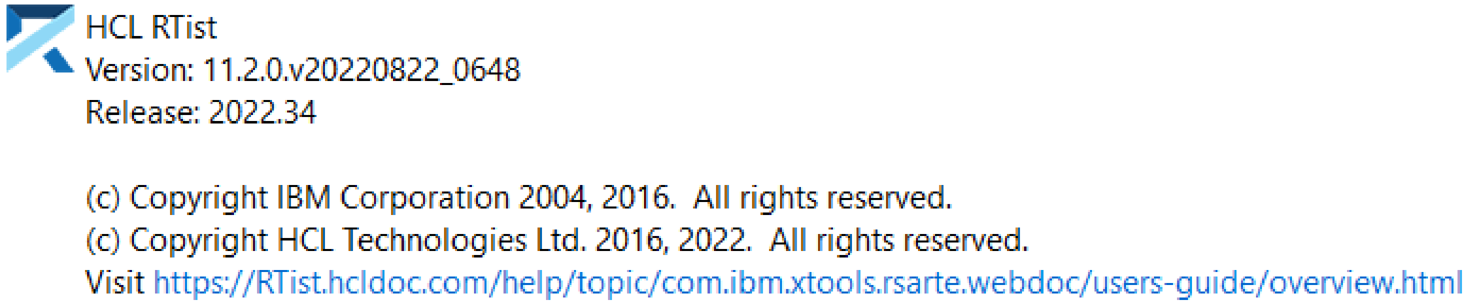
What’s New in HCL RTist 11.2

updated for release 2022.34

HCL SOFTWARE

Overview

- RTist 11.2 is based on Eclipse 2021.06 (4.20)
- HCL RTist is 100% compatible with IBM RSARTE. All features in IBM RSARTE are also present in HCL RTist. However, HCL RTist contains some features that do not exist in IBM RSARTE.
  - Those features are marked in this presentation by RTist only


HCL RTist
Version: 11.2.0.v20220822_0648
Release: 2022.34

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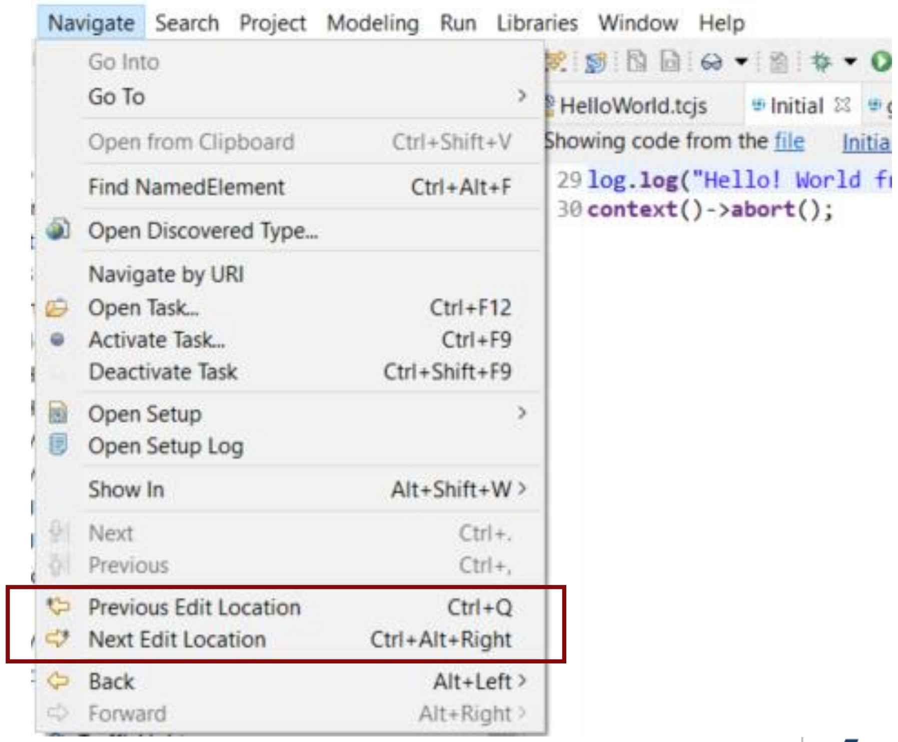
Visit https://RTist.hcldoc.com/help/topic/com.ibm.xtools.rsarte.webdoc/users-guide/overview.html

Eclipse 4.20 (2021.06)

- Compared to RTist 11.1, RTist 11.2 includes new features and bug fixes from 4 quarterly Eclipse releases:
  - 2020.09 (https://www.eclipse.org/eclipse/news/4.17/platform.php)
  - 2020.12 (https://www.eclipse.org/eclipse/news/4.18/platform.php)
  - 2021.03 (https://www.eclipse.org/eclipse/news/4.19/platform.php)
  - 2021.06 (https://www.eclipse.org/eclipse/news/4.20/platform.php)
- For full information about all improvements and changes in these Eclipse releases see the links above
  - Some highlights are listed in the next few slides...

Eclipse 4.20 (2021.06)

- The **Last Edit Location** command was improved to support a list of previous edit locations
  - Now two commands are available for moving backwards and forwards in the history of recent edit locations
  - **Previous Edit Location** (Ctrl+Alt+Left Arrow or Ctrl+Q) → moves backward in the history
  - **Next Edit Location** (Ctrl+Alt+Right Arrow) → moves forward in the history
- These commands work for all Eclipse text editors (including the Code Editor but excluding diagram editors)



```
log.log("Hello! World fr
context()->abort();
```

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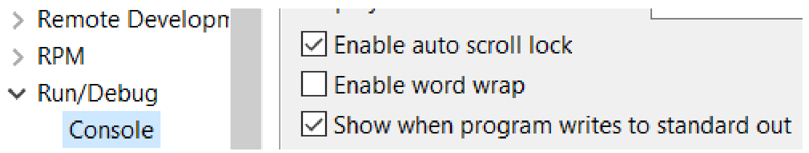
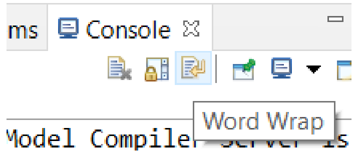
Eclipse 4.20 (2021.06)

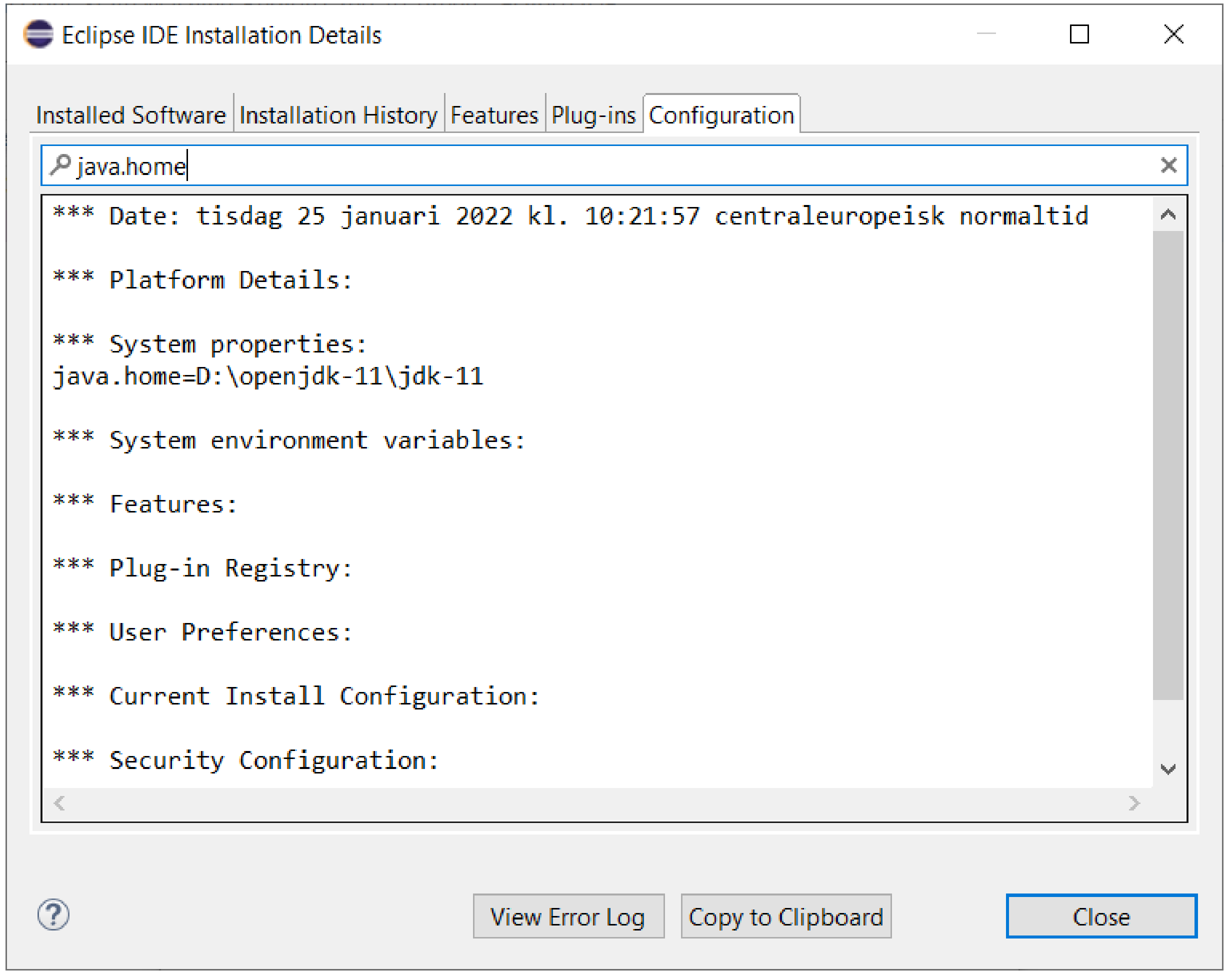
- Filter field for the Configuration view of the Installation Details dialog
  - Makes it much faster to find particular interesting information from the configuration information (e.g. which RTist installation or JVM is being used)

