Interacting with the Debugger

You can use the Qt Creator **Debug** mode to inspect the state of your application while debugging. You can interact with the debugger in several ways, including the following:

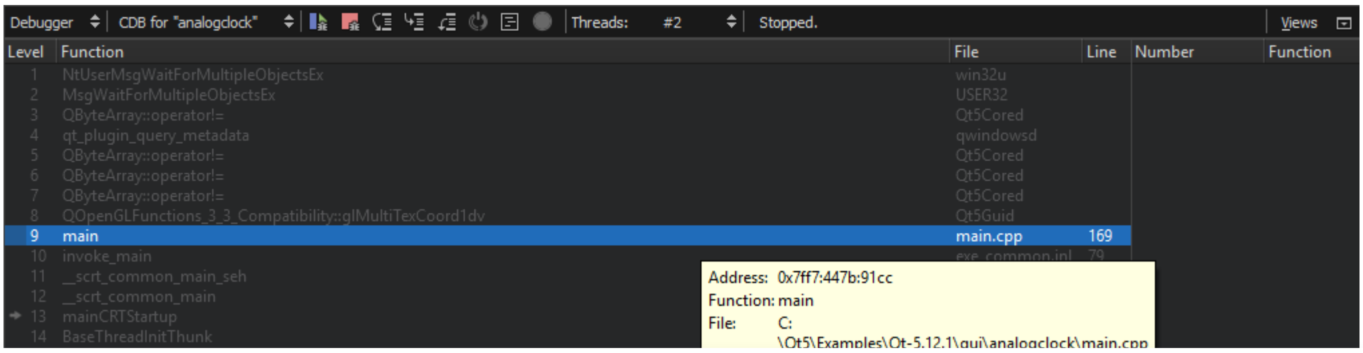
- Go through a program line-by-line or instruction-by-instruction.
- Interrupt running programs.
- Set breakpoints.
- Examine the contents of the call stack.
- Examine and modify contents of local and global variables.
- Examine and modify registers and memory contents of the debugged program.
- Examine the list of loaded shared libraries.
- Disassemble sections of code.

Qt Creator displays the raw information provided by the native debuggers in a clear and concise manner with the goal to simplify the debugging process as much as possible without losing the power of the native debuggers.

In addition to the generic IDE functionality provided by stack view, views for locals and expressions, registers, and so on, Qt Creator includes features to make debugging Qt-based applications easy. The debugger plugin understands the internal layout of several Qt classes, for example, QString, the Qt containers, and most importantly QObject (and classes derived from it), as well as most containers of the C++ Standard Library and some GCC extensions. This deeper understanding is used to present objects of such classes in a useful way.

Using the Debugger

In **Debug** mode, you can use several views to interact with the program you are debugging. The availability of views depends on whether you are debugging C++ or QML. Frequently used views are shown by default and rarely used ones are hidden. To change the default settings, select **View** > **Views**, and then select views to display or hide. Alternatively, you can enable or disable views from the context menu of the title bar of any visible debugger view.



Level	Function	File	Line
1	NtUserMsgWaitForMultipleObjectsEx	win32u	
2	MsgWaitForMultipleObjectsEx	USER32	
3	QByteArray::operator!=	Qt5Cored	
4	qt_plugin_query_metadata	qwindowsd	
5	QByteArray::operator!=	Qt5Cored	
6	QByteArray::operator!=	Qt5Cored	
7	QByteArray::operator!=	Qt5Cored	
8	QOpenGLFunctions_3_3_Compatibility::glMultiTexCoord1dv	Qt5Guid	
9	main	main.cpp	169
10	invoke_main	exe_common.inl	79
11	__scrt_common_main_seh		
12	__scrt_common_main		
13	mainCRTStartup		
14	BaseThreadInitThunk		

Number	Function

Address: 0x7ff7:447b:91cc
Function: main
File: C:
\Qt5\Examples\Qt-5.12.1\gui\analogclock\main.cpp

Double-click on the file name to open an editor.

You can drag and drop the views in Qt Creator to new positions on the screen. The size and position of views are saved for future sessions. Select **View** > **Views** > **Reset to Default Layout** to reset the views to their original sizes and positions.

To save space on the screen, select **View** > **Views** > **Automatically Hide View Titlebars**.

To show and hide columns in views, toggle **Show Column** in the context menu.

Once the program starts running under the control of the debugger, it behaves and performs as usual. You can interrupt a running C++ program by selecting **Debug** > **Interrupt**. The program is automatically interrupted when a breakpoint is hit.

Once the program stops, Qt Creator:

- Retrieves data representing the call stack at the program's current position.
- Retrieves the contents of local variables.
- Examines **Expressions**.
- Updates the **Registers**, **Modules**, and **Disassembler** views if you are debugging the C++ based applications.

You can use the **Debug** mode views to examine the data in more detail.

You can use the following keyboard shortcuts:

- To finish debugging, press **Shift+F5**.
- To execute a line of code as a whole, press **F10** (**Command+Shift+O** on macOS).
- To step into a function or a subfunction, press **F11** (**Command+Shift+I** on macOS).
- To leave the current function or subfunction, press **Shift+F11** (**Command+Shift+T** on macOS).
- To continue running the program, press **F5**.
- To run to the line containing the cursor, press **Ctrl+F10** (**Shift+F8** on macOS).
- To run to the selected function when you are stepping into a nested function, press **Ctrl+F6**.

It is also possible to continue executing the program until the current function completes or jump to an arbitrary position in the current function.

Stepping Into Code

When using GDB as the debugging backend, you can compress several steps into one step for less noisy debugging. For more information, see Specifying GDB Settings.

The extended GDB settings provide the option to step backwards in code, but this option should be used with care, as it is slow and unstable on the GDB side. For more information, see Specifying Extended GDB Settings.

Customizing Debug Views

You can change the appearance and behavior of the debug views by specifying settings in **Preferences** > **Debugger**. For example, you can:

- Use alternating row colors in debug views.
- Adopt font size changes from the main editor.

debugger exits.

- Bring Qt Creator to the foreground when the debugged application is interrupted.

For more information, see Specifying Debugger Settings.

Setting Breakpoints

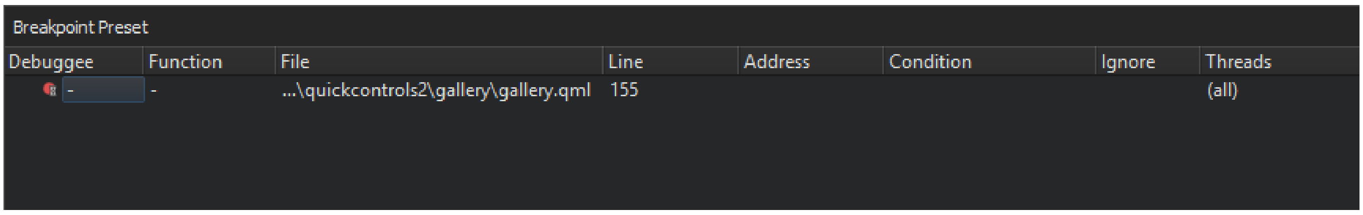
You can associate breakpoints with:

- Source code files and lines
- Functions
- Addresses
- Throwing and catching exceptions
- Executing and forking processes
- Executing some system calls
- Changes in a block of memory at a particular address when a program is running
- Emitting QML signals
- Throwing JavaScript exceptions

The interruption of a program by a breakpoint can be restricted with certain conditions.

Breakpoints come in two varieties: `unclaimed` and `claimed`. An unclaimed breakpoint represents a task to interrupt the debugged program and passes the control to you later. It has two states: `pending` and `implanted`.

