Release Note CODESYS V3.5 SP9 Patch 6

20.01.2017

1   Compatibility information and known restrictions

CODESYS Static Analysis

CODESYS V3.5 SP9 requires at least Version 4.1.0.0 of the CODESYS Static Analysis AddOn and will not work with older versions. Likewise, the CODESYS Static Analysis AddOn Version 4.1.0.0 requires at least version 3.5 SP9 of CODESYS and will not work with older versions.

Drive no longer supported by CODESYS SoftMotion

With the release of CODESYS V3.5 SP9, the following drive will no longer be supported by CODESYS SoftMotion: Nanotec SMCI47S

All previously delivered standard versions of the CODESYS setup contain the required drivers and libraries for these drives.

No more CODESYS product support for systems running a Windows version older than Windows 7

Along with the introduction of Windows 7, Microsoft has enhanced protection for Windows systems through certificate management. Due to this, Windows systems older than Windows 7 are no longer compatible.

Starting with CODESYS V3.5 SP9, the following CODESYS products will no longer be offered for systems running Windows versions older than Windows 7:

> CODESYS Control RTE
> CODESYS Control RTE (for Beckhoff CX)
> CODESYS Control SoftMotion RTE
> CODESYS Control SoftMotion RTE (for Beckhoff)
> CODESYS Control Win
> CODESYS Automation Platform SDK
> CODESYS OPC-Server
> CODESYS HMI
> CODESYS Gateway

1.1   Automation Platform

DeviceApplication OnlineServices CDS-46517

The following AutomationPlatform API methods/delegates in the _3S.CoDeSys.OnlineCommands. namespace have been deprecated:

> ILoginService.ConfigureLogin
> OnlineChangeDialogDelegate
> PromptDialogDelegate

Contents, order, number and sequence of values of the undocumented options array parameter may have changed.

1.2 Runtime System

RTS, OPCConfig, usability: Dialog „CoDeSys address of PLC" CDS-48239

To add "(recommended)" suffix in the dialog for setting the V3 PLC-address, the following OPCConfig.ini file entries may be used.

[PLCDefaults]

v3RecommendBlkDrvGeneric=1

;or (do not use both, may confuse users)

v3RecommendTcpIp=1

1.3 Compatibility Information for End Users

1.3.1 Automation Platform

Online change message CDS-42000

There are two distinct mechanisms to show the changes that occur during download:

If at login, changes have been found, there will be a message box to confirm Download or Online Change. This message box contains a Details button, that opens the Application Information dialog.

This dialog contains a text field labelled "Changes" that contains all changes in the source code of the project. For example, if a global variable has changed, the global variable list will be listed as changed.

If the application content is part of the project and downloaded to the runtime, then a second tab is present in the "Application Content" dialog. This second tab contains the changes between the generated code in the project and the generated code in the runtime.

For example, if a global variable has changed, the global variable list will be listed as changed, and all POUs that access this global variable!

The changes for this issue affect both mechanisms:

- First of all, the "Changes" text will always be generated, even if the Application Content is present. (it used to be either-or).
- Some of the content in both lists contain cryptic names, especially those that are generated by the I/O Configuration. In most cases, it will be possible to show the original object in the I/O Configuration as origin of the change. For example, Global Variable lists with a generated name like G1234...HPS will be replaced by the name of a module in the IO-Configuration.
- The output in the content text is more detailed. If an interface has changed, the output will contain the name of the changed variable.

Breakpoints CDS-21720

When performing a Reset Warm or Reset Cold, breakpoints are now re-enabled after the reset.

1.3.2 New Compiler Errors and Warnings

Allow to derive an IEC FB from an external library FB (despite known problems) CDS-51192

With Compiler Version >= 3.5.9.50, if an external function_block has the attribute 'ignore_error_361' no error message will be produced for the inheritance of an internal function block from an external function block.

NOTE: If you do so: all virtual function calls to an overloaded method of the internal function block will fail! Wrong code may be executed, or a crash may **occur**! We strongly recommend never ever to use this attribute! Consider using composition instead of inheritance, or any other suitable programming technique.

For example:

```
    pfbExtern : POINTER TO FBExtern;
    instIntern : FBInternDerived;


    pfbExtern := ADR(instIntern);
    pfbExtern^.Meth(in := 123.456);
```

The value of "in" will be wrong inside FBInternDerived.Meth, and so will be the THIS-Pointer.