- Word wrap in Console view is now saved between Eclipse sessions
  - A new preference **Run/Debug – Console – Enable word wrap** remembers this setting



☑ Enable auto scroll lock
☐ Enable word wrap
☑ Show when program writes to standard out



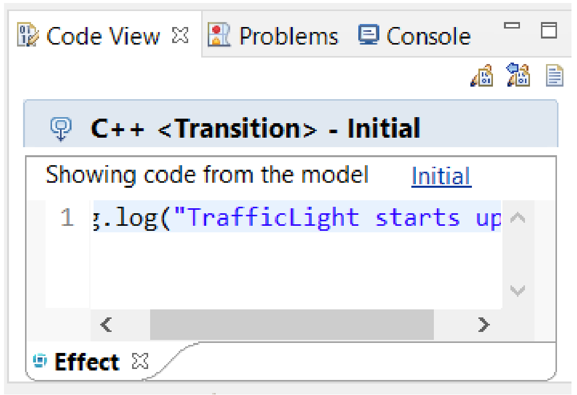


java.home

```
*** Date: tisdag 25 januari 2022 kl. 10:21:57 centraleuropeisk normaltid

*** Platform Details:

*** System properties:
java.home=D:\openjdk-11\jdk-11

*** System environment variables:

*** Features:

*** Plug-in Registry:

*** User Preferences:

*** Current Install Configuration:

*** Security Configuration:
```

Eclipse 4.20 (2021.06)

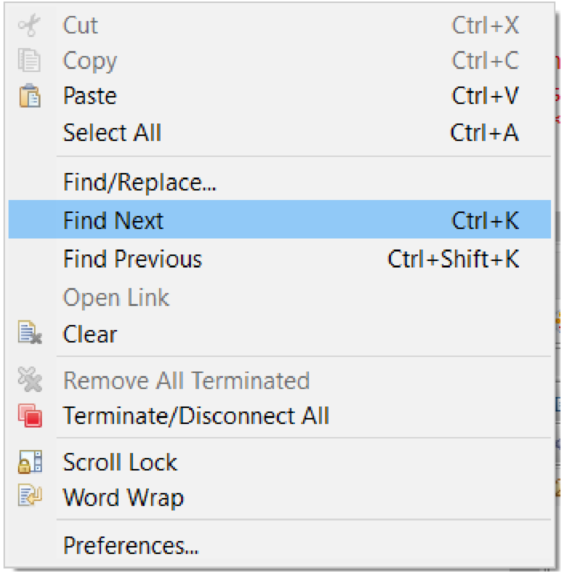
- Horizontal scrolling with Shift + mouse wheel
  - More convenient way of scrolling horizontally if you use a mouse with a scroll wheel
  - Works in all editors (both text editors and diagram editors) and also in views (e.g. the Code view)

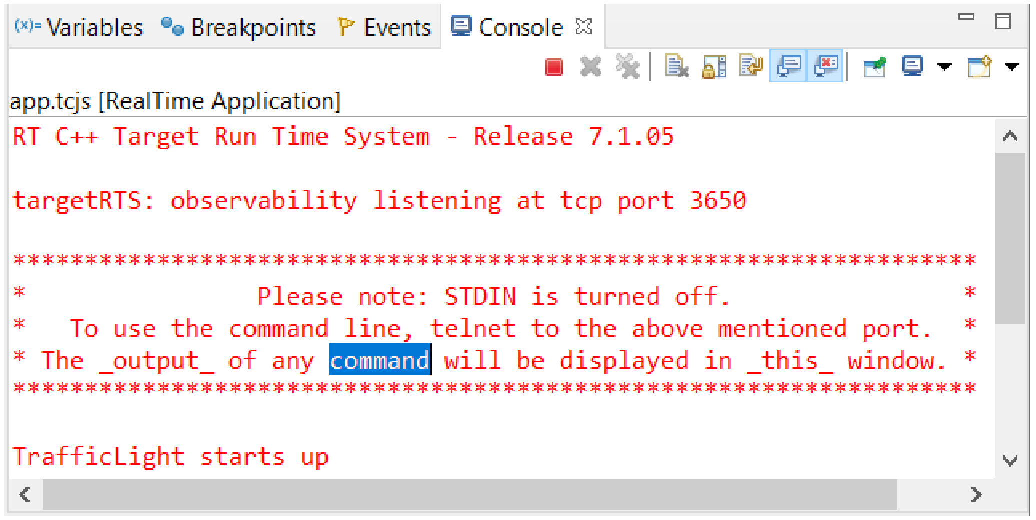


Code View
Problems
Console
C++ <Transition> - Initial
Showing code from the model Initial
Effect

```
1 ɜ.log("TrafficLight starts up
```

- Easier to repeat a search in the Console view
  - Incremental search (Ctrl+J) does not work in the Console view
  - But now you can instead use new context menu commands **Find Next** and **Find Previous** for repeating a search that was previously done with Ctrl + F.





```
app.tcjs [RealTime Application]
RT C++ Target Run Time System - Release 7.1.05

targetRTS: observability listening at tcp port 3650

*******************************************************************
*             Please note: STDIN is turned off.                   *
*   To use the command line, telnet to the above mentioned port.  *
* The _output_ of any command will be displayed in _this_ window. *
*******************************************************************

TrafficLight starts up
```

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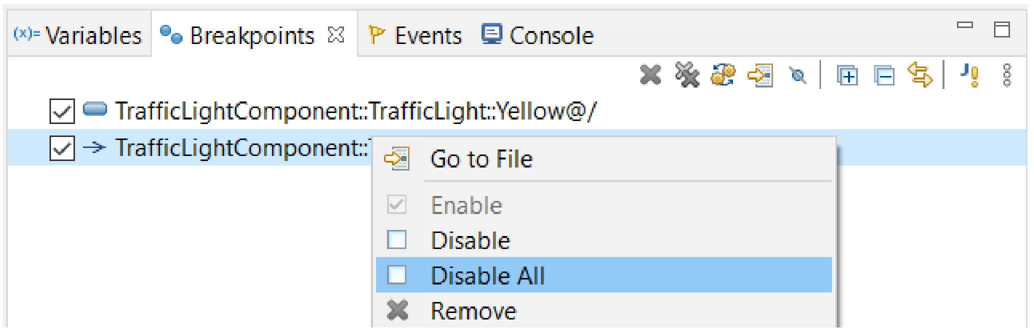
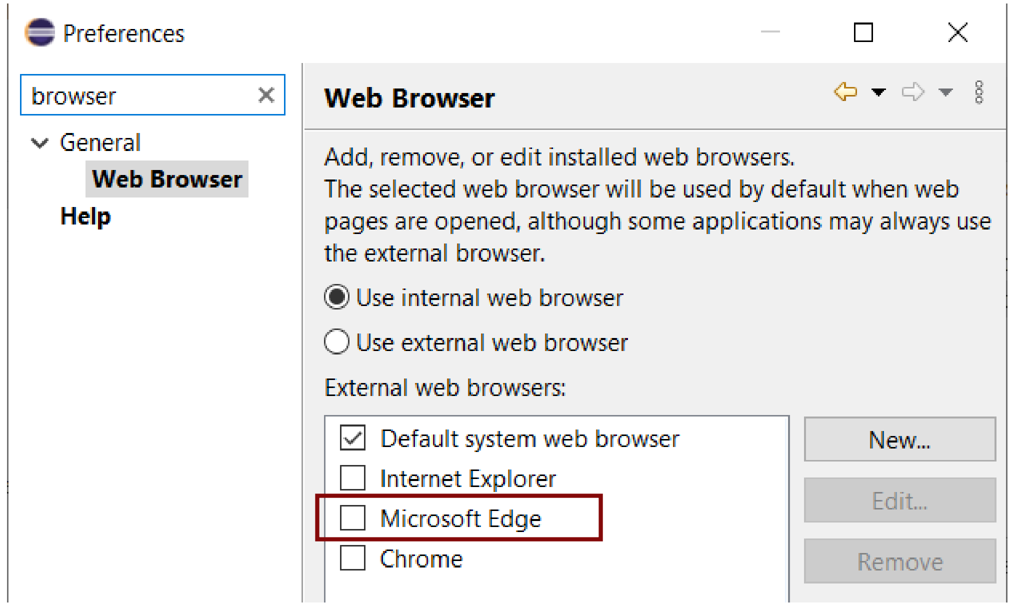
Eclipse 4.20 (2021.06)