Unclaimed breakpoints are stored as a part of a session and exist independently of whether a program is being debugged or not. They are listed in the **Breakpoint Preset** view and in the editor using the (**Unclaimed Breakpoint**) icon, when they refer to a position in code.


Breakpoint Preset

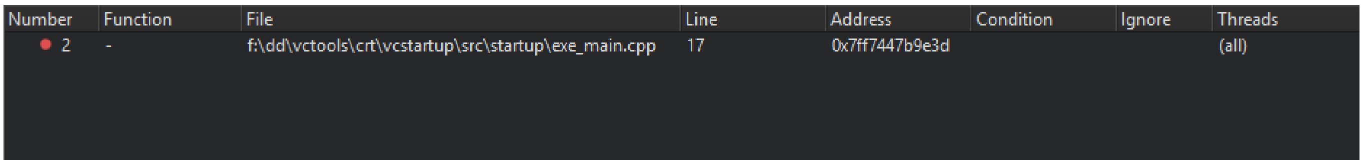
Debuggee	Function	File	Line	Address	Condition	Ignore	Threads
-	-	...\quickcontrols2\gallery\gallery.qml	155				(all)

When a debugger starts, the debugging backend identifies breakpoints from the set of unclaimed breakpoints that might be handled by the debugged program and claims them for its own exclusive use. Claimed breakpoints are listed in the **Breakpoints** view of the running debugger. This view only exists while the debugger is running.

When a debugger claims a breakpoint, the unclaimed breakpoint disappears from the **Breakpoint Preset** view, to appear as a pending breakpoint in the **Breakpoints** view.

At various times, attempts are made to implant pending breakpoints into the debugged process. Succesfull implantation might create one or more implanted breakpoints, each associated with an actual address in the debugged breakpoint. The implantation might also move a breakpoint marker in the editor from an empty line to the next line for which the actual code was generated, for example. Implanted breakpoint icons don't have the hourglass overlay.

When the debugger ends, its claimed breakpoints, both pending and implanted, will return to the unclaimed state and re-appear in the **Breakpoint Preset** view.

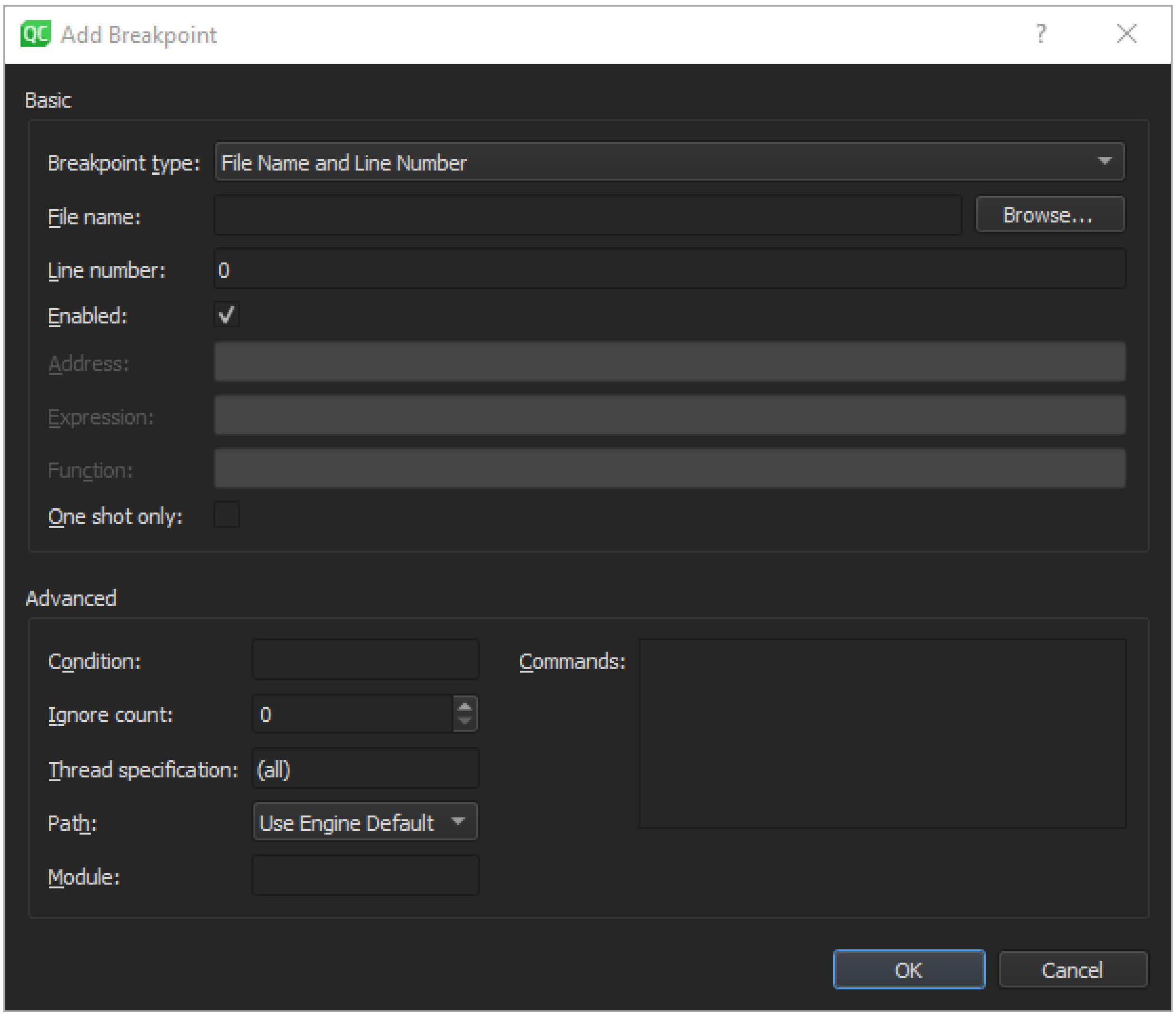


Number	Function	File	Line	Address	Condition	Ignore	Threads
● 2	-	f:\dd\vctools\crt\vcstartup\src\startup\exe_main.cpp	17	0x7ff7447b9e3d			(all)

Adding Breakpoints

To add breakpoints:

1. Add a new breakpoint in one of the following ways:
   - In the code editor, click the left margin or press **F9** (**F8** on macOS) on a particular line you want the program to stop.
   - In the **Breakpoint Preset** view or the **Breakpoints** view:
     - Double-click the empty part of the view.
     - Right-click the view, and select **Add Breakpoint** in the context menu.
2. In the **Breakpoint type** field, select the location in the program code where you want the program to stop. The other options to specify depend on the selected location.



Add Breakpoint

Basic

Breakpoint type:	File Name and Line Number
File name:	
Line number:	0
Enabled:	✓
Address:	
Expression:	
Function:	
One shot only:	

Advanced

Condition:	
Ignore count:	0
Thread specification:	(all)
Path:	Use Engine Default
Module:	
Commands:	

3. In the **Condition** field, set the condition to be evaluated before stopping at the breakpoint if the condition evaluates as true.

GDB executes the commands in the order in which they are specified.

Specifying Breakpoint Settings

You can specify settings for breakpoints in **Edit** > **Preferences** > **Debugger**. For more information, see Specifying Debugger Settings.

To use a full absolute path in breakpoints, select the **Set breakpoints using a full absolute path** check box.

