

## MARTe2-core - User story #188

### Object introspection base infrastructure

31.07.2015 15:49 - André Neto

<b>Status:</b> Closed	<b>Start date:</b> 31.07.2015
<b>Priority:</b> Normal	<b>Due date:</b>
<b>Assignee:</b>	<b>% Done:</b> 0%
<b>Category:</b>	<b>Estimated time:</b> 0.00 hour
<b>Target version:</b> 0.11	<b>Spent time:</b> 0.00 hour
<b>Git branch (link):</b>	<b>SVN commit (link/?p=rev):</b>
<b>Git merge to develop (link):</b>	

#### Description

Define the base infrastructure for object introspection.

This would satisfy requirements:

- MARTe-EX-F-2.2.1: The framework shall allow to fully introspect the properties of any of its object.
- MARTe-EX-F-2.2.2: The framework shall allow to introspect the class name of any of its objects.
- MARTe-EX-F-2.2.3: The framework shall allow to introspect the class type of any of its objects.

#### Source code files modified

- L0Types/BasicTypes.h
- L0Types/CompilerTypes.h
- L0Types/Introspection.h (Moved to L2Objects)
- L0Types/TypeDescriptor.h (Moved to L1Portability)
- L0Types/ZeroTerminatedArray.h
- L1Portability/ErrorManagement.h
- L1Portability/FormatDescriptor.cpp
- L1Portability/TypeDescriptor.\*
- L1Portability/StringHelper.h
- L2Objects/ClassRegistryItem.\*
- L2Objects/IntrospectionEntry.\*
- L2Objects/Introspection.\*
- L3Streams/IOBuffer.cpp
- L4Configuration/ConfigurationDatabase.\*
- L4Configuration/TypeConversion.\*
- L4Configuration/ValidateBasicType.\*
- L3Streams/IOBuffer.\*
- Lib/IntrospectionParser.\*

#### Architecture & design review

**Date of the review:** 31/07/2015

**Person who did the review:** Andre' Neto

**Version of architecture & design document:** N/A. As per the original MARTe implementation, this is a support function and does not require formal design in UML.

**Result of review:** N/A

**List of non-conformities:** N/A

#### Code and documentation review

**Date of the review:** 01/02/2016

**Person who did the review:** Andre' Neto

**Result of review:** PASS

**List of non-conformities:**

- During Specific Walk:
- File ./Source/Core/BareMetal/L3Streams/IOBufferIntegerPrint.cpp line 531: MARTe::BitSetToInteger(?, ?, ?, 8?, !=0) [#1](#)
- File ./Source/Core/BareMetal/L3Streams/BitSetToInteger.h line 345: MARTe::BitSetToBitSet([1], 0, 8, 1, ?, ?, 8?, !=0) [#2](#)
- File ./Source/Core/BareMetal/L3Streams/BitSetToInteger.h line 286: MARTe::BSToBS([1], 0, 8, 1, ?, 31? | 0?, 8?, !=0) [#3](#)
- File ./Source/Core/BareMetal/L3Streams/BitSetToInteger.h line 105: MARTe::MemoryOperationsHelper::Copy([4], ?, 5?) #31
- ./Source/Core/BareMetal/L1Portability/Environment/Generic/MemoryOperationsHelper\_CLIB\_Generic.cpp:58:1: Warning 669: Possible data overrun for function 'memcpy(void \*, const void \*, unsigned long)', argument 3 (size=5) exceeds argument 1 (size=4)
- ./Source/Core/BareMetal/L3Streams/BitSetToInteger.h:101:1: Info 831: Reference cited in prior message
- ./Source/Core/BareMetal/L3Streams/BitSetToInteger.h:105:1: Info 831: Reference cited in prior message
- ./Source/Core/BareMetal/L3Streams/BitSetToInteger.h:227:1: Info 831: Reference cited in prior message
- ./Source/Core/BareMetal/L3Streams/BitSetToInteger.h:242:1: Info 831: Reference cited in prior message
- ./Source/Core/BareMetal/L3Streams/BitSetToInteger.h:286:1: Info 831: Reference cited in prior message
- ./Source/Core/BareMetal/L3Streams/BitSetToInteger.h:345:1: Info 831: Reference cited in prior message
- ./Source/Core/BareMetal/L3Streams/IOBufferIntegerPrint.cpp:528:1: Info 831: Reference cited in prior message
- ./Source/Core/BareMetal/L3Streams/IOBufferIntegerPrint.cpp:531:1: Info 831: Reference cited in prior message
- ./Source/Core/BareMetal/L4Configuration/ParserI.cpp:51:80: Note 9138: null statement not in line by itself [MISRA C++ Rule 6-2-3]