- Disable all breakpoints
  - A new context menu command in the Breakpoints view makes this easier
- Microsoft Edge is now supported as an external web browser
- The Quick Search dialog now shows the number of matching items
  - A new preference **General – Quick Search – Max Results** allow to stop the search when a certain number of matches have been found



☑ TrafficLightComponent::TrafficLight::Yellow@/
☑ TrafficLightComponent::



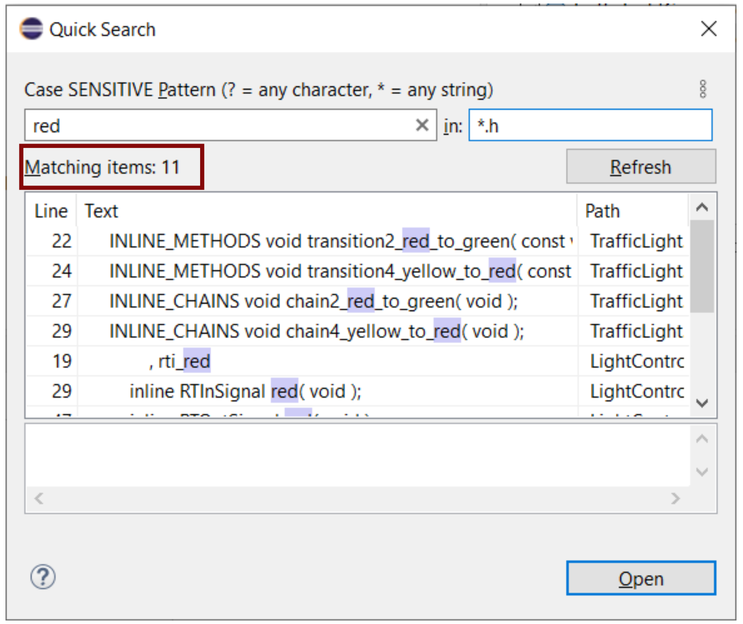
Web Browser

Add, remove, or edit installed web browsers.
The selected web browser will be used by default when web pages are opened, although some applications may always use the external browser.

● Use internal web browser
○ Use external web browser

External web browsers:

☑ Default system web browser
☐ Internet Explorer
☐ Microsoft Edge
☐ Chrome



Case SENSITIVE Pattern (? = any character, * = any string)

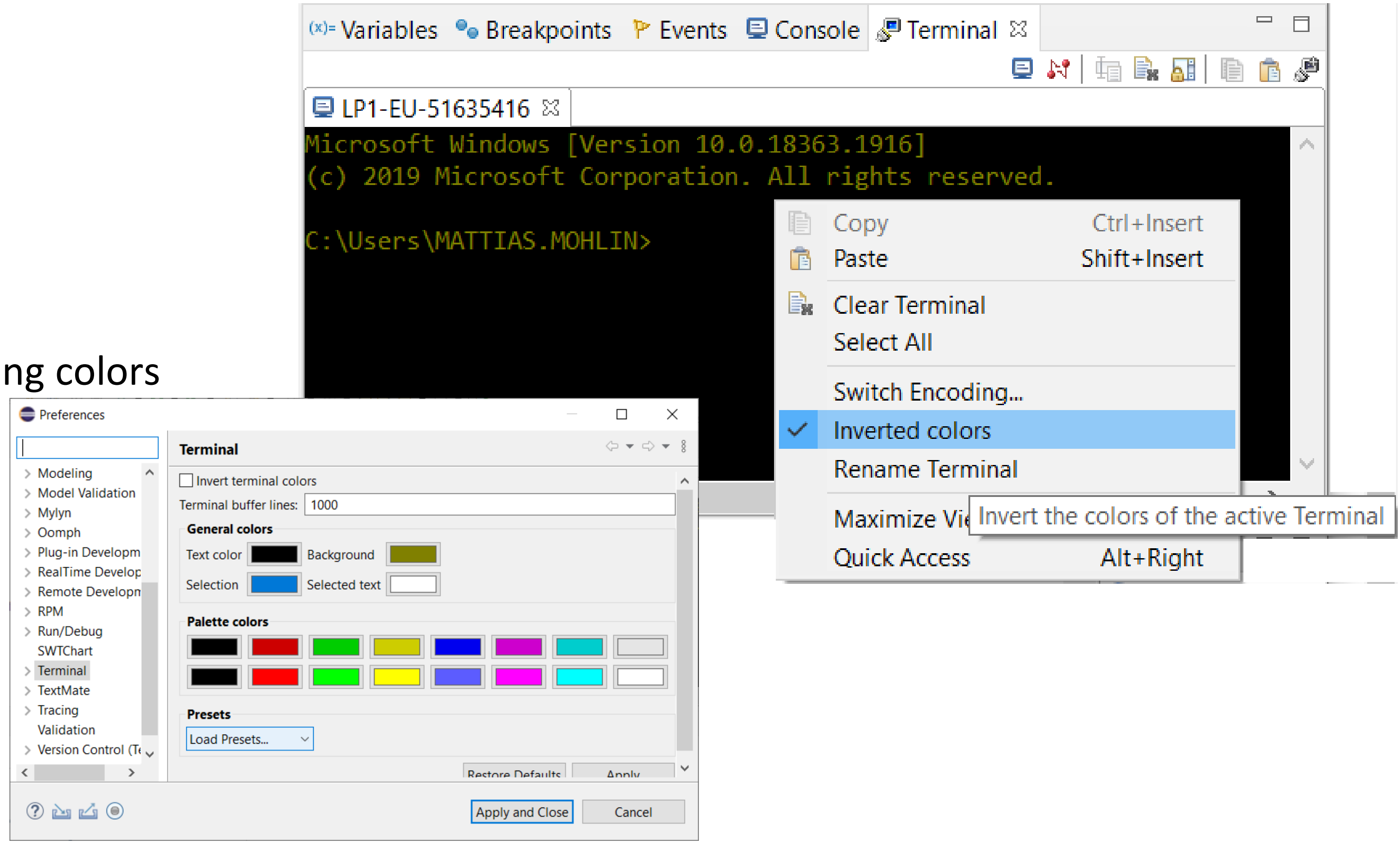
red in: *.h

Matching items: 11

Line	Text	Path
22	INLINE_METHODS void transition2_red_to_green(const	TrafficLight
24	INLINE_METHODS void transition4_yellow_to_red(const	TrafficLight
27	INLINE_CHAINS void chain2_red_to_green(void);	TrafficLight
29	INLINE_CHAINS void chain4_yellow_to_red(void);	TrafficLight
19	, rti_red	LightContrc
29	inline RTInSignal red(void);	LightContrc

CDT 10.3 (included as part of Eclipse 2021.06)

- Various parser and preprocessor improvements for new C++ constructs
  - Template deduction guides (C++ 17)
  - __has_include (C++ 17)
- More configurable Terminal view
  - New context menu command for inverting colors
  - New preferences for configuring the colors used by the Terminal view
  - Changing the colors helps for example when connecting to certain remote systems that make assumptions about what colors are used
  - New context menu command for renaming the terminal (useful if you have many open at the same time)



```
Microsoft Windows [Version 10.0.18363.1916]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\MATTIAS.MOHLIN>
```

Terminal

- [ ] Invert terminal colors

Terminal buffer lines: 1000

General colors

Text color ■ Background 🟨 Selection 🟦 Selected text □

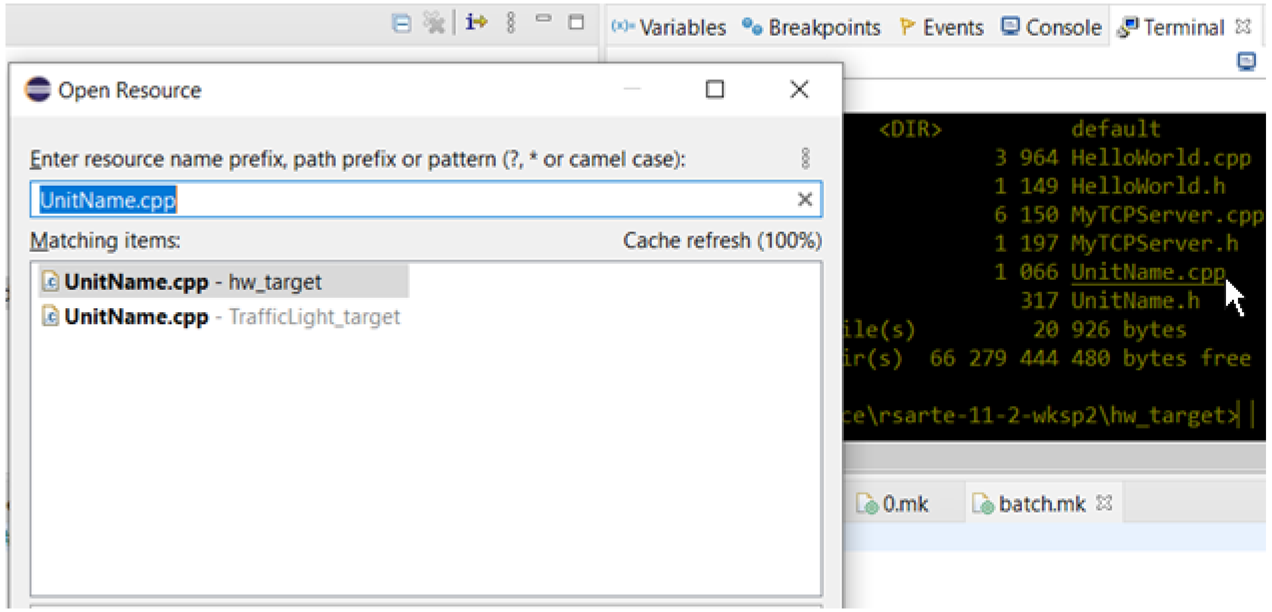
Palette colors

Presets

Load Presets...