GDB and CDB enable setting breakpoints on source lines for which no code was generated. In such situations, the breakpoint is shifted to the next source code line for which the code was actually generated. To reflect such temporary changes by moving the breakpoint markers in the source code editor, select **GDB** > **Adjust breakpoint locations** or **CDB** > **Correct breakpoint location**.

When using GDB as backend, you can extend the ordinary GDB breakpoint class by using Python. Select **GDB** > **Use pseudo message tracepoints**.

When using CDB as backend, you can specify that the debugger should break on specific events, such as C++ exceptions, thread creation or exit, loading or unloading application modules, or particular output. Select the appropriate check boxes in the **CDB** > **Break on** group. To disable first-chance break on access violation exceptions, select the **Ignore first chance access violations** check box. The second occurrence of an access violation will break into the debugger.

You can automatically add breakpoints on some functions to catch error and warning messages. For more information, see Specifying CDB Settings and Specifying Extended GDB Settings.

For more information on breakpoints, see Breakpoints, Watchpoints, and Catchpoints in GDB documentation.

Moving Breakpoints

To move a breakpoint:

- Drag and drop a breakpoint marker to another line in the text editor.
- In the **Breakpoint Preset** view or the **Breakpoints** view, select **Edit Selected Breakpoints**, and set the line number in the **Line number** field.

Deleting Breakpoints

To delete breakpoints:

- Click the breakpoint marker in the text editor.
- In the **Breakpoint Preset** view or the **Breakpoints** view:
  - Select the breakpoint and press **Delete**.
  - Select **Delete Selected Breakpoints**, **Delete Selected Breakpoints**, or **Delete Breakpoints of File** in the context menu.

Enabling and Disabling Breakpoints

To temporarily disable a breakpoint without deleting it and losing associated data like conditions and commands:

- Right-click the breakpoint marker in the text editor and select **Disable Breakpoint**.
- Select a line that contains a breakpoint and press **Ctrl+F9** (**Ctrl+F8** on macOS).
- In the **Breakpoint Preset** view or the **Breakpoints** view:

A hollow breakpoint icon in the text editor and the views indicates a disabled breakpoint. To re-enable a breakpoint, use any of the above methods.

With the notable exception of data breakpoints, breakpoints retain their enabled or disabled state when the debugged program is restarted.

Setting Data Breakpoints

A *data breakpoint* stops the program when data is read or written at the specified address.

To set a data breakpoint at an address:

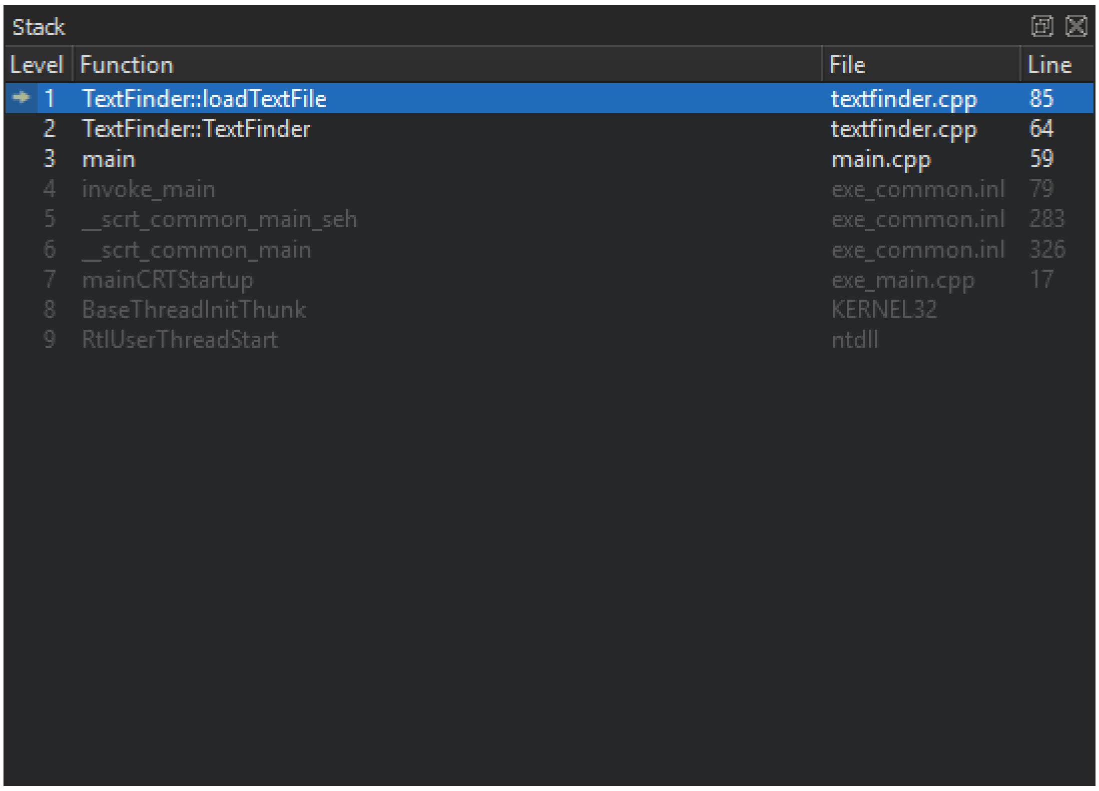
1. In the **Breakpoint Preset** or **Breakpoints** view, select **Add Breakpoint** in the context menu.
2. In the **Breakpoint type** field, select **Break on data access at fixed address**.
3. In the **Address** field, specify the address of the memory block.
4. Select **OK**.

If the address is displayed in the **Locals** or **Expressions** view, you can select **Add Data Breakpoint at Object's Address** in the context menu to set the data breakpoint.

Data breakpoints will be disabled when the debugged program exits, as it is unlikely that the used addresses will stay the same at the next program launch. If you really want a data breakpoint to be active again, re-enable it manually.

Viewing Call Stack Trace

When the program being debugged is interrupted, Qt Creator displays the nested function calls leading to the current position as a call stack trace. This stack trace is built up from call stack frames, each representing a particular function. For each function, Qt Creator tries to retrieve the file name and line number of the corresponding source file. This data is shown in the **Stack** view.


Stack

Level	Function	File	Line
1	TextFinder::loadTextFile	textfinder.cpp	85
2	TextFinder::TextFinder	textfinder.cpp	64
3	main	main.cpp	59
4	invoke_main	exe_common.inl	79
5	__scrt_common_main_seh	exe_common.inl	283
6	__scrt_common_main	exe_common.inl	326
7	mainCRTStartup	exe_main.cpp	17
8	BaseThreadInitThunk	KERNEL32	
9	RtlUserThreadStart	ntdll	