Online Change: Handle out of memory exception CDS-47453

Error C0398 introduced for System.OutOfMemory Exception.

No error appears if a located variable is defined in a VAR_TEMP block CDS-46022

The error C0392 is reported if an AT declaration is used inside one of the following blocks: VAR_TEMP, VAR_IN_OUT and VAR CONSTANT

Output assignment of interfaces CDS-45977

The assignment is not supported, a type mismatch error is reported.

__ISVALIDREF returns TRUE for check of interface instance with value null CDS-43812

__ISVALIDREF is a special operator that should only be used for checking references. Interfaces and pointers can be checked via

    interf <> 0, pointer <> 0

Unfortunately, __ISVALIDREF did not check the input for any useful type but accepted all inputs.

Therefore, there will now be a new error message if __ISVALIDREF is used with any other type than REFERENCE types.

Online Change: wrong data after changed address CDS-44576

If an address is moved from one variable to another variable at an online change code, there will now be an error message, since we cannot guarantee correct copy code.

    Example:
```
    var1 : BYTE;
    var2 AT %MB0 : BYTE;
    ->
    var1 AT %MB0 : BYTE;
    var2 : BYTE;
```

This will no longer be possible with online change, since we do not generate a specific order for copying values, and the old value of var1 may be copied to %MB0 before the old value of var2 is copied from %MB0.

Assertion at compilation of project with Array with length 0 CDS-45776

With Compiler Version >= 3.5.9.0 there will now be an error message for arrays like this:

    arr[0..unsigned_const-1]

if (and only if) the unsigned_const is 0 because the upper border is evaluated as unsigned operation and would result in a too large number for any signed array border.

A way to avoid the problem would be to use a signed constant instead, or to cast the constant to a signed type:

```
arr[0..TO_INT(unsigned_const)-1]
```

PRIVATE should not be allowed for FB_Init CDS-45575

A new error message will be produced, if an FB_Init, FB_Exit or FB_ReInit Method is PRIVATE, or PROTECTED

No compile error reported if writing to an %I* input variable CDS-45684

There will now be a new error message for writing to variables located at %I* addresses

FB_Exit should be called to destroy local instances CDS-383

FB_EXIT is now called for instances allocated on the stack before the owning scope returns.

A warning has been added to inform users about the change of semantics in these cases.

In order to suppress the warning, decorate the POU declaring the local instance with the warning disable macro for the warning code C0394 ("{warning disable C0394}")

Implicit variables generated for properties with "Exclude from build" CDS-48066

The compiler now treats getters and setters marked with "Exclude from build" as if the corresponding accessor was missing from the object tree.

No implicit variable declaration is generated for properties without getters and setters.

A warning is generated if a property has neither a getter nor a setter.

1.3.3   Runtime System

-none-

1.4   Compatibility Information for OEMs

1.4.1   Automation Platform

Power PC: Stackframe CDS-45213

Requires targetsetting "codegenerator\\EABIStackFrame"

Attention:

The stack frame of the CODESYS PowerPC and PowerPC VLE codegenerator changed in a way that it is now according to EABI

and thus the same in CODESYS application context and in C context . This requires an adaptation of the runtime system layer, which implicitly relies on the stack frame of the CODESYS application. Following functions of SysCpuHandlingOS.c must be adapted:

- SysCpuGetInstancePointer()

This function is used to get the instance pointer, which is placed on the stack by the CODESYS application relatively to the base pointer. The relative offset of the instance pointer to the base pointer changed from 16 byte to 8 byte.

- SysCpuGetCallstackEntry2()

To roll back the call stack in case of an exception or a breakpoint in the CODESYS IDE, this function gets the necessary information like the return address and the previous base pointer, by using the current base pointer.

As the stack frame of CODESYS application context and the C context is usually different, there is an differentiation between those contexts. This is not necessary anymore and the implementation may be the same for both contexts now, which is usually implemented in the function SysCpuGetCallstackEntry().

- SysCpuSearchOnStack_()

In case of an exception in an external C function and the case that SysCpuGetCallstackEntry2() was not able to roll back the call stack, it is tried to find a pattern, placed by the CODESYS application on the stack. This allows to roll back the call stack of the CODESYS application independent of the number of nested function call in the external C implementation. As the stack frame is the same for both contexts now, this function is not needed and should return ERR_NOTIMPLEMENTED.