CDT 10.3 (included as part of Eclipse 2021.06)

- Open files and links from the Terminal view
  - Ctrl+click on files shown in the Terminal view now opens the file in the workspace (sometimes via the Open Resource dialog to resolve ambiguities)
  - Ctrl+click on hyperlinks to open them in a web browser



Enter resource name prefix, path prefix or pattern (?, * or camel case):

UnitName.cpp

UnitName.cpp - hw_target
UnitName.cpp - TrafficLight_target

```
<DIR>          default
      3 964 HelloWorld.cpp
      1 149 HelloWorld.h
      6 150 MyTCPServer.cpp
      1 197 MyTCPServer.h
      1 066 UnitName.cpp
        317 UnitName.h
ile(s)       20 926 bytes
ir(s)  66 279 444 480 bytes free

ce\rsarte-11-2-wksp2\hw_target>
```

- For more information about CDT improvements see
  https://wiki.eclipse.org/CDT/User/NewIn100
  https://wiki.eclipse.org/CDT/User/NewIn101
  https://wiki.eclipse.org/CDT/User/NewIn102
  https://wiki.eclipse.org/CDT/User/NewIn103

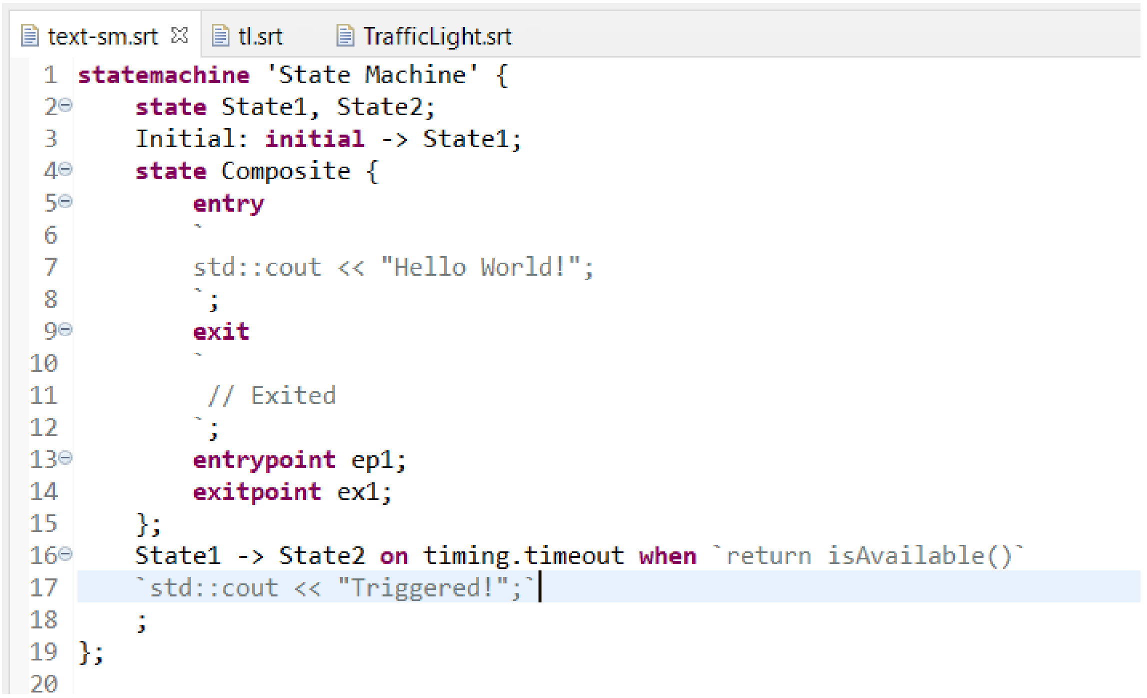
Newer EGit Version in the EGit Integration

- The EGit integration in RTist has upgraded EGit from 5.8 to 5.12
  - This is the recommended and latest version for Eclipse 2021.06
- This upgrade provides several new features and bug fixes
  - For detailed information about the changes see
    https://wiki.eclipse.org/EGit/New_and_Noteworthy/5.9
    https://wiki.eclipse.org/EGit/New_and_Noteworthy/5.10
    https://wiki.eclipse.org/EGit/New_and_Noteworthy/5.11
    https://wiki.eclipse.org/EGit/New_and_Noteworthy/5.12

Textual State Machines (1/4)

RTist only

- RTist now supports to define capsule state machines using a textual language
  - The language includes all necessary state machine constructs, including a way to embed C++ code snippets
- This can sometimes be an attractive alternative to using graphical diagrams
  - Certain tasks are faster to perform using a textual language, for example copy/paste, refactoring etc.
  - It can be useful to have all C++ code snippets shown and edited in a single text editor (e.g. makes searching in those code snippets easier)
  - Possible to define textual templates for commonly used state machine constructs
  - Easier to merge changes in textually defined state machines



```
statemachine 'State Machine' {
    state State1, State2;
    Initial: initial -> State1;
    state Composite {
        entry
        `
        std::cout << "Hello World!";
        `;
        exit
        `
         // Exited
        `;
        entrypoint ep1;
        exitpoint ex1;
    };
    State1 -> State2 on timing.timeout when `return isAvailable()`
    `std::cout << "Triggered!";`
    ;
};

```

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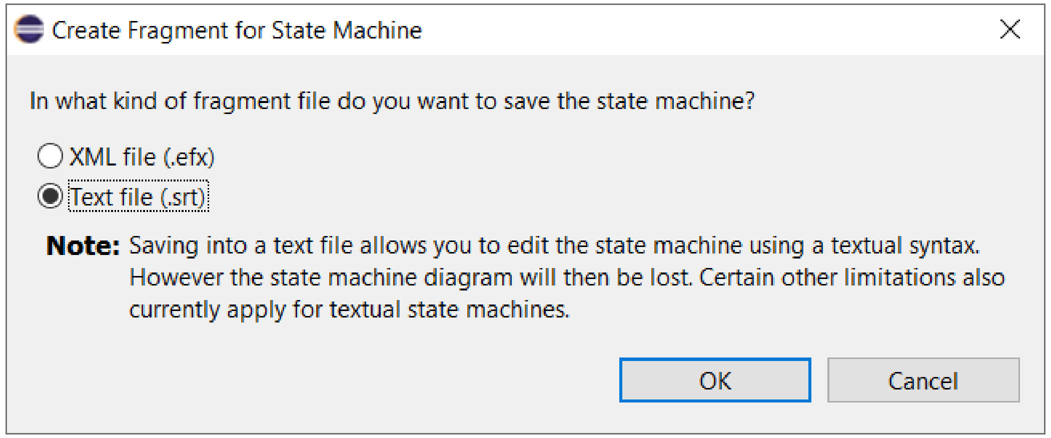
Textual State Machines (2/4)

RTist only

- Existing (graphical) state machines can be converted to a textual representation
  - Create a fragment for the state machine and store it in an .srt text file
  - Note that existing state chart diagrams for the state machine will be lost (but can later be created from the textual representation for visualization purposes)