## Unit test review

**Date of the review:** 03/02/2015

**Person who did the review:** Ivan Herrero

**Result of coverage tests review:** PASS

**Result of functional tests review:** PASS

**Result of review:** PASS

**List of non-conformities:**

- Object::Clone(), and Object::Initialise() are not tested, but it is fine because they are not really implemented, yet.
- LexicalAnalyzer.cpp, IOBufferFloatPrint.cpp, and IOBuffer.cpp have some error handling branches not covered, that consist of a bit more than a simple error reporting sentence. Anyway, they have been left uncovered, because the error is hard to simulate.
- The following tests on Windows platform fail:

```
[-----] Global test environment tear-down
[=====] 2502 tests from 75 test cases ran. (78098 ms total)
[ PASSED ] 2462 tests.
[ FAILED ] 40 tests, listed below:
[ FAILED ] AnyObjectGTest.TestGetType_Scalar_String
[ FAILED ] AnyTypeGTest.TestAnyType_ConstCharPointerToConst
[ FAILED ] BufferedStreamIGTest.TestPrintFormatted_CCString_BufferSize_1
[ FAILED ] BufferedStreamIGTest.TestPrintFormatted_CCString_BufferSize_2
[ FAILED ] BufferedStreamIGTest.TestPrintFormatted_CCString_BufferSize_8
[ FAILED ] BufferedStreamIGTest.TestPrintFormatted_CCString_BufferSize_64
[ FAILED ] BufferedStreamIGTest.TestPrintFormatted_CCString_BufferSize_128
[ FAILED ] BufferedStreamIGTest.TestPrintFormatted_CCString_BufferSize_1024
[ FAILED ] ConfigurationDatabaseGTest.TestCopy
[ FAILED ] DirectoryGTest.TestGetLastAccessTime_ReRead
[ FAILED ] DirectoryGTest.TestGetLastAccessTime_ReRead2
[ FAILED ] IOBufferGTest.TestPrintFormatted_CCString
[ FAILED ] JsonParserGTest.TestParseVector
[ FAILED ] JsonParserGTest.TestParseMatrix
[ FAILED ] LoadableLibraryGTest.TestOpenCloseLibrary
[ FAILED ] LoadableLibraryGTest.TestCloseLibrary
[ FAILED ] LoadableLibraryGTest.TestLoadFunction
```

```
[ FAILED ] LoadableLibraryGTest.TestLoadFunctionSquareBracketsOperator
[ FAILED ] LoadableLibraryGTest.TestGetModule
[ FAILED ] MutexSemGTest.TestIsRecursive
[ FAILED ] MutexSemGTest.TestRecursiveOff
[ FAILED ] StreamMemoryReferenceGTest.TestAnyTypeOperator
[ FAILED ] StreamStringGTest.TestAnyTypeOperator
[ FAILED ] ThreadsGTest.TestBeginThreadStacksize0
[ FAILED ] TypeConversionGTest.TestInt32ToCArrayVector
[ FAILED ] TypeConversionGTest.TestUInt32ToCArrayVector
[ FAILED ] TypeConversionGTest.TestFloat32ToCArrayVector
[ FAILED ] TypeConversionGTest.TestCStringToCArrayVector
[ FAILED ] TypeConversionGTest.TestCArrayToInt32Vector
[ FAILED ] TypeConversionGTest.TestCArrayToUInt32Vector
[ FAILED ] TypeConversionGTest.TestCArrayToFloat32Vector
[ FAILED ] TypeConversionGTest.TestFloat32ToCArrayMatrixStaticToStatic
[ FAILED ] TypeConversionGTest.TestCArrayToFloat32MatrixStaticToStatic
[ FAILED ] TypeConversionGTest.TestCArrayToFloat32MatrixStaticToHeap
[ FAILED ] TypeConversionGTest.TestCArrayToCStringVector
[ FAILED ] TypeConversionGTest.TestCArrayToCStringMatrix
[ FAILED ] StandardParserGTest.TestParseVector
[ FAILED ] StandardParserGTest.TestParseMatrix
[ FAILED ] XMLParserGTest.TestParseVector
[ FAILED ] XMLParserGTest.TestParseMatrix
```