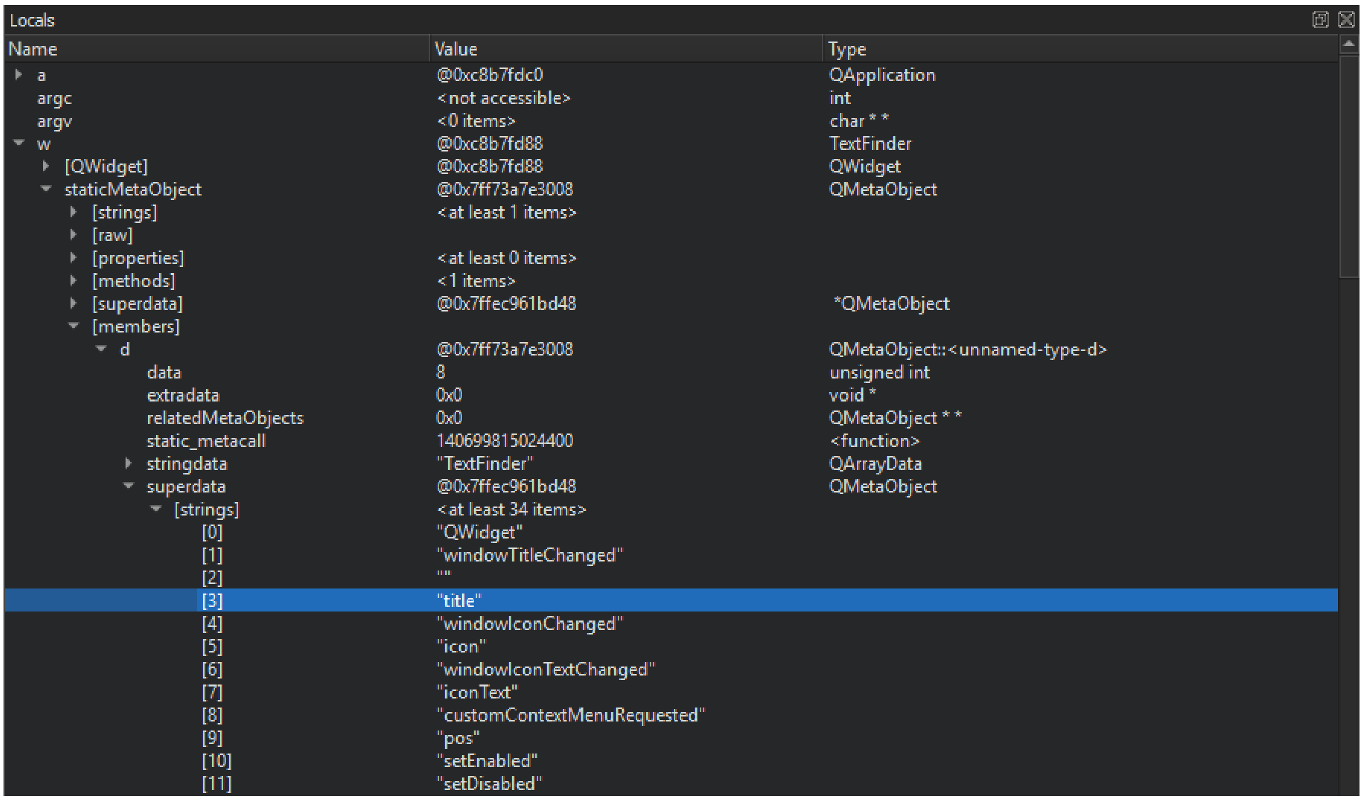
Since the call stack leading to the current position may originate or go through code for which no debug information is available, not all stack frames have corresponding source locations. Stack frames without corresponding source locations are grayed out in the **Stack** view.

If you click a frame with a known source location, the text editor jumps to the corresponding location and updates the **Locals** and **Expressions** views, making it seem like the program was interrupted before entering the function.

To find out which QML file is causing a Qt Quick 2 application to crash, select **Load QML Stack** in the context menu in the **Stack** view. The debugger tries to retrieve the JavaScript stack from the stopped executable and prepends the frames to the C++ frames, should it find any. You can click a frame in the QML stack to open the QML file in the editor.

Local Variables and Function Parameters

The Locals view consists of the **Locals** pane and the **Return Value** pane (hidden when empty).



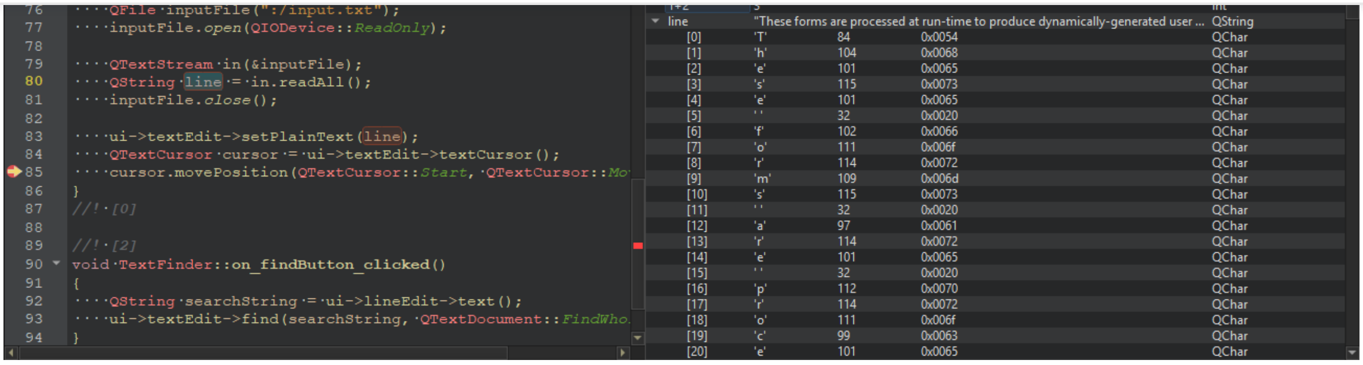
```
Locals
Name                              Value                          Type
▸ a                               @0xc8b7fdc0                    QApplication
  argc                            <not accessible>               int
  argv                            <0 items>                      char * *
▾ w                               @0xc8b7fd88                    TextFinder
  ▸ [QWidget]                     @0xc8b7fd88                    QWidget
  ▾ staticMetaObject              @0x7ff73a7e3008                QMetaObject
    ▸ [strings]                   <at least 1 items>
    ▸ [raw]
    ▸ [properties]                <at least 0 items>
    ▸ [methods]                   <1 items>
    ▸ [superdata]                 @0x7ffec961bd48                *QMetaObject
    ▾ [members]
      ▾ d                         @0x7ff73a7e3008                QMetaObject::<unnamed-type-d>
          data                    8                              unsigned int
          extradata               0x0                            void *
          relatedMetaObjects      0x0                            QMetaObject * *
          static_metacall         140699815024400                <function>
        ▸ stringdata              "TextFinder"                   QArrayData
        ▾ superdata               @0x7ffec961bd48                QMetaObject
          ▾ [strings]             <at least 34 items>
              [0]                 "QWidget"
              [1]                 "windowTitleChanged"
              [2]                 ""
              [3]                 "title"
              [4]                 "windowIconChanged"
              [5]                 "icon"
              [6]                 "windowIconTextChanged"
              [7]                 "iconText"
              [8]                 "customContextMenuRequested"
              [9]                 "pos"
              [10]                "setEnabled"
              [11]                "setDisabled"
```

Whenever a program stops under the control of the debugger, it retrieves information about the topmost stack frame and displays it in the **Locals** view. The **Locals** pane shows information about parameters of the function in that frame as well as the local variables. If the last operation in the debugger was returning from a function after pressing **Shift+F11**, the **Return Value** pane displays the value returned by the function.

When using GDB, you can specify whether the dynamic or the static type of objects will be displayed. Select **Use dynamic object type for display** in the context menu. Keep in mind that choosing the dynamic type might be slower.