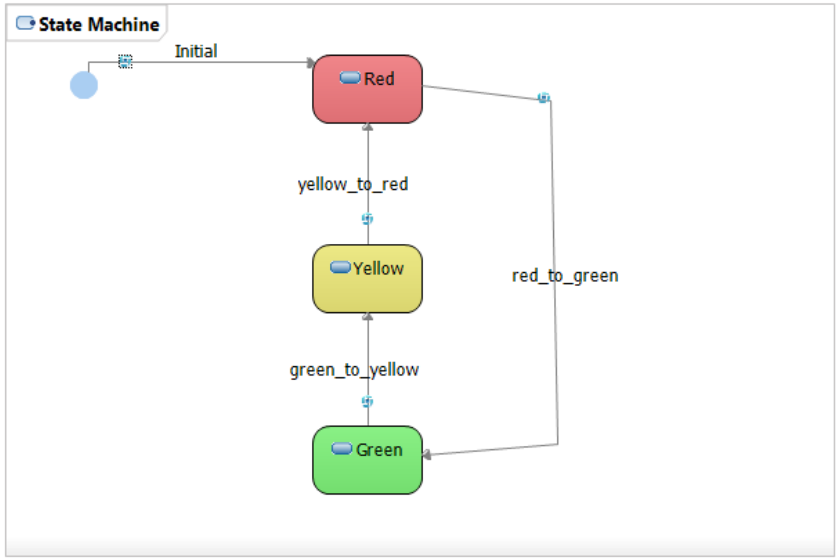
Create Fragment for State Machine

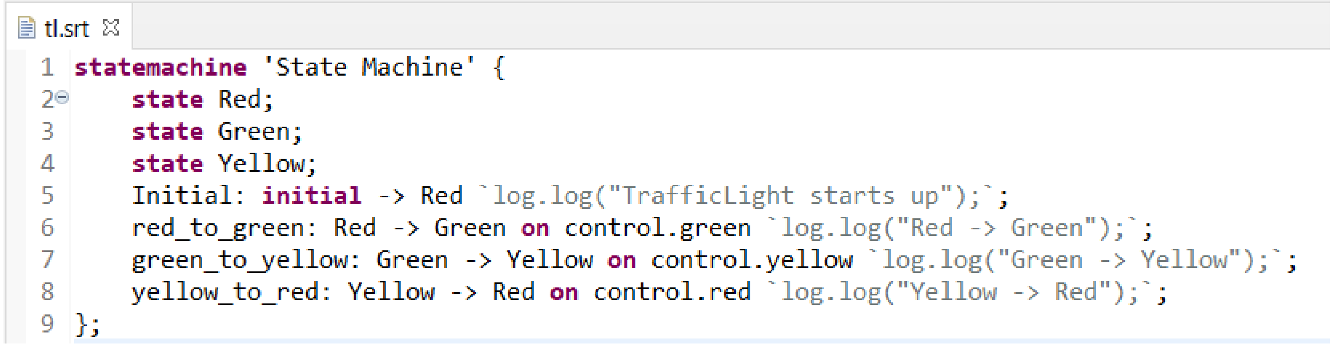
In what kind of fragment file do you want to save the state machine?

- [ ] XML file (.efx)
- [✓] Text file (.srt)

Note: Saving into a text file allows you to edit the state machine using a textual syntax. However the state machine diagram will then be lost. Certain other limitations also currently apply for textual state machines.

OK | Cancel





tl.srt

```
statemachine 'State Machine' {
    state Red;
    state Green;
    state Yellow;
    Initial: initial -> Red `log.log("TrafficLight starts up");`;
    red_to_green: Red -> Green on control.green `log.log("Red -> Green");`;
    green_to_yellow: Green -> Yellow on control.yellow `log.log("Green -> Yellow");`;
    yellow_to_red: Yellow -> Red on control.red `log.log("Yellow -> Red");`;
};
```

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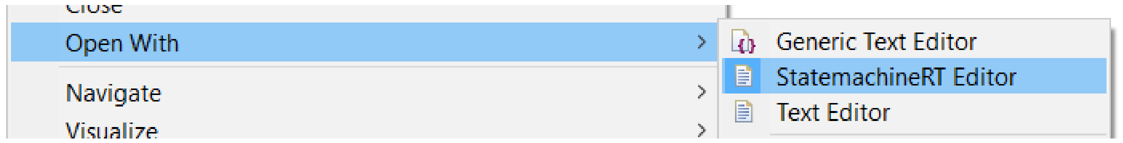
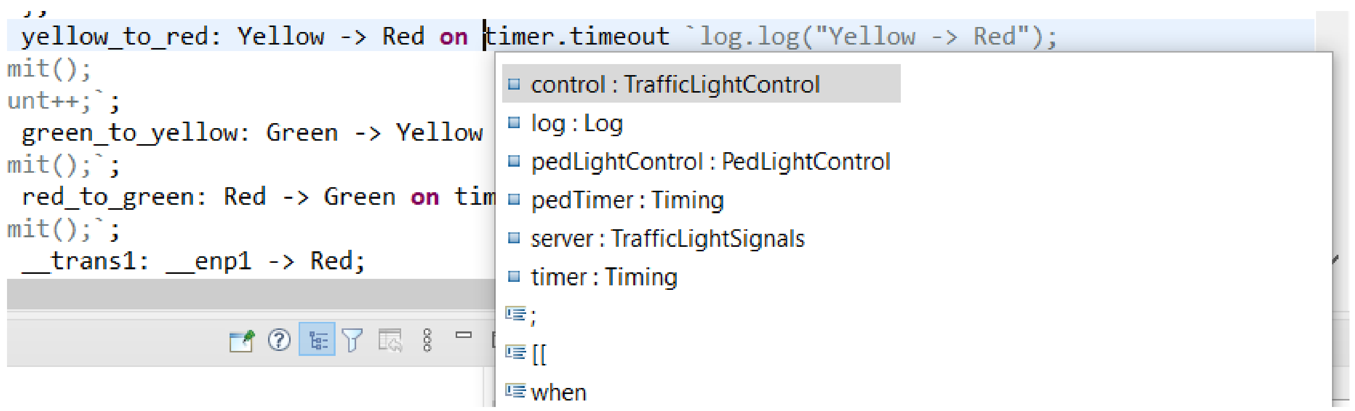
Textual State Machines (3/4)

RTist only

- Textual state machines can be edited in any text editor, but are best edited in the "StatemachineRT" text editor provided in RTist (associated in Eclipse with the .srt file extension)



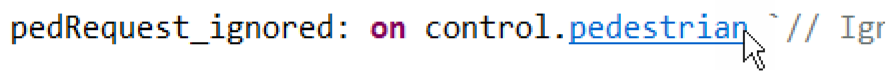
  - Ctrl + space content assist (provides both code templates for creating new elements, and automatic completion of names)



```
yellow_to_red: Yellow -> Red on timer.timeout `log.log("Yellow -> Red");
mit();
unt++;`;
 green_to_yellow: Green -> Yellow
mit();`;
 red_to_green: Red -> Green on tim
mit();`;
 __trans1: __enp1 -> Red;
```

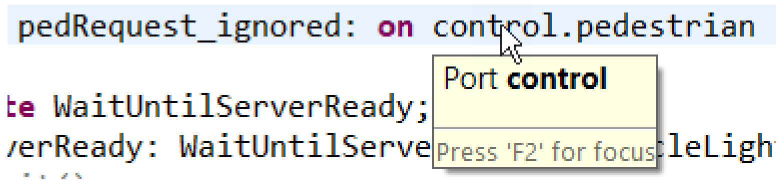
control : TrafficLightControl
log : Log
pedLightControl : PedLightControl
pedTimer : Timing
server : TrafficLightSignals
timer : Timing
;
[[
when

  - Ctrl + click for navigating from a name reference to the corresponding definition (in the Project Explorer, or an in the same or a different .srt file)



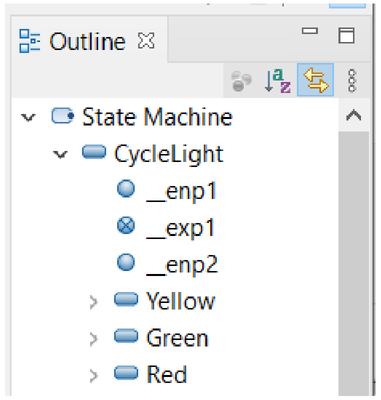
```
pedRequest_ignored: on control.pedestrian `// Igr
```

  - Tooltips when hovering over names

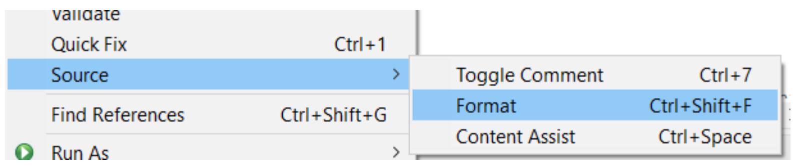


```
pedRequest_ignored: on control.pedestrian
te WaitUntilServerReady;
/erReady: WaitUntilServe         leLigh
```

  - Syntax coloring and folding
  - Semantic validations assist creating correct state machines
  - Outline view for overview and navigation



  - Formatting and other useful commands are available in the context menu



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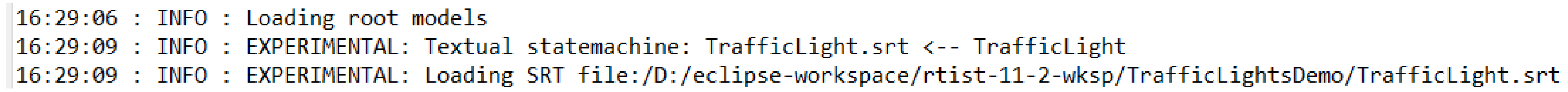
Textual State Machines (4/4)

RTist only

- The textual state machine is automatically updated if the underlying model changes (for example using the Project Explorer, Properties view or a state chart diagram)

- The model compiler supports textual state machines in the same way as graphical ones
  - Generated code is identical, and the only difference is some additional printouts in the build log



```
16:29:06 : INFO : Loading root models
16:29:09 : INFO : EXPERIMENTAL: Textual statemachine: TrafficLight.srt <-- TrafficLight
16:29:09 : INFO : EXPERIMENTAL: Loading SRT file:/D:/eclipse-workspace/rtist-11-2-wksp/TrafficLightsDemo/TrafficLight.srt
```

- Note that the support for textual state machines is currently an experimental feature and certain limitations exist
  - Code-to-model synchronization is not available
  - RTist search commands do not index .srt files (but regular file-based search in Eclipse works, as well as search within an .srt file)
  - Not integrated with the RTist Compare/Merge editor (but regular Eclipse compare/merge works)
  - There are known issues with using both a graphical diagram and the text editor for editing a textual state machine
  - Support for textual state machines affects the keybinding to open the Code Editor (Ctrl+Shift+F3)
  - Passive class state machines are not supported. Only capsule state machines can be textually defined.