## Associated revisions

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### Revision c4beb5d4 - 29.09.2015 15:18 - Filippo Sartori

Merge branch 'master' into #188\_Introspection

### Revision da35c940 - 29.09.2015 15:19 - Filippo Sartori

Merge branch 'master' into #188\_Introspection

### Revision ee8ad586 - 22.10.2015 12:21 - Filippo Sartori

Merge branch 'master' into #188\_Introspection

Conflicts:

Source/Core/BareMetal/L3Streams/AnyType.h

### Revision 02b3550f - 18.01.2016 16:13 - Giuseppe Ferro

#188

-Created Introspection class

-Added the macro to register the introspection class to the ClassRegistryDatabase

### Revision e3f9b763 - 18.01.2016 16:14 - Giuseppe Ferro

#188

-Added Introspection class

-Added macro to register it into the ClassRegistryDatabase

### Revision b97157e1 - 18.01.2016 16:30 - Giuseppe Ferro

#188 Added ZeroTerminatedArray

### Revision 1d598e58 - 19.01.2016 18:43 - Giuseppe Ferro

#188 Added introspection tests

Added GetTypeCastDescriptor function to AnyTypeCreator

Added GetChildName and GetNumberOfChilds to ConfigurationDatabase

WIP Introspection parser

### Revision 3599d735 - 20.01.2016 12:42 - Giuseppe Ferro

#188

-Added lookup table [basic type name - TypeDescriptor]

-Moved TypeDescriptor from Level0 to Level1 because it needs StringHelper.

-Moved Introspection stuff to Level2 because IntrospectionEntry needs ClassRegistryDatabase to build in runtime the TypeDescriptor if it is an

Object.

-Added the implementation of IntrospectionParser in the Lib folder

**Revision ae722abf - 20.01.2016 13:04 - Giuseppe Ferro**

#188 Linting done

**Revision f2f827c0 - 20.01.2016 13:52 - Giuseppe Ferro**

#188 Source code documentation done.

**Revision e2a9866e - 20.01.2016 17:05 - Giuseppe Ferro**

#188 Improved and documented Tests

**Revision 9e02a299 - 20.01.2016 17:08 - Giuseppe Ferro**

#188 Improved documentation of tests

**Revision 45cf8438 - 20.01.2016 17:18 - Giuseppe Ferro**

Merge remote-tracking branch 'origin/#296\_GTest\_Folder\_Structure' into #188\_Object\_Introspection

**Revision efec44d0 - 20.01.2016 18:49 - Giuseppe Ferro**

#188 Fixed and checked test coverage

**Revision 59ac2744 - 21.01.2016 09:26 - Giuseppe Ferro**

#188 Improved the IntrospectionParser in order to use different parsers.

**Revision 749b5731 - 21.01.2016 09:28 - Giuseppe Ferro**

#188 Removed a comment

**Revision 4aaa97a4 - 21.01.2016 17:50 - Giuseppe Ferro**

#188 Added ZeroTerminatedArray tests

**Revision e3640f3b - 21.01.2016 18:18 - Giuseppe Ferro**

#188 Improved documentation

**Revision 2384a046 - 22.01.2016 10:17 - Giuseppe Ferro**

#188

Added the pointer level to the function IsConstant in IntrospectionEntry and the function GetMemberPointerLevel

**Revision 3bdbe1f7 - 22.01.2016 18:08 - Giuseppe Ferro**

#188 Work in progress struct type conversion

**Revision 1a4ba2fd - 25.01.2016 18:55 - Giuseppe Ferro**

#188 Added ValidateBasicType

Added tests on TypeConversion for structuredData

Added Read and Write for StructuredData for ConfigurationDatabase

Changed Copy to do a real ConfigurationDatabase copy

**Revision ae53deb2 - 27.01.2016 18:41 - Giuseppe Ferro**

#188

-Added Tests

-Improved linting and documentation

-Added print support of multidimensional, object, introspection and buffered data

**Revision f6abac40 - 29.01.2016 15:51 - Giuseppe Ferro**

#188

-Finished Tests and Documentation

**Revision 26354db2 - 29.01.2016 17:08 - Giuseppe Ferro**

#188  
-Adjusted IntrospectionParser with the new configuration

**Revision 732857d3 - 29.01.2016 17:38 - Giuseppe Ferro**

#188  
Improved documentation

**Revision 6ffcab7c - 29.01.2016 17:40 - Giuseppe Ferro**

#188  
Improved documentation

**Revision 369fa7b6 - 31.01.2016 17:23 - André Neto**

#188 Small lint and documentation corrections

Corrected some lint errors and clarified documentation.