Evaluating Expressions

To compute values of arithmetic expressions or function calls, use expression evaluators in the **Expressions** view. To insert a new expression evaluator, either double-click on an empty part of the **Expressions** or **Locals** view, or select **Add New Expression Evaluator** from the context menu, or drag and drop an expression from the code editor.



```
    QFile inputFile(":/input.txt");
    inputFile.open(QIODevice::ReadOnly);

    QTextStream in(&inputFile);
    QString line = in.readAll();
    inputFile.close();

    ui->textEdit->setPlainText(line);
    QTextCursor cursor = ui->textEdit->textCursor();
    cursor.movePosition(QTextCursor::Start, QTextCursor::Mo
}
//! [0]

//! [2]
void TextFinder::on_findButton_clicked()
{
    QString searchString = ui->lineEdit->text();
    ui->textEdit->find(searchString, QTextDocument::FindWho
}
```

```
  i+2       3                                                                          int
▾ line      "These forms are processed at run-time to produce dynamically-generated user ...  QString
    [0]     'T'    84     0x0054                                                       QChar
    [1]     'h'    104    0x0068                                                       QChar
    [2]     'e'    101    0x0065                                                       QChar
    [3]     's'    115    0x0073                                                       QChar
    [4]     'e'    101    0x0065                                                       QChar
    [5]     ' '    32     0x0020                                                       QChar
    [6]     'f'    102    0x0066                                                       QChar
    [7]     'o'    111    0x006f                                                       QChar
    [8]     'r'    114    0x0072                                                       QChar
    [9]     'm'    109    0x006d                                                       QChar
    [10]    's'    115    0x0073                                                       QChar
    [11]    ' '    32     0x0020                                                       QChar
    [12]    'a'    97     0x0061                                                       QChar
    [13]    'r'    114    0x0072                                                       QChar
    [14]    'e'    101    0x0065                                                       QChar
    [15]    ' '    32     0x0020                                                       QChar
    [16]    'p'    112    0x0070                                                       QChar
    [17]    'r'    114    0x0072                                                       QChar
    [18]    'o'    111    0x006f                                                       QChar
    [19]    'c'    99     0x0063                                                       QChar
    [20]    'e'    101    0x0065                                                       QChar
```

Note: Expression evaluators are powerful, but slow down debugger operation significantly. It is advisable to not use them excessively, and to remove unneeded expression evaluators as soon as possible.

Expression evaluators are re-evaluated whenever the current frame changes. Note that functions used in the expressions are called each time, even if they have side-effects.

The QML debugger can evaluate JavaScript expressions.

GDB, LLDB and CDB support the evaluation of simple C and C++ expressions. Functions can be called only if they are actually compiled into the debugged executable or a library used by the executable. Most notably, inlined functions such as most `operator[]` implementations of standard containers are typically *not* available.

When using GDB or LLDB as backend, a special ranged syntax can be used to display multiple values with one expression. A sub-expression of form `foo[a..b]` is split into a sequence of individually evaluated expressions `foo[a], ..., foo[b]`.

Compound variables of struct or class type are displayed as expandable in the view. Expand entries to show all members. Together with the display of value and type, you can examine and traverse the low-level layout of object data.

Note:
GDB and LLDB, and therefore Qt Creator's debugger, also work for optimized builds on Linux and macOS. Optimization can lead to re-ordering of instructions or removal of some local variables, causing the **Locals** and **Expressions** view to show unexpected data.
The debug information provided by GCC does not include enough information about the time when a variable is initialized. Therefore, Qt Creator can not tell whether the contents of a local variable contains "real data", or "initial noise". If a QObject appears uninitialized, its value is reported as **not in scope**. Not all uninitialized objects, however, can be recognized as such.

Note: The set of evaluated expressions is saved in your session.

Inspecting Basic Qt Objects

The **Locals** and **Expressions** views also provide access to the most powerful feature of the debugger: comprehensive display of data belonging to Qt's basic objects. For example, in case of QObject, instead of displaying a pointer to some private data structure, you see a list of children, signals and slots.

Similarly, instead of displaying many pointers and integers, Qt Creator's debugger displays the contents of a QHash or QMap in an orderly manner. Also, the debugger displays access data for QFileInfo and provides access to the *real* contents of QVariant.

viewing data. The available options depend on the type of the current items, and are provided by the Debugging Helpers. Typically, string-like data, such as `QByteArray` and `std::string`, offer a selection of encodings, as well as the possibility to use a full editor window. Map-like data, such as `QMap`, `QHash`, and `std::map`, offer a compact option using the `name` column for keys, resulting in a concise display of containers with short keys, such as numbers or short strings. For example, to expand all the values of QMap, select **Change Value Display Format** > **Compact**.

You can use the **Locals** and **Expressions** view to change the contents of variables of simple data types, for example, `int`, `float`, `QString` and `std::string` when the program is interrupted. To do so, click the **Value** column, modify the value with the inplace editor, and press **Enter** (or **Return**).

To change the complete contents of QVector or `std::vector` values, type all values separated by commas into the **Value** column of the main entry.

You can enable tooltips in the main editor displaying this information. For more information, see See the value of variables in tooltips while debugging.

Directly Interacting with Native Debuggers

In some cases, it is convenient to directly interact with the command line of the native debugger. In Qt Creator, you can use the left pane of the **Debugger Log** view for that purpose. When you press **Ctrl+Enter**, the contents of the line under the text cursor are sent directly to the native debugger. Alternatively, you can use the line edit at the bottom of the view. Output is displayed in the right pane of the **Debugger Log** view.

Note: Usually, you do not need this feature because Qt Creator provides you with better ways to handle the task. For example, instead of using the GDB `print` command from the command line, you can evaluate an expression in the **Expressions** view.

Debugging C++ Based Applications

The following sections describe additional debugging functions that apply only to debugging C++.

Starting the Debugger from the Command Line

You can use the Qt Creator debugger interface from the command line. To attach it to a running process, specify the process ID as a parameter for the `-debug` option. To examine a core file, specify the file name. Qt Creator executes all the necessary steps, such as searching for the binary that belongs to a core file. To connect to a debug server, specify the server location and port number.

For example:

```
C:\qtcreator\bin>qtcreator -debug 2000
C:\qtcreator\bin>qtcreator -debug core=core.2000
C:\qtcreator\bin>qtcreator -debug some.exe,core=core
C:\qtcreator\bin>qtcreator -debug server=some.dot.com:4251
```

For more information, see Using Command Line Options.

Stepping into Frameworks in macOS

In macOS, external libraries are usually built into so-called Frameworks, which may contain both release and debug

Viewing Threads

If a multi-threaded program is interrupted, the **Threads** view or the combobox named **Threads** in the debugger status bar can be used to switch from one thread to another. The **Stack** view adjusts itself accordingly.

Viewing Modules

The **Modules** view displays information that the debugger plugin has about modules included in the application that is being debugged. A module is a dynamic link library (`.dll`) in Windows, a shared object (`.so`) in Linux, and a dynamic shared library (`.dylib`) in macOS.

In addition, the view displays symbols within the modules and indicates where each module was loaded.

Right-click the view to open a context menu that contains menu items for:

- Updating the module list
- Loading symbols for modules
- Examining modules
- Editing module files
- Showing symbols in modules
- Showing dependencies between modules (Windows only)

By default, the **Modules** view is hidden.

When using CDB as debug backend, you can specify that the debugger should break when application modules are loaded or unloaded. To enable breaking for the specified modules, select **Edit** > **Preferences** > **Debugger** > **CDB**. For more information, see Specifying CDB Settings.

Viewing Source Files

The **Source Files** view lists all the source files included in the project. If you cannot step into an instruction, you can check whether the source file is actually part of the project, or whether it was compiled elsewhere. The view shows the path to each file in the file system.

Right-click the view to open a context menu that contains menu items for reloading data and opening files.

To enable the debugger to step into the code and display the source code when using a copy of the source tree at a location different from the one at which the libraries were built, you can map source paths to target paths. For more information, see Mapping Source Paths.

By default, the **Source Files** view is hidden.

Viewing Disassembled Code

The **Disassembler** view displays disassembled code for the current function.