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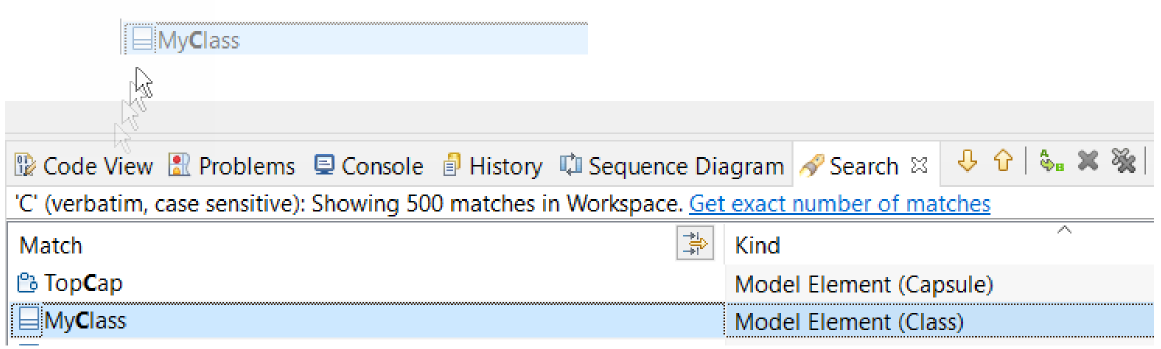
Drag/drop Support from More Views

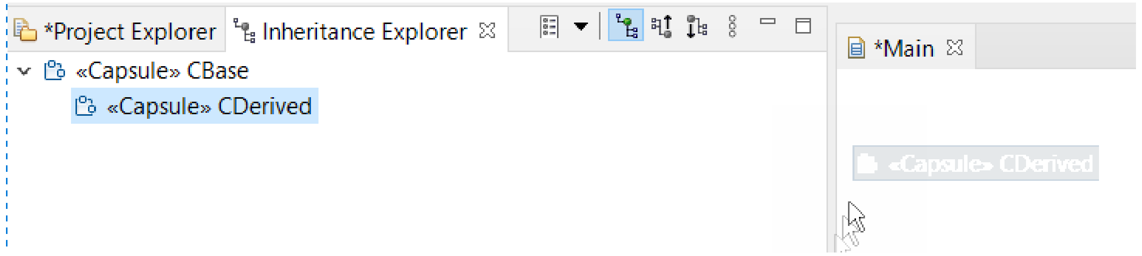
- Now it's possible to drag/drop elements from other views than the Project Explorer to diagrams
  - Search view
  - Inheritance Explorer



'C' (verbatim, case sensitive): Showing 500 matches in Workspace. Get exact number of matches

Match	Kind
TopCap	Model Element (Capsule)
MyClass	Model Element (Class)

- Previously this was a two-step process: first navigate from the Search view / Inheritance Explorer to the Project Explorer and then perform the drag/drop
  - Now the navigation step is avoided



- Known limitation: Dragging a capsule to a composite structure diagram in order to create a part for it doesn't work
  - In this particular case, it's still necessary to drag from the Project Explorer

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Copy/Paste of Element Names

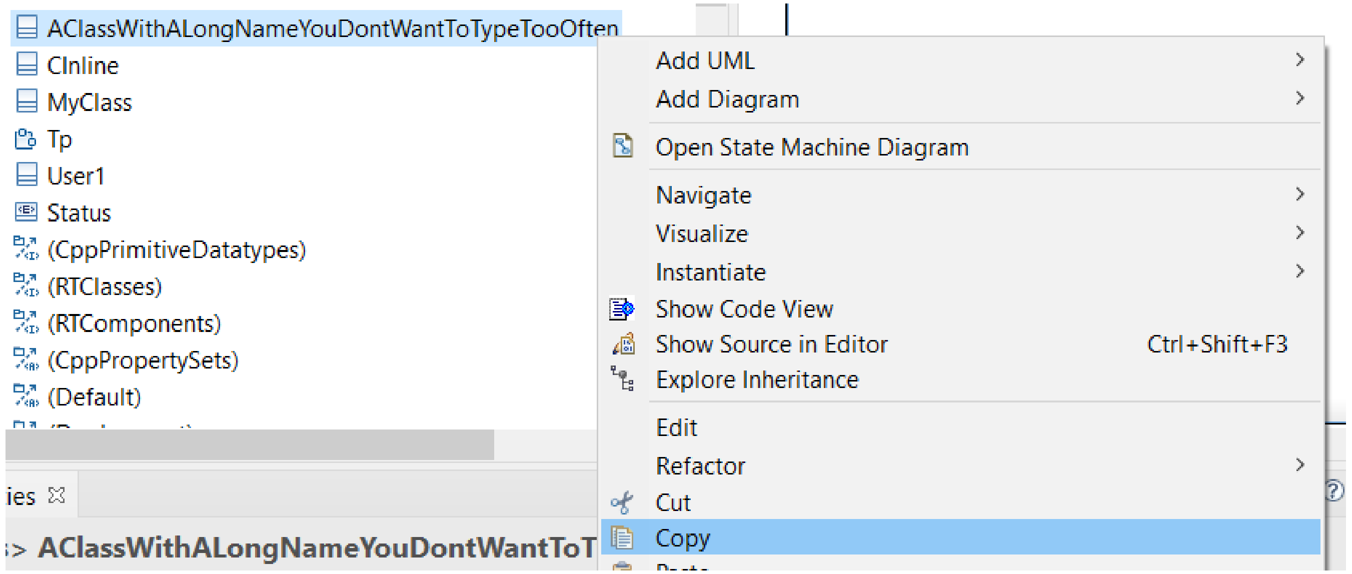
- All elements with a name (model elements, diagrams) can now have their names copied from the Project Explorer

- Select the element in the Project Explorer and perform the Copy command (Ctrl + C)

- The name is placed in the clipboard and can be pasted in any text editor (e.g. the Code view or Code editor)

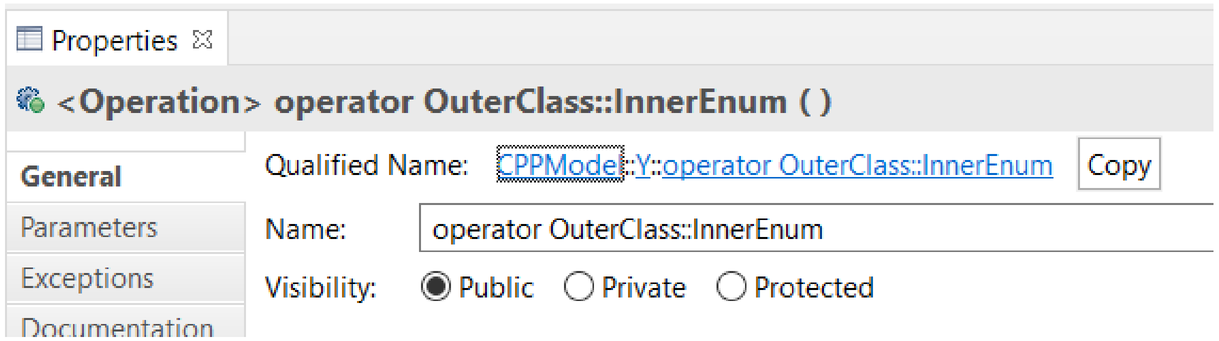
- Avoids the need to type long names in code snippets

- Note that this was already before supported for Eclipse projects, and several other elements shown in the Project Explorer



Better Handling of C++ Names and Types

- It’s now possible to use names that contain ::
  - For example necessary when defining a conversion operator function for a nested type



Properties

<Operation> operator OuterClass::InnerEnum ( )

