CamilleX User Manual

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1 CamilleX Overview

The CamilleX provides new CamilleX constructs (XMachines and XContexts) which are text files which are automatically translated into the corresponding Rodin Event-B constructs (i.e., Machine and Context) accordingly. Facility for translating from Rodin Event-B components to CamilleX components can be invoked manually. The overall process can be seen in Figure 1.

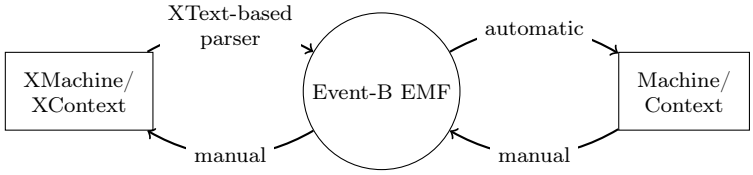

Figure 1: Overview of CamilleX and Rodin Event-B Constructs

2 Getting Started

2.1 Installation

2.1.1 Setup

- Before installing the CamilleX feature, you need to add the XText update site (`http://download.eclipse.org/modeling/tmf/xtext/updates/composite/releases/`) as an additional software site (see Figure 2).
- The CamilleX feature is available from the main Rodin update site (under "Modelling Extensions" category). There are two versions of the feature, *CamilleX* providing facilities for working with CamilleX, and the *CamilleX (SDK)* is the feature including source code for software developers (see Figure 3).

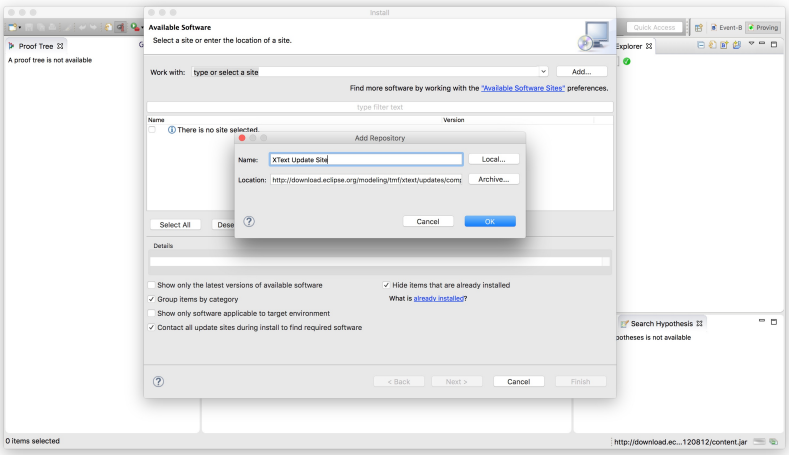

Figure 2: Adding XText Update Site

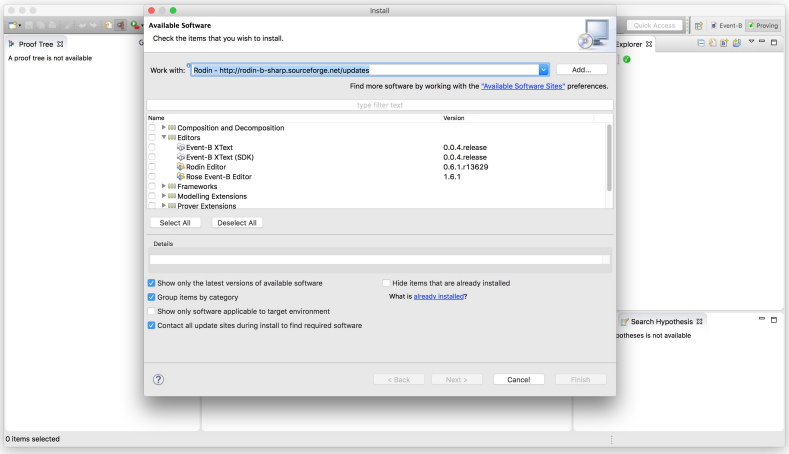

Figure 3: Adding XText Update Site

2.1.2 IMPORTANT

- Currently, CamilleX **not only** supports "standard" Event-B machines and contexts, but also supports "*Machine Inclusion*" and "*Event Synchronisation*".
- Since the XContexts and XMachines are compiled to the Rodin files, the corresponding Rodin contexts and machines will be **OVER-WRITTEN**. Any changes in the Rodin files will not be lost.
- **DO NOT USE** the CamilleX if you use modelling plug-ins such as *iUML-B* state-machines and class-diagrams, as the additional modelling elements will be over-written.
- Windows users **must** change the workspace text file encoding to **UTF-8**. This can be updated under the Rodin Preferences: General/Workspace then in the "*Text file encoding*" section, select Other: UTF-8.