The **Disassembler** view is useful for low-level commands for checking single instructions, such as **Step Into** and **Step Over**. By default, the **Disassembler** view is hidden.

To access the **Disassembler** view, check **Debug** > **Operate by Instruction** while the debugger is running.

Alternatively, click the (**Operate by Instruction**) tool button on the debugger tool bar.

Viewing and Editing Register State

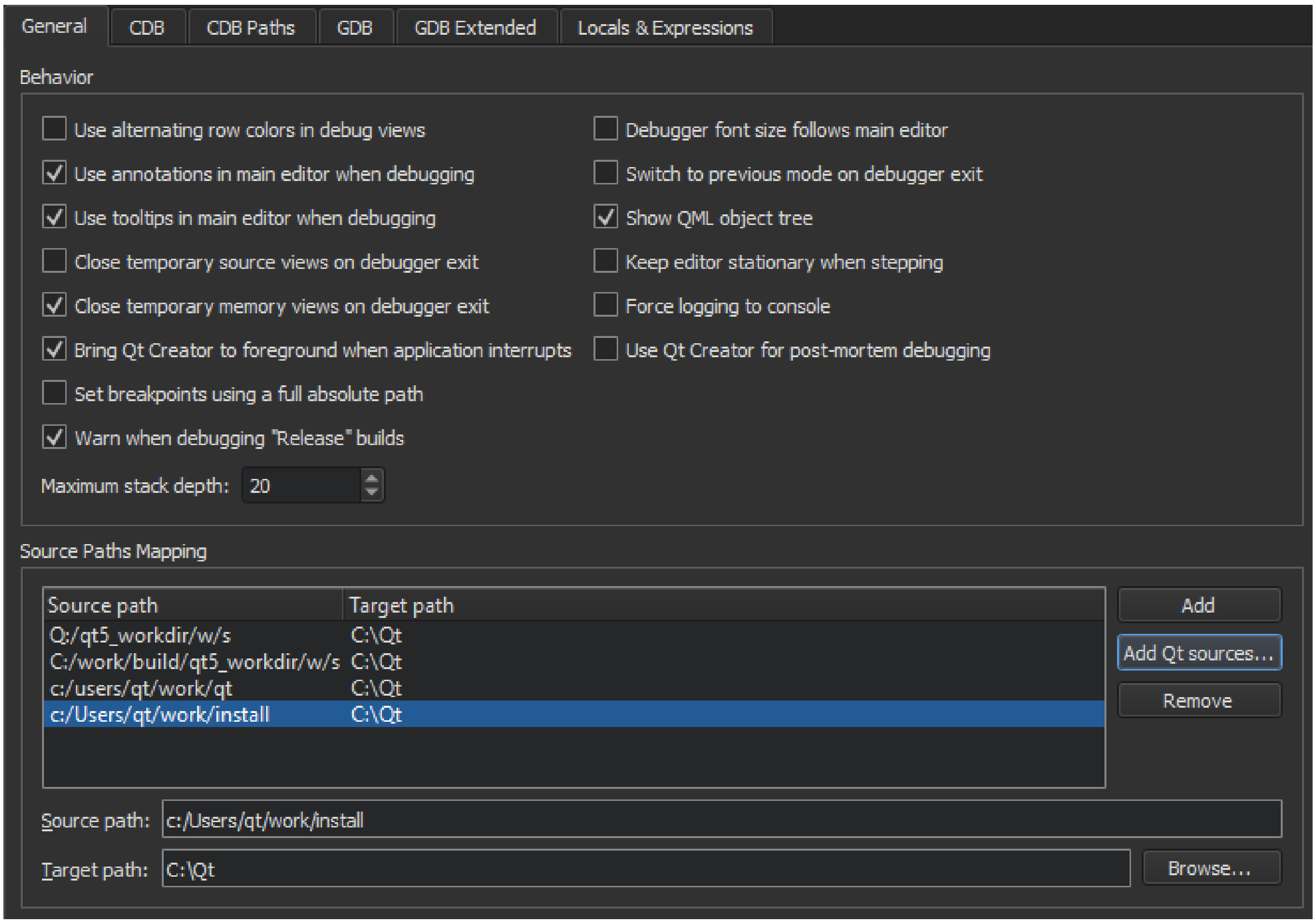
The **Registers** view displays the current state of the CPU registers. Depending on the CPU type, there will be different registers available. The values of registers that recently have changed are highlighted in red and empty register values as well as leading zeroes are grayed out.

In addition it is possible to edit the content of registers while the program is stopped. This applies to both General-purpose and Special-purpose registers. Registers can be edited in the standard condensed view or in their particular parts if the register is displayed expanded.

By default, the **Registers** view is hidden.

Specifying Debugger Settings

To specify settings for managing debugger processes, select **Edit** > **Preferences** > **Debugger**. In the **General** tab, you can specify settings that are common to all debuggers.



Behavior

- [ ] Use alternating row colors in debug views
- [✓] Use annotations in main editor when debugging
- [✓] Use tooltips in main editor when debugging
- [ ] Close temporary source views on debugger exit
- [✓] Close temporary memory views on debugger exit
- [✓] Bring Qt Creator to foreground when application interrupts
- [ ] Set breakpoints using a full absolute path
- [✓] Warn when debugging "Release" builds
- [ ] Debugger font size follows main editor
- [ ] Switch to previous mode on debugger exit
- [✓] Show QML object tree
- [ ] Keep editor stationary when stepping
- [ ] Force logging to console
- [ ] Use Qt Creator for post-mortem debugging

Maximum stack depth: 20

Source Paths Mapping

Source path	Target path
Q:/qt5_workdir/w/s	C:\Qt
C:/work/build/qt5_workdir/w/s	C:\Qt
c:/users/qt/work/qt	C:\Qt
c:/Users/qt/work/install	C:\Qt

Source path: c:/Users/qt/work/install

Target path: C:\Qt

You can customize the appearance and behavior of the debug views, specify settings for breakpoints, and map source paths to target paths.

You can view debug output in the **Debugger Log** view. However, in some Linux distributions, such as Arch Linux, debug output is sent to the system log. To override this behavior, select the **Force logging to console** check box. This sets `QT_LOGGING_TO_CONSOLE=1` in the environment of the debugged program, which effectively prevents storing debug output in system logs.

Mapping Source Paths

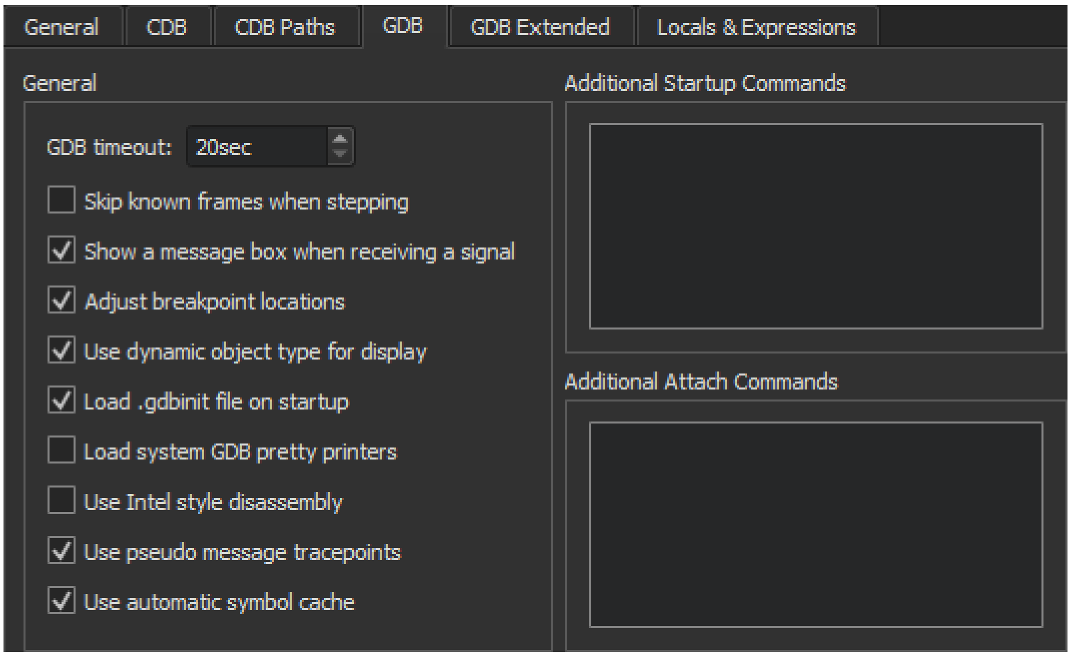
To automatically map the source paths to a Qt version that has not been patched, select **Add Qt Sources** and browse to the location of the Qt source files.