**Revision 08716c63 - 01.02.2016 10:04 - Giuseppe Ferro**

#188 Merge commit

**Revision 5b4edb1e - 01.02.2016 10:04 - Giuseppe Ferro**

Merge branch '#188\_Object\_Introspection' of <https://vcis-gitlab.f4e.europa.eu/aneto/MARTe2.git> into #188\_Object\_Introspection

**Revision d3b39159 - 01.02.2016 10:50 - Giuseppe Ferro**

#188 Added the test of CLASS\_INTROSPECTION\_REGISTER macro

**Revision e55a7b74 - 01.02.2016 16:08 - Ivan Herrero**

#188 - Fix error on test value used in  
IntrospectionTest::TestMacroToAddObjectClassRegistryDatabase().

**Revision 3b041ee1 - 01.02.2016 16:37 - Ivan Herrero**

#188 - Finish incomplete postcondition on IntrospectionEntry constructor  
and update its unit test.

**Revision 56f4a945 - 01.02.2016 18:35 - Giuseppe Ferro**

#188 Added tests

**Revision 976feec5 - 01.02.2016 18:36 - Giuseppe Ferro**

Merge branch '#188\_Object\_Introspection' of <https://vcis-gitlab.f4e.europa.eu/aneto/MARTe2.git> into #188\_Object\_Introspection

**Revision e2dc9c62 - 02.02.2016 10:34 - Giuseppe Ferro**

#188 Improved testing

**Revision d7a1d96e - 02.02.2016 11:22 - Giuseppe Ferro**

#188  
Added a test

**Revision 3cfbc015 - 02.02.2016 11:23 - Ivan Herrero**

#188 - Add postconditions on TypeDescriptor's constructors.

**Revision bfe69342 - 02.02.2016 11:24 - Ivan Herrero**

Merge branch '#188\_Object\_Introspection' of <https://vcis-gitlab.f4e.europa.eu/aneto/MARTe2.git> into #188\_Object\_Introspection

**Revision b90b7e75 - 02.02.2016 11:45 - Ivan Herrero**

#188 - Fix linting issue on Parserl.

**Revision 013acbcd - 02.02.2016 12:09 - Giuseppe Ferro**

#188 Change the BasicTCPSocket::WaitConnection from recursive to loop

**Revision 3283c59c - 02.02.2016 12:10 - Giuseppe Ferro**

Merge branch '#188\_Object\_Introspection' of <https://vcis-gitlab.f4e.europa.eu/aneto/MARTe2.git> into #188\_Object\_Introspection

**Revision 987f9977 - 03.02.2016 18:19 - Ivan Herrero**

#188 - Update StringHelper\_CLIB\_Generic.cpp and ErrorManagement.cpp to last generic version.

**Revision b8b94fa7 - 03.02.2016 18:20 - Ivan Herrero**

#188 - Fix syntax error on /Core/BareMetal/L1Portability/Environment/Windows/Makefile.inc (extra tab removed).

**Revision a1f7b00b - 03.02.2016 18:21 - Ivan Herrero**

#188 - Fix error TimeStamp.cpp (inclusion of ctime header was missing).

**Revision 48e6ad1e - 03.02.2016 18:26 - Ivan Herrero**

#188 - Fix DLL exporting error (the BasicConsole::Close function has been reverted to non-virtual because, for unknown reasons, it is not exported when is virtual, so it is not found at runtime, hence making the program to abort).