2.1.3 Known Issues

- Machine Inclusion:
  - Including the **same** machine to both the abstract and its refining machine can result in the repetition of invariants.

2.2 Basic Tutorial

This tutorial provides a step-by-step walk-through working with CamilleX constructs. This tutorial also available as Cheatsheets with the Rodin Platform (`Help/Cheat Sheets/CamilleX Cheatsheets/CamilleX Basic Tutorial`).

2.2.1 Task 1. Create an Event-B Project

Introduction The purpose of this task is to create an Event-B project for the XEvent-B constructs.

Step 1. Create a new Event-B Project Create a new Event-B Project named "Club" using the *New Event-B Project* wizard (see Figure 4).

Conclusion By now, the project "Club" should be visible in the Event-B Explorer.

2.2.2 Task 2. Create a simple XContext coursesCtx.bucx

Introduction The purpose of this task is to create a simple XContext within the newly created project.

Step 1. Create a new XContext coursesCtx.bucx Create a new XContext named "coursesCtx.bucx" using the *New File wizard* (see Figure 5). **Important**: A pop-up dialog will be displayed asking to convert the "Club" project to XText project, please answer **Yes** (see Figure 6).

Step 2. Set the content of courseCtx.bucx Set the content of "coursesCtx.bucx" as follows.

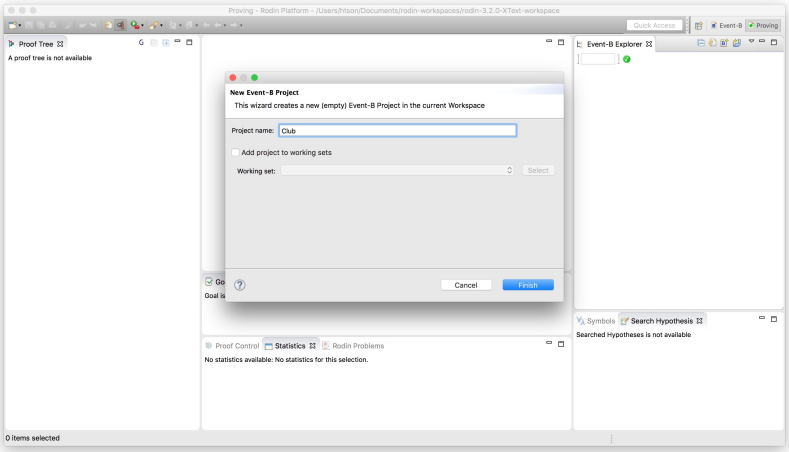

Figure 4: Create Event-B Project called “Club”

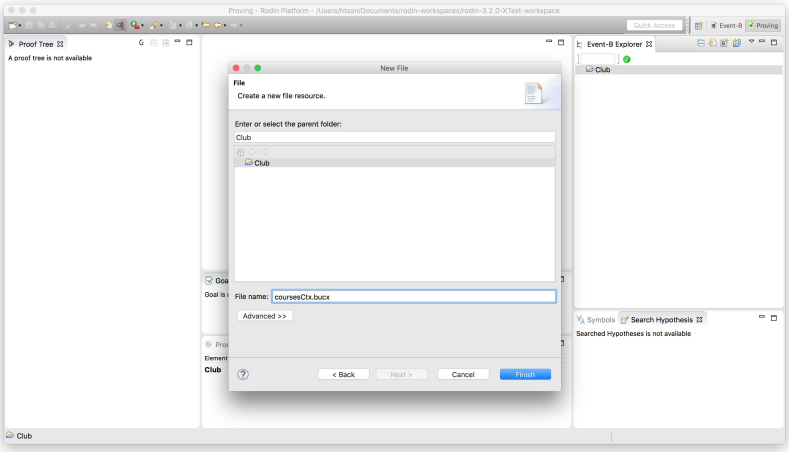

Figure 5: Create an XContext called “coursesCtx.bucx”