General | Parameters | Exceptions | Documentation

Qualified Name: CPPModel::Y::operator OuterClass::InnerEnum Copy

Name: operator OuterClass::InnerEnum

Visibility: [✓ Public] Private Protected

- Parsing of C++ types were improved
  - Commas are now supported – needed for instantiations of templates with multiple template parameters
  - Nested template instantiations are now also supported

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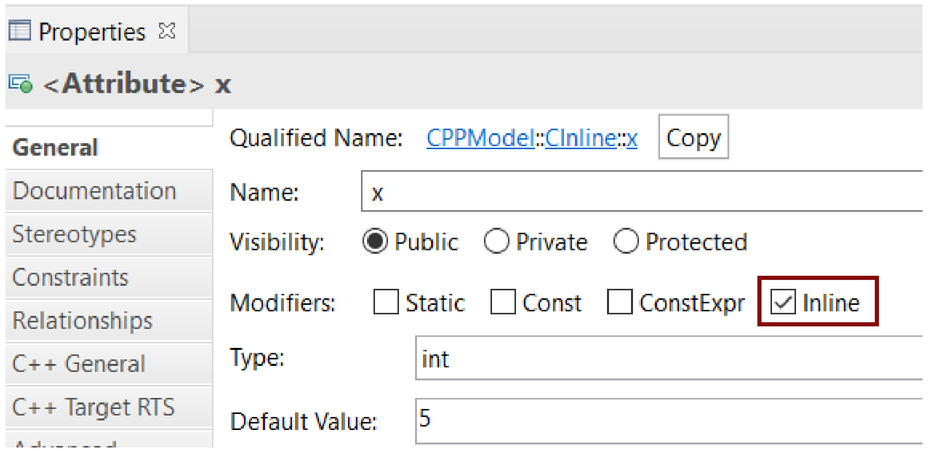
Support for inline variables

- A static member variable or global variable that is defined in the header file needs to be declared as **inline**; otherwise the header file cannot be included from multiple compilation units without getting a linker error

- A new checkbox was added for declaring an attribute as inline

- Note that inline variables requires C++ 17 or later
  - The model compiler will detect if you attempt to use this feature with a too old language standard



Qualified Name: CPPModel::CInline::x

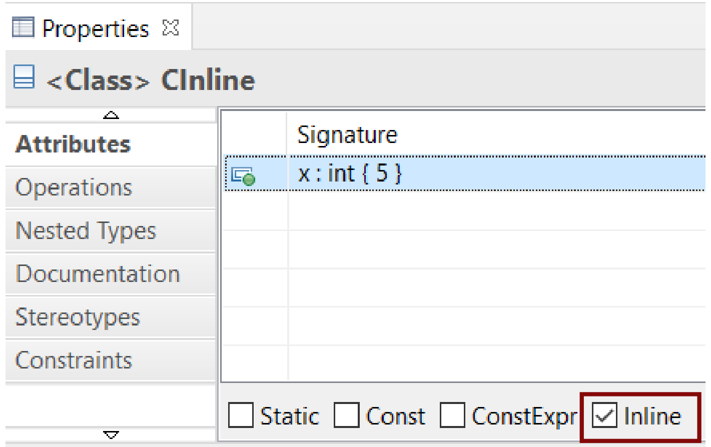
Name: x

Visibility: [✓ Public] Private Protected

Modifiers: Static Const ConstExpr [✓ Inline]

Type: int

Default Value: 5



Signature
x : int { 5 }

Static Const ConstExpr [✓ Inline]

```
10:43:17 : WARNING : CPPModel::CInline::x : Inline variables require C++ 17 or later
```

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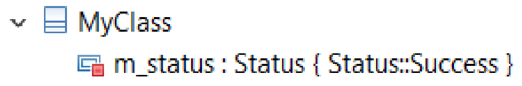
Attribute Initialization in Copy Constructor

- The generated copy constructor now takes the property **Initializer Kind** of an attribute into account to decide how to initialize the attribute

- Brace initialization

Initializer Kind: brace

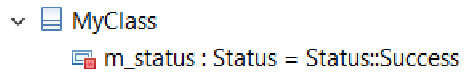


MyClass
m_status : Status { Status::Success }

```
MyClass::MyClass( const MyClass & rtg_arg )
      : m_status{ rtg_arg.m_status }
{
}
```

- Equal / assignment initialization

Initializer Kind: equal
Initializer Kind: assignment

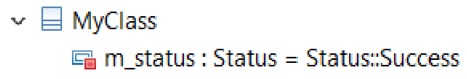


MyClass
m_status : Status = Status::Success

```
MyClass::MyClass( const MyClass & rtg_arg )
{
    m_status = rtg_arg.m_status;
}
```

- Constructor initialization

Initializer Kind: constructor



MyClass
m_status : Status = Status::Success

```
MyClass::MyClass( const MyClass & rtg_arg )
      : m_status( rtg_arg.m_status )
{
}
```

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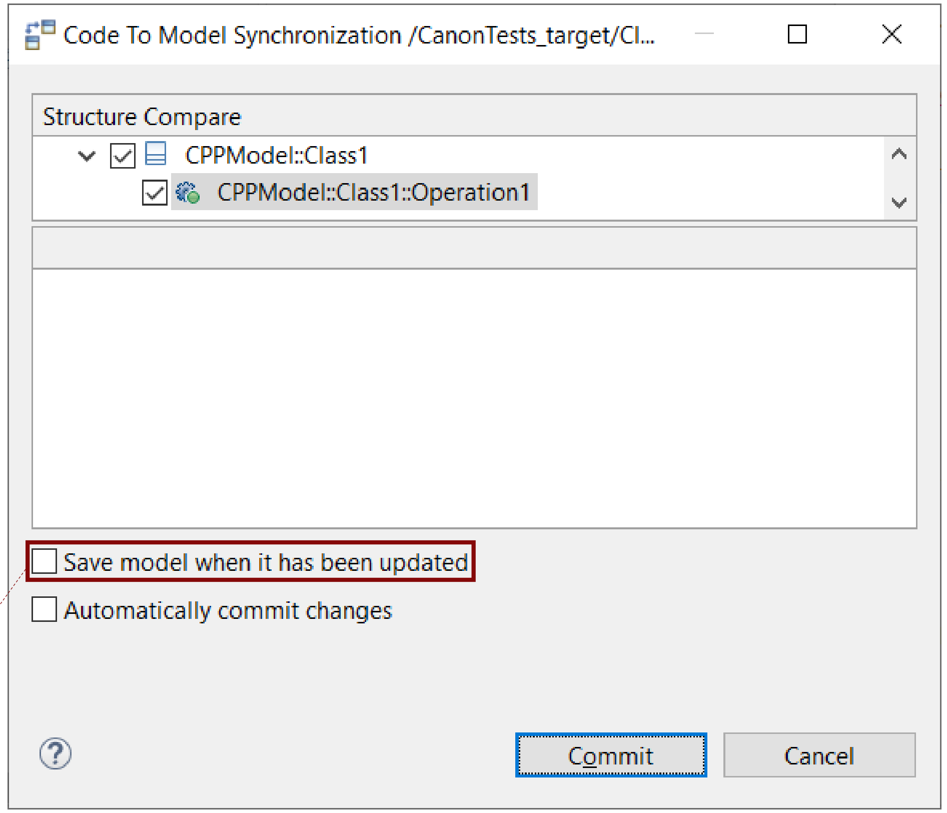
Code to Model Synchronization

- A new preference can be set for automatically saving the model after running code-to-model synchronization
  - **RealTime Development – Code To Model Synchronization – Save model when it has been updated**
- Previously this had to be set in the dialog, and was not remembered after restarting RTist
- The dialog checkbox still is present and can now be used as a shortcut for changing the preference

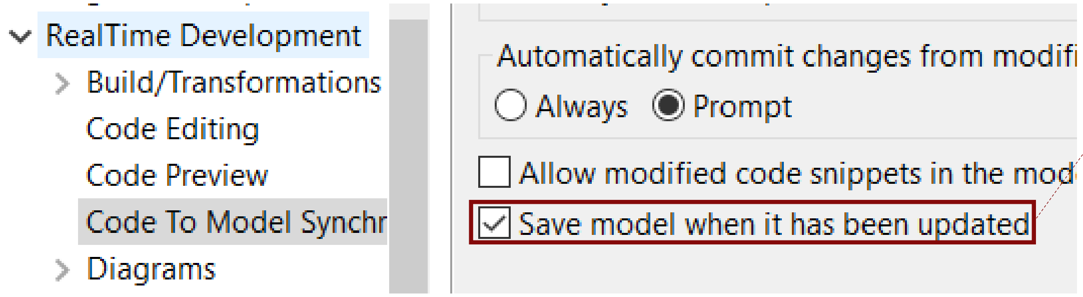

Code To Model Synchronization /CanonTests_target/Cl...