To manually map the source paths to target paths:

1. In **Source Paths Mapping**, select **Add** to add an entry to the path list.
2. In the **Source path** field, specify the source path in the debug information of the executable as reported by the debugger.
3. In the **Target path** field, specify the actual location of the source tree on the local machine.

Specifying GDB Settings

To specify settings for managing the GDB process, select **Edit** > **Preferences** > **Debugger** > **GDB**.



GDB timeout: 20sec

[✓] Skip known frames when stepping → unchecked: Skip known frames when stepping
✓ Show a message box when receiving a signal
✓ Adjust breakpoint locations
✓ Use dynamic object type for display
✓ Load .gdbinit file on startup
Load system GDB pretty printers
Use Intel style disassembly
✓ Use pseudo message tracepoints
✓ Use automatic symbol cache

To specify a timeout for terminating non-responsive GDB processes, set the number of seconds to wait in the **GDB timeout** field. The default value of 20 seconds should be sufficient for most applications, but if loading big libraries or listing source files takes much longer than that on slow machines, you should increase the value.

To compress several steps into one step for less noisy debugging when stepping into code, select the **Skip known frames when stepping** check box. For example, the atomic reference counting code is skipped, and a single *Step Into* for a signal emission ends up directly in the slot connected to it.

To display a message box as soon as your application receives a signal, such as SIGSEGV, during debugging, select the **Show a message box when receiving a signal** check box.

GDB allows setting breakpoints on source lines for which no code was generated. In such situations, the breakpoint is shifted to the next source code line for which the code was actually generated. To reflect such temporary changes by moving the breakpoint markers in the source code editor, select the **Adjust breakpoint locations** check box.

To specify whether the dynamic or the static type of objects will be displayed, select the **Use dynamic object type for display** check box. Keep in mind that choosing the dynamic type might be slower.

To allow reading the user's default .gdbinit file on debugger startup, select the **Load .gdbinit file on startup** check box.

To use the default GDB pretty printers installed in your system or linked to the libraries your application uses, select the **Load system GDB pretty printers** check box.

To have GDB automatically save a copy of its symbol index in a cache on disk and retrieve it from there when loading the same binary in the future, select the **Use automatic symbol cache** check box.

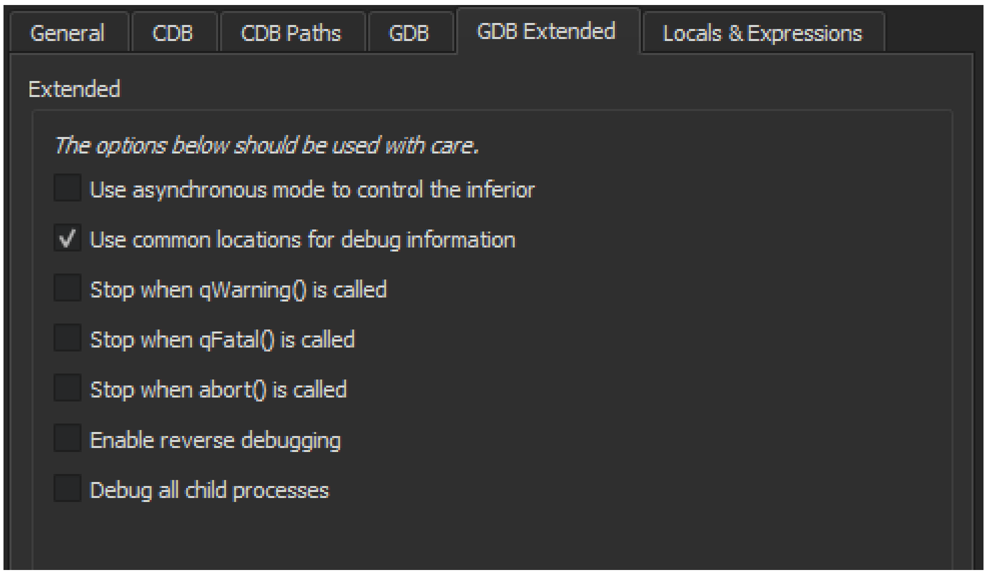
To execute GDB commands after GDB has been started, but before the debugged program is started or attached, and before the debugging helpers are initialized, enter them in the **Additional Startup Commands** field.

To execute GDB commands after GDB has successfully attached to remote targets, enter them in the **Additional Attach Commands** field. You can add commands to further set up the target here, such as `monitor reset` or `load`.

To execute simple Python commands, prefix them with `python`. To execute sequences of Python commands spanning multiple lines, prepend the block with `python` on a separate line, and append `end` on a separate line. To execute arbitrary Python scripts, use `python execfile('/path/to/script.py')`.

Specifying Extended GDB Settings

To specify extended settings for GBD, select **Edit** > **Preferences** > **Debugger** > **GDB Extended**. The settings give access to advanced or experimental functions of GDB. Enabling them may negatively impact your debugging experience, so use them with care.



Extended

The options below should be used with care.

- [ ] Use asynchronous mode to control the inferior
- [✓] Use common locations for debug information
- [ ] Stop when qWarning() is called
- [ ] Stop when qFatal() is called
- [ ] Stop when abort() is called
- [ ] Enable reverse debugging
- [ ] Debug all child processes

To use asynchronous mode to control the inferior, select the respective check box.

To add common paths to locations of debug information, such as `/usr/src/debug`, when starting GDB, select the **Use common locations for debug information** check box.

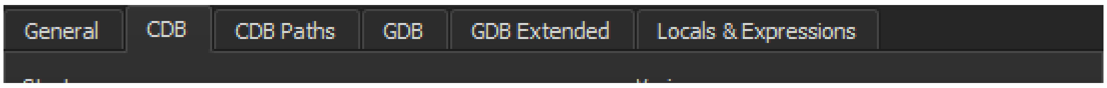
To stop when `qWarning`, `qFatal`, or `abort` is called, select the respective check box.