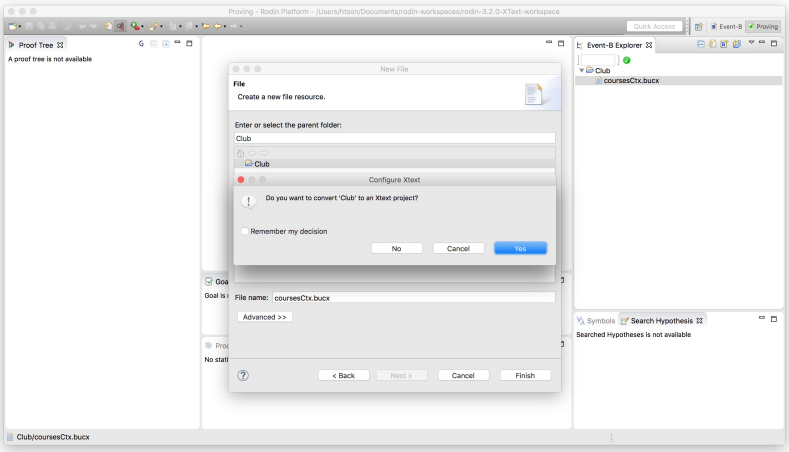

Figure 6: Convert "Club" to XText project

```
1  context coursesCtx
2  sets
3   CRS
4  constants
5   m
6  axioms
7   axm0_1: finite(CRS)
8   axm0_2: m ∈ ℕ1
9   theorem thm0_1: 0 < m
10 end
```

Important: In order to typeset Event-B mathematical symbol, e.g., $\mathbb{N}_1$, one can use content assist. For example, typing `NAT` and invoking content assist (e.g., on Mac OS `Ctrl+Space`), a dropdown list will appear with options for typesetting $\mathbb{N}$ and $\mathbb{N}_1$ (See Figure 7.

Step 3. Auto-format the code Automatically format the content of "coursesCtx.bucx" using short-cut (e.g., on Mac OS: `Cmd+Shift+F`).

Step 4. Save the file **Save the file "coursesCtx.bucx"**.

Conclusion By now, the XContext "coursesCtx.bucx" and the corresponding Rodin Context "coursesCtx" should be visible in the Event-B Explorer (see Figure 8).

3 Concepts

3.1 XText Projects

Each project containing CamilleX constructs must be set to be XText project. An XText project has an associated XContext and XMachine builders that can compile CamilleX source files into Rodin files as they are changed. The builders

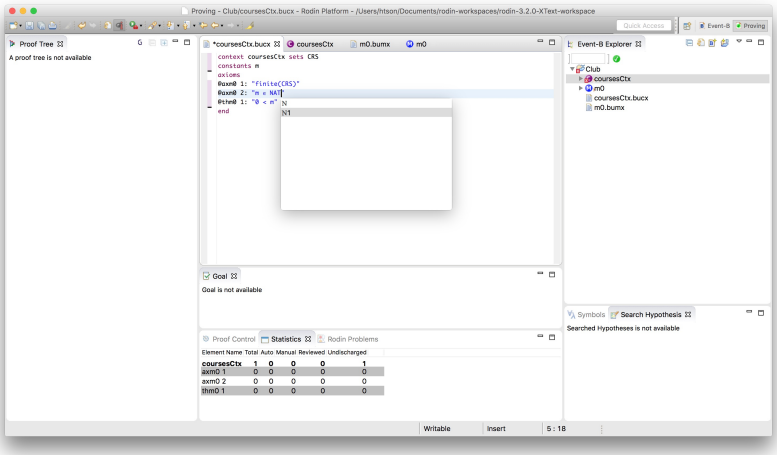

Figure 7: Type-setting $\mathbb{N}_1$ using Content Assist

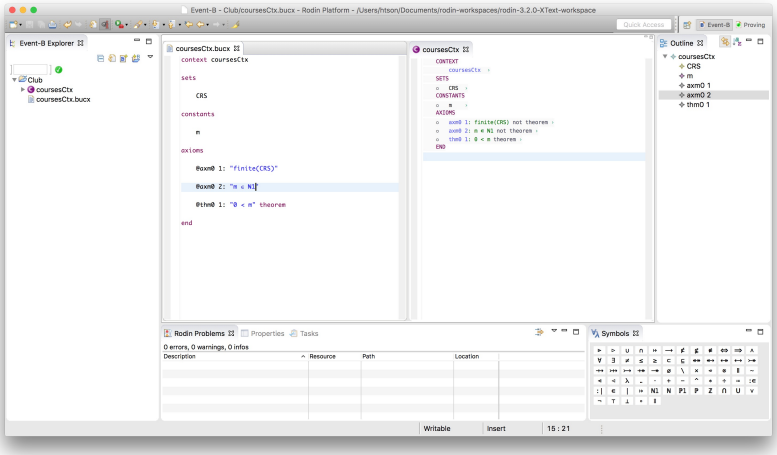

Figure 8: The final XContext coursesCtx.bucx

can be turn off via the preferences, either workspace-wise or project-wise (see Figure 9.