Structure Compare

- [✓] CPPModel::Class1
  - [✓] CPPModel::Class1::Operation1

[ ] Save model when it has been updated

[ ] Automatically commit changes



Automatically commit changes from modifi

Always [✓ Prompt]

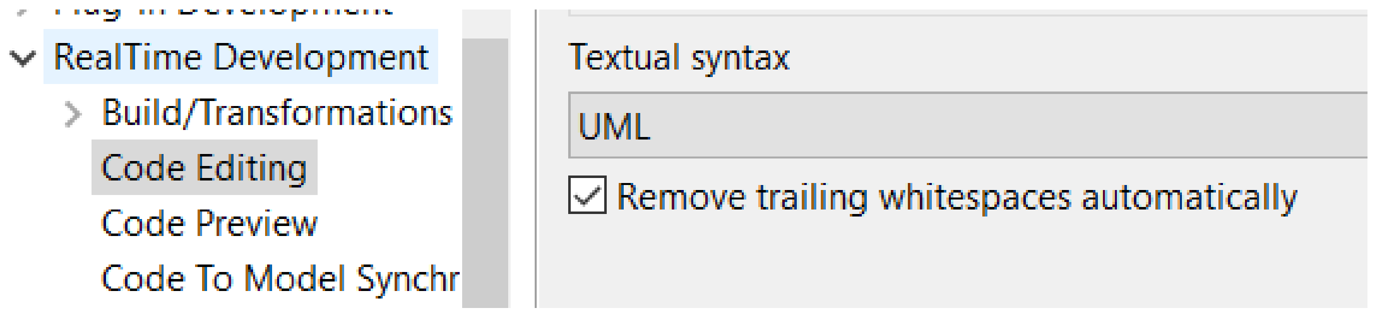
[ ] Allow modified code snippets in the mod

[✓] Save model when it has been updated

Automatic Removal of Trailing Whitespace from Code

- Eclipse CDT provides this feature for C++ files
  - Preference **C/C++ - Editor – Save Actions – Remove trailing whitespace**

- A similar preference was added to support the same for code snippets
  - Preference **RealTime Development – Code Editing – Remove trailing whitespaces automatically**
  - For the Code editor, white spaces are removed when you save it.
    For the Code view, white spaces are removed when the changed code snippet is committed to the model.



Textual syntax

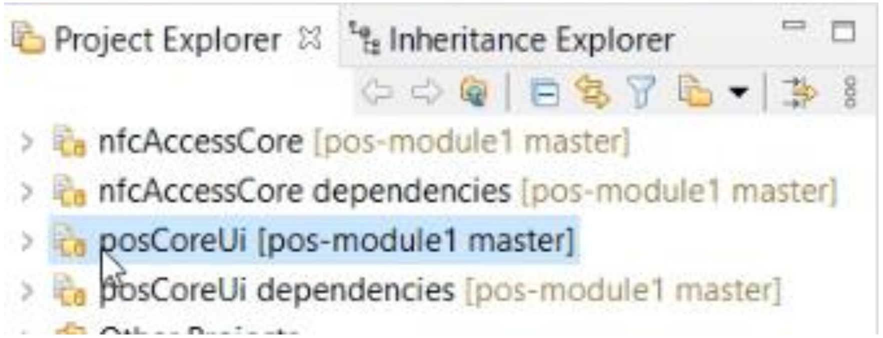
UML

☑ Remove trailing whitespaces automatically

HCL SOFTWARE

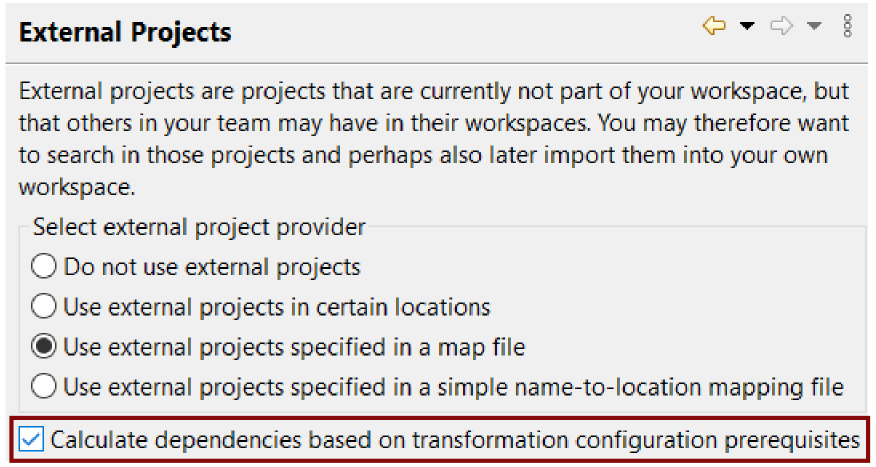
External Project Importer

- Now two working sets will be automatically created; one for the projects being imported and another for their dependent projects



nfcAccessCore [pos-module1 master]
nfcAccessCore dependencies [pos-module1 master]
posCoreUi [pos-module1 master]
posCoreUi dependencies [pos-module1 master]

- A new preference was added for automatically calculating project dependencies by analyzing TC prerequisites
  - Avoids the need to manually maintain the information about dependent projects in the map file
  - Makes it possible to search in prerequisites of external projects



External Projects

External projects are projects that are currently not part of your workspace, but that others in your team may have in their workspaces. You may therefore want to search in those projects and perhaps also later import them into your own workspace.

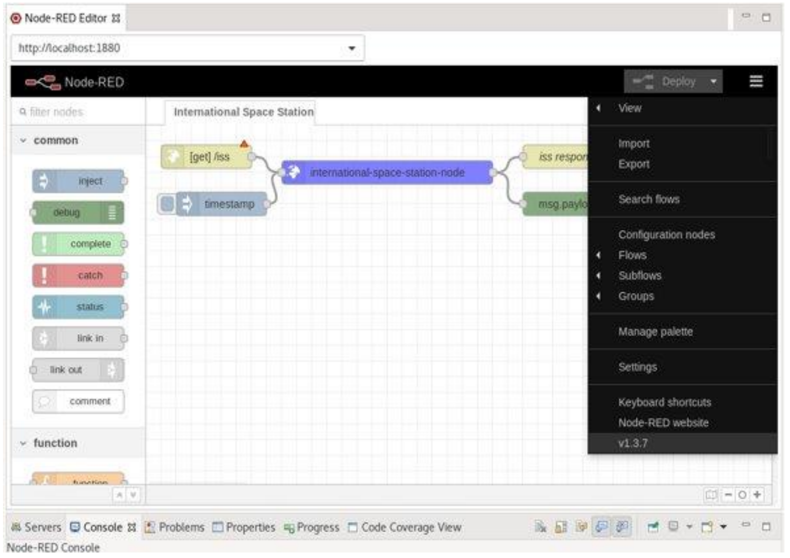
Select external project provider
- ○ Do not use external projects
- ○ Use external projects in certain locations
- ● Use external projects specified in a map file
- ○ Use external projects specified in a simple name-to-location mapping file

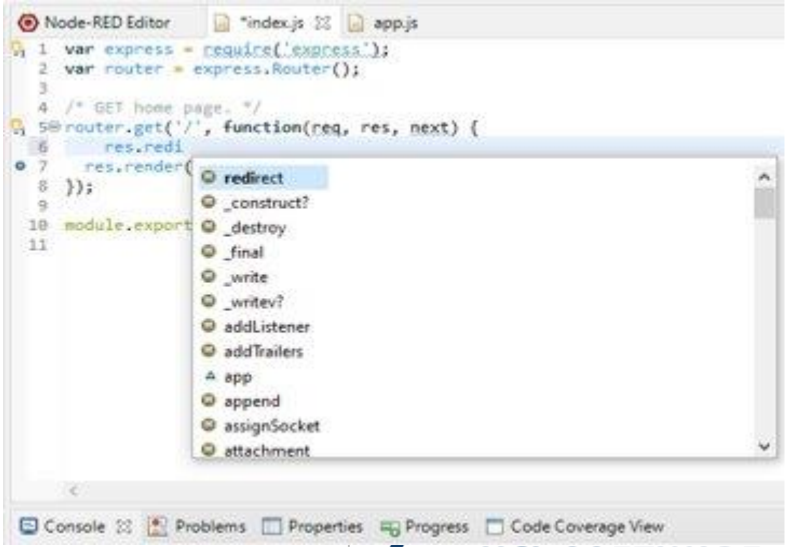
✓ Calculate dependencies based on transformation configuration prerequisites

NodePlus 2.0

RTist only

- NodePlus 2.0 now supports Eclipse 2021.06 and can be used with RTist 11.2
- It's now delivered as a separate update site to reduce the size of the RTist update site
- NodePlus now uses the Wild Web Developer (WWD) which provides a rich development environment for the typical languages used for web development (JavaScript, CSS, HTML, etc)
- The Node-RED server was updated
- NodePlus is still only available for RTist users, but work is ongoing for supporting also IBM RSARTE in the near future





```
var express = require('express');
var router = express.Router();

/* GET home page. */
router.get('/', function(req, res, next) {
    res.redi
  res.render(
});

module.export
```

```
redirect
_construct?
_destroy
_final
_write
_writev?
addListener
addTrailers
app
append
assignSocket
attachment
```

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