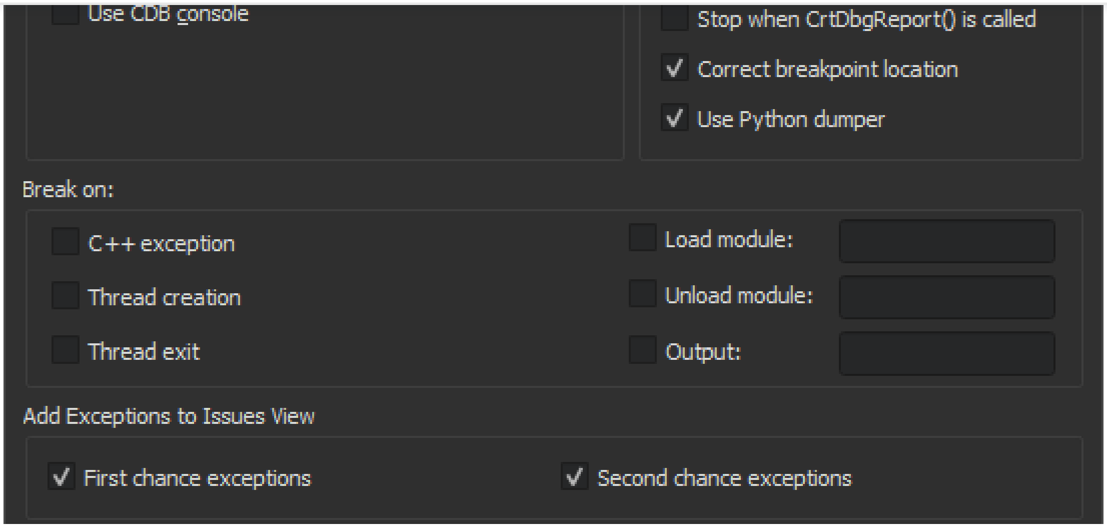
To enable stepping backwards, select the **Enable reverse debugging** check box. This feature is very slow and unstable on the GDB side. It exhibits unpredictable behavior when going backwards over system calls and is very likely to destroy your debugging session.

To keep debugging all children after a fork, select the **Debug all child processes** check box.

Specifying CDB Settings

To specify settings for managing the CDB process, select **Edit** > **Preferences** > **Debugger** > **CDB**.





☐ Use CDB console

☐ Stop when CrtDbgReport() is called

✓ Correct breakpoint location

✓ Use Python dumper

Break on:

☐ C++ exception

☐ Thread creation

☐ Thread exit

☐ Load module:

☐ Unload module:

☐ Output:

Add Exceptions to Issues View

✓ First chance exceptions

✓ Second chance exceptions

You can specify additional arguments for starting CDB in the **Additional arguments** field.

If a console application does not start up properly in the configured console and the subsequent attach fails, you can diagnose the issue by using CDB's native console. Select the **Use CDB console** check box to override the console set in the Windows system environment variables. Note that the native console does not prompt on application exit.

To automatically add a breakpoint on the `CrtCbgReport()` function, select the **Stop when CrtCbgReport() is called** check box. This catches runtime error messages caused by `assert()`, for example.

In the **Break on** group, specify whether the debugger should break on C++ exceptions, on thread creation or exit, on loading or unloading the specified application modules, or on the specified output.

To disable first-chance break on access violation exceptions, select the **Ignore first chance access violations** check box. The second occurrence of an access violation will break into the debugger.

CDB enables setting breakpoints in comments or on source lines for which no code was generated. In such situations, the breakpoint is shifted to the next source code line for which the code was actually generated. To reflect such temporary changes by moving the breakpoint markers in the source code editor, select the **Correct breakpoint location** check box. For more information, see Setting Breakpoints.

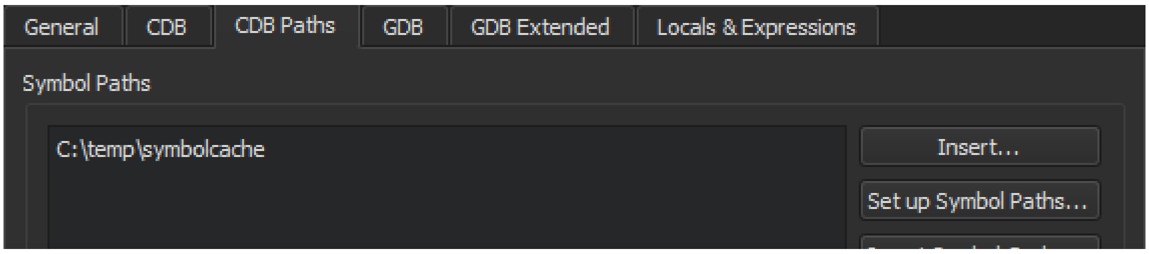
To use the abstraction layer provided by Python Dumper classes to create a description of data items displayed in the **Locals** and **Expressions** views, select the **Use Python dumper** check box. For more information, see Debugging Helper Implementation.

To display information about first-chance and second-chance exceptions in Issues, select the check boxes in the **Add Exceptions to Issues View** group.

Setting CDB Paths on Windows

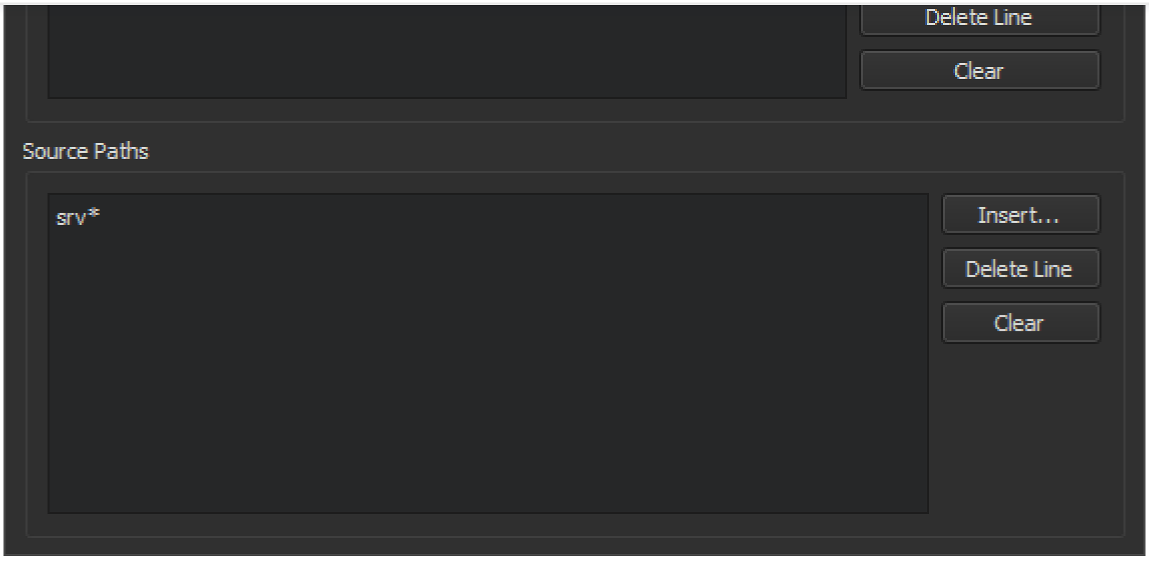
To obtain debugging information for the operating system libraries for debugging Windows applications, add the Symbol Server provided by Microsoft to the symbol search path of the debugger:

1. Select **Edit** > **Preferences** > **Debugger** > **CDB Paths**.



Symbol Paths

C:\temp\symbolcache



2. In the **Symbol Paths** group, select **Insert**.
3. Select the directory where you want to store the cached information. Use a subfolder in a temporary directory, such as `C:\temp\symbolcache`.
4. Select **OK**.

Note: Populating the cache might take a long time on a slow network connection.

To use the Source Server infrastructure for fetching missing source files directly from version control or the web, enter the following string in the **Source Paths** field: `srv*`.

< Launching the Debugger Using Debugging Helpers >

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