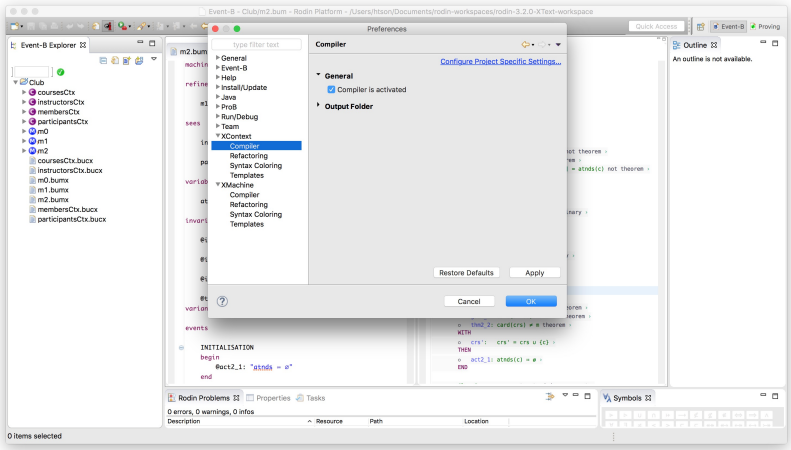

Figure 9: XContext Preference

The XText projects must be organised such that all CamilleX constructs has the project as the source container.

3.2 CamilleX Builders

The CamilleX Builders, i.e., XContext builder and XMachine builder, build CamilleX constructs, i.e., XContext and XMachine using their own compiler. If they are enabled, the CamilleX builders are run everytime an individual CamilleX file is saved. Problems detected by the CamilleX builders are classified as either warnings or errors. Compile-time errors are always reported as errors by the CamilleX buiders and in the presence of errors, no new Rodin files are created or updated, i.e., the CamilleX builders do not produce any new Rodin file content. In the case of machine inclusion and event synchronisation, a flattened machine is generated which includes data from the included machine and the synchronised events, which can be renamed if prefixing is applied.

3.3 Content Assist

Content assist are available for typesetting keywords and Event-B mathematical symbols. The short-cut for invoking content assist is `Ctrl+Space`. Figure 10 shows an example for content assist with keywords. For Event-B mathematical

Figure 10: Keyword Content Assist

symbols, the key combination is defined by the Rodin Keyboard plug-in.

4 Reference

4.1 Combmon Syntax

```
ML_COMMENT ::= /* STRING */
SL_COMMENT ::= // SL_STRING
ID ::= [^] (LETTER | \_) \{LETTER | DIGIT | \_ \}
XLABEL ::= STRING:
```

4.2 Preferences

4.2.1 XContext Preferences

The following XContext preferences can be set on the the XContext preference page and its sub-pages.

Option	Description	Default
Compiler is activated	**Compiler is activated** or **deactivated**	Activated

Table 1: XContext Compiler Preferences

Compiler

Syntax Coloring

4.2.2 XMachine Preferences

The following XMachine preferences can be set on the XMachine preference page and its sub-pages.

Compiler

Syntax Coloring

4.3 XEvent-B Editors

4.3.1 XEvent-B Content Assist

In the XContext and XMachine editors press `Ctrl+Space` on code to complete. This opens a list of available code completions. Some tips for using code assist are listed in the following paragraph:

- You can use the mouse or the keyboard (Up Arrow, Down Arrow, Page Up, Page Down, Home, End, Enter) to navigate and select lines in the list.
- Clicking or pressing Enter on a selected line in the list inserts the selection into the editor.