## History

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**#1 - 31.07.2015 15:49 - André Neto**

- Target version set to 0.3

**#2 - 31.07.2015 16:10 - André Neto**

- Description updated

**#3 - 08.09.2015 12:39 - André Neto**

- Target version changed from 0.3 to 0.5

**#4 - 08.09.2015 12:56 - André Neto**

- Status changed from New to Code: Impl

**#5 - 27.09.2015 10:12 - André Neto**

- Assignee set to Filippo Sartori

**#6 - 29.09.2015 12:27 - André Neto**

- Target version changed from 0.5 to 0.6

**#7 - 26.10.2015 15:17 - Ivan Herrero**

- Target version changed from 0.6 to 0.7

**#8 - 10.11.2015 17:36 - André Neto**

- Target version changed from 0.7 to Backlog

**#9 - 18.01.2016 10:57 - André Neto**

- Assignee changed from Filippo Sartori to Giuseppe Ferro

- Target version deleted (Backlog)

**#10 - 18.01.2016 12:28 - Giuseppe Ferro**

- Status changed from Code: Impl to Code: Rev

**#11 - 18.01.2016 12:34 - Giuseppe Ferro**

- Description updated

- Assignee deleted (Giuseppe Ferro)

**#12 - 18.01.2016 12:35 - Giuseppe Ferro**

- Description updated

**#13 - 18.01.2016 12:36 - Giuseppe Ferro**

- Status changed from Code: Rev to Code: Impl

**#14 - 18.01.2016 12:36 - Giuseppe Ferro**

- Assignee set to Giuseppe Ferro

**#15 - 18.01.2016 13:09 - André Neto**

- Target version set to 0.11

**#16 - 21.01.2016 09:54 - Giuseppe Ferro**

- Description updated

- Status changed from Code: Impl to Code: Rev

- Assignee deleted (Giuseppe Ferro)

code implementation done: 749b573

Created from #296\_GTest\_Folder\_Structure

**#17 - 22.01.2016 10:18 - Giuseppe Ferro**

- Description updated

**#18 - 26.01.2016 14:47 - Ivan Herrero**

- Status changed from Code: Rev to Code: Impl

**#19 - 29.01.2016 17:11 - Giuseppe Ferro**

- Description updated

**#20 - 29.01.2016 17:11 - Giuseppe Ferro**

- Status changed from Code: Impl to Blocked

**#21 - 29.01.2016 17:12 - Giuseppe Ferro**

- Status changed from Blocked to Unit: Rev

**#22 - 29.01.2016 17:12 - Giuseppe Ferro**

- Status changed from Unit: Rev to Code: Rev

**#23 - 29.01.2016 17:35 - Giuseppe Ferro**

- Description updated

**#24 - 31.01.2016 08:29 - André Neto**

- Description updated

**#25 - 31.01.2016 08:53 - André Neto**

- Description updated

**#26 - 31.01.2016 09:25 - André Neto**

- Description updated

**#27 - 31.01.2016 10:09 - André Neto**

- Description updated

**#28 - 31.01.2016 10:11 - André Neto**

- Description updated

**#29 - 31.01.2016 17:00 - André Neto**

- Description updated

**#30 - 31.01.2016 20:46 - André Neto**

- Assignee set to André Neto

**#31 - 01.02.2016 15:04 - André Neto**

- Description updated

**#32 - 01.02.2016 15:05 - André Neto**

- Status changed from Code: Rev to Unit: Impl

**#33 - 01.02.2016 15:05 - André Neto**

- Assignee changed from André Neto to Ivan Herrero

**#34 - 01.02.2016 15:05 - André Neto**

- Status changed from Unit: Impl to Unit: Rev

**#35 - 01.02.2016 17:46 - Ivan Herrero**

- Description updated

- Status changed from Unit: Rev to Unit: Impl

- Assignee deleted (Ivan Herrero)

**#36 - 02.02.2016 09:08 - Ivan Herrero**

- Assignee set to Giuseppe Ferro

**#37 - 02.02.2016 10:51 - Ivan Herrero**

- Status changed from Unit: Impl to Unit: Rev

- Assignee changed from Giuseppe Ferro to Ivan Herrero

**#38 - 02.02.2016 12:16 - Ivan Herrero**

- Description updated

Unit test review finished on branch #188\_Object\_Introspection [b90b7e7].

**#39 - 03.02.2016 19:57 - Ivan Herrero**

- Description updated

**#40 - 04.02.2016 09:18 - Ivan Herrero**

- Description updated

- Status changed from Unit: Rev to Closed

- Assignee deleted (Ivan Herrero)

commit 17d5804ba45316e2875e1fe8ce29698b2e0bb009

Merge branch '#188\_Object\_Introspection' into develop

Conflicts:

Test/GTest/BareMetal/Makefile.inc

Test/GTest/FileSystem/Makefile.cov

Test/GTest/FileSystem/Makefile.inc

Test/GTest/Scheduler/Makefile.cov

Test/GTest/Scheduler/Makefile.inc