Option	Description	Default
Comment	**Color** **Background** **Style** (Italic, Bold, Underline, Strike through) **Font**	Dark Green White None Platform dependent
Default	**Color** **Background** **Style** (Italic, Bold, Underline, Strike through) **Font**	Black White None Platform dependent
Invalid Symbol	**Color** **Background** **Style** (Italic, Bold, Underline, Strike through) **Font**	Black White None Platform dependent
Keyword	**Color** **Background** **Style** (Italic, Bold, Underline, Strike through) **Font**	Dark Purple White Bold Platform dependent
Number	**Color** **Background** **Style** (Italic, Bold, Underline, Strike through) **Font**	Dark Gray White None Platform dependent
Punctuation character	**Color** **Background** **Style** (Italic, Bold, Underline, Strike through) **Font**	Black White None Platform dependent
String	**Color** **Background** **Style** (Italic, Bold, Underline, Strike through) **Font**	Blue White None Platform dependent
Task Tag	**Color** **Background** **Style** (Italic, Bold, Underline, Strike through) **Font**	Light Blue White Bold Platform dependent

Table 2: XContext Syntax Coloring Preferences

Option	Description	Default
Compiler is activated	**Compiler is activated** or **deactivated**	Activated

Table 3: XMachine Compiler Preferences

Option	Description	Default
Comment	**Color** **Background** **Style** (Italic, Bold, Underline, Strike through) **Font**	Dark Green White None Platform dependent
Default	**Color** **Background** **Style** (Italic, Bold, Underline, Strike through) **Font**	Black White None Platform dependent
Invalid Symbol	**Color** **Background** **Style** (Italic, Bold, Underline, Strike through) **Font**	Black White None Platform dependent
Keyword	**Color** **Background** **Style** (Italic, Bold, Underline, Strike through) **Font**	Dark Purple White Bold Platform dependent
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String	**Color** **Background** **Style** (Italic, Bold, Underline, Strike through) **Font**	Blue White None Platform dependent
Task Tag	**Color** **Background** **Style** (Italic, Bold, Underline, Strike through) **Font**	Light Blue White Bold Platform dependent

Table 4: XMachine Syntax Coloring Preferences

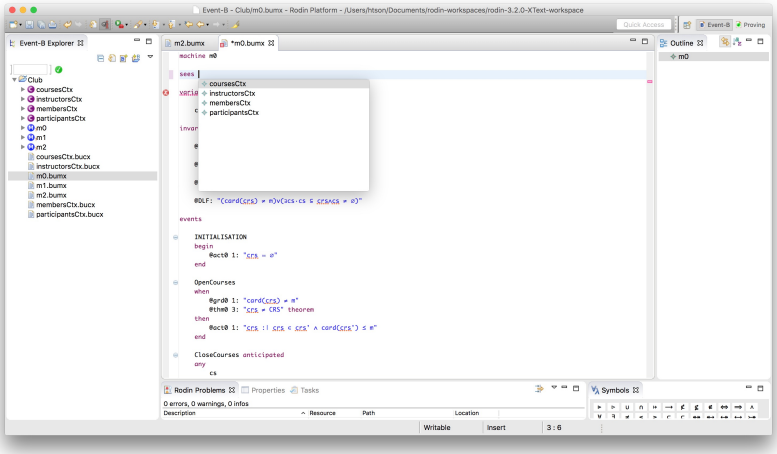

Figure 11: Content Assist for adding Sees clause

4.3.2 XEvent-B Formatter

In the XContent and XMachine editors press `Ctrl+Shift+F` on code to format it. If no selection is set then the entire source is formatted otherwise only the selection will be.

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June 1st, 2006

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- Sub-directories of the directory named "src" of certain Plug-ins
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A Release Notes

1.0.0 The feature is now called CamilleX (instead of XEvent-B)

- Branding (0.0.4): Updated logo to CamilleX.
- Common (0.0.5): Update copyright statements in source code.

- Cheatsheets (1.0.0): Updated the name to use CamilleX instead of XEvent-B.
- Documentation (1.0.0): Updated the name to use CamilleX instead of XEvent-B.
- UI (0.1.0): Updated the name to use CamilleX instead of XEvent-B.
- XContext (1.0.0): Updated the name to use CamilleX instead of XEvent-B.
  - Update dependency ranges
- XContext IDE (1.0.0): Updated the name to use CamilleX instead of XEvent-B.
  - Update dependency ranges
- XContext UI (1.0.0): Updated the name to use CamilleX instead of XEvent-B.
  - Update dependency ranges
- XMachine (1.0.0): Updated the name to use CamilleX instead of XEvent-B.
  - Update dependency ranges
- XMachine IDE (1.0.0): Updated the name to use CamilleX instead of XEvent-B.
  - Update dependency ranges
- XMachine UI (1.0.0): Updated the name to use CamilleX instead of XEvent-B.
  - Update dependency ranges

0.0.7

- XEvent-B Branding (0.0.3): Updated logo to XEvent-B.
- XEvent-B Common (0.0.4): Enhancement (Issue #11).
  - Machines from different projects can now be included.
  - Machines are now included using qualified name defined as: *projectName.machineName*
- XEvent-B Documentations (0.0.7): Update documentation for 0.0.7 release.
- XEvent-B XContext (0.0.5): Changed dependency on XText to [2.12.0, 3.0.0).
- XEvent-B XContext IDE (0.0.4): Changed dependency on XText to [2.12.0, 3.0.0).

- XEvent-B XContext UI (0.0.4): Changed dependency on XText to [2.12.0, 3.0.0).
- XEvent-B XMachine (0.0.5):
  - Changed dependency on XText to [2.12.0, 3.0.0).
  - Fixed Issue #8: Comments are not parsed.
  - Fixed Issue #10: Variants not translated: Fix is part of inclusion plug-in release 0.2.0.
  - Flattened machines now have the included machine elements generated before the source machine.
  - Order of generating elements of multiple inclusions and/or instances is from last to first.
  - This update is part of inclusion plug-in release 0.2.0.
- XEvent-B XMachine IDE (0.0.4): Changed dependency on XText to [2.12.0, 3.0.0).
- XEvent-B XMachine UI (0.0.4):
  - Changed dependency on XText to [2.12.0, 3.0.0).
  - Regenerated from XEvent-B XMachine 0.0.5

0.0.6

- Renamed plug-ins and features to XEvent-B (instead of Event-B XText).
- XEvent-B Branding (0.0.2): Renamed from Event-B XText Branding.
- XEvent-B Documentations (0.0.2): Renamed from Event-B XText Documentations.
- XEvent-B Cheatsheets (0.0.2): Renamed from Event-B XText Cheatsheets.
- XEvent-B Common (0.0.3): Renamed from Event-B XText Common.
- XEvent-B UI (0.0.2): Renamed from Event-B XText UI.
- XEvent-B XContext (0.0.4): Renamed from Event-B XText Context.
- XEvent-B XContext IDE (0.0.3): Renamed from Event-B XText Context IDE.
- XEvent-B XContext UI (0.0.3): Renamed from Event-B Context UI.
- XEvent-B XMachine (0.0.4): Renamed from Event-B XText Machine.
  - Support Machine Inclusion and Event Synchronisation.
- XEvent-B XMachine IDE (0.0.3): Renamed from Event-B XText Machine IDE.
- XEvent-B XMachine UI (0.0.3): Renamed from Event-B XText Machine UI.

0.0.5

- Event-B XText Documentations (0.0.1): Documentation plug-in (Initial version).

0.0.4

- Updated plug-in dependency for the feature

0.0.3

- Event-B XText Context (0.0.3):
  - Issue #3: Single-line comment after the element, multi-line comment before the element
- Event-B XText Context IDE (0.0.2): Regenerated
- Event-B XText ContextUI IDE (0.0.2): Regenerated
- Event-B XText Machine (0.0.3):
  - Issue #3: Single-line comment after the element, multi-line comment before the element.
  - Issue #5: Event terminator using 'end' keyword instead of ';'
- Event-B XText Machine IDE (0.0.2) Regenerated
- Event-B XText Machine UI IDE (0.0.2) Regenerated

0.0.2

- Event-B XText Common (0.0.2):
  - Added transient value service for XContext and XMachine.
- Event-B XText Context (0.0.2):
  - Added formatter (used for auto-indentation).
- Event-B XText Machine (0.0.2):
  - Added formatter (used for auto-indentation).
- Event-B XText UI (0.0.1): Initial version
  - Added context menu for converting machines and contexts to XText.

0.0.1 Initial version contains the following plug-ins:

- Event-B XText Branding (0.0.1) Initial version: Branding information
- Event-B XText Common (0.0.1) Initial version: Common facilities
- Event-B XText Context (0.0.1) Initial version: Core support for Event-B contexts
- Event-B XText Context IDE (0.0.1) Initial version: IDE for Event-B contexts
- Event-B XText Context UI (0.0.1) Initial version: UI for Event-B contexts
- Event-B XText Machine (0.0.1) Initial version: Core support for Event-B machines
- Event-B XText Machine IDE (0.0.1) Initial version: IDE for Event-B machines
- Event-B XText Machine UI (0.0.1) Initial version: UI for Event-B machines