Please refer to the interface documentation of the SysCpuHandling interface in Components/SysCpuHandlingItf.h of your runtime toolkit for more detailed information and to the example implementation of the described functions in SysTemplates/Sys/SysCpuHandlingOS.c of your runtime toolkit.

Redundancy CDS-44089

The services (write variable, force variable, release force list, online change) which are executed synchronously on both plcs cannot be selected any more in Redundancy Configuration editor. They are now activated per default when the settings are written to the plcs.

A custom setting of the supported services can be written by using IRedundancySettings. TransmitSynchServices. The services from IRedundancySettings.SynchServices are then written when the settings are written to the PLCs.

1.4.2   Runtime System

M4-Export CDS-47088

Constant literals and enum initial values are exported now via constant macros (#define RTS_IEC_type_C(constant)) in the m4 file to be portable in the runtime.

These new constant qualifiers are available only in the runtime with v3.5.9.0 and later. So you will get compile errors if you use these exported m4 files in previous versions of the runtime system.

There are 2 workarounds for previous runtime versions:

1st You export the library with CODESYS < v3.5.9.0

2nd You add the missing defines in your platform specific sysdefines.h of your runtime system:

```
#define RTS_IEC_BOOL_C(x) (x)

#define RTS_IEC_BYTE_C(x) (UINT8_C(x))

#define RTS_IEC_SINT_C(x) (INT8_C(x))

#define RTS_IEC_USINT_C(x) (UINT8_C(x))

#define RTS_IEC_INT_C(x) (INT16_C(x))

#define RTS_IEC_UINT_C(x) (UINT16_C(x))

#define RTS_IEC_DINT_C(x) (INT32_C(x))

#define RTS_IEC_UDINT_C(x) (UINT32_C(x))

#define RTS_IEC_LINT_C(x) (INT64_C(x))

#define RTS_IEC_ULINT_C(x) (UINT64_C(x))

#define RTS_IEC_WORD_C(x) (UINT16_C(x))

#define RTS_IEC_DWORD_C(x) (UINT32_C(x))

#define RTS_IEC_LWORD_C(x) (UINT64_C(x))

#define RTS_IEC_REAL_C(x) (x)
```

```
#define RTS_IEC_LREAL_C(x) (x)
#ifdef TRG_64BIT
#define RTS_IEC_XINT_C(x) (INT64_C(x))
#define RTS_IEC_UXINT_C(x) (UINT64_C(x))
#define RTS_IEC_XWORD_C(x) (UINT64_C(x))
#else
#define RTS_IEC_XINT_C(x) (INT32_C(x))
#define RTS_IEC_UXINT_C(x) (UINT32_C(x))
#define RTS_IEC_XWORD_C(x) (UINT32_C(x))
#endif
```

CODESYSControl: Management of X.509 certificates CDS-47581

The new X509 Certificate store saves the certificates and private keys under the $.pki$ placeholder. This folder structure is managed by the certificate store and not meant to be modified by hand.

The default folder will .pki in the working directory of the PLC .

There will be PLC shell commands to manage the certificates.

Use "?" to get a list of commands.

By now, this is a temporary solution for security reasons. In the future, this folder structure has to be protected from unauthorized access. See CDS-49418.

OPC UA / Server: Public component interface CDS-47004

There is a new OPC UA provider interface (CmpOPCUAProviderInterfaceItf.m4) which allows for extending the OPC UA server with custom nodes. In this way, a new provider can be implemented in a separate component.

CAA NetBaseServices CDS-45946

Uses CmpAsyncMgr for TCP, which needs to be implemented by the used runtime system, when DEFINE CAA_NETBASESERVICES_USE_ASYNCMGR is set. In this case, two extra threads are used:

1.) for opening and closing sockets

2.) for send and receive.

The priority can be set by means of the library parameters gc_udiTaskOpenerPriority and gc_udiTaskRWPriority, which are default on 240 (low priority).

When this DEFINE is not set, the calls on the sockets will be executed on the calling thread context. This is normally the IEC task, which may be blocked by the incorrectly implemented non-blocking sockets on the used system.

1.4.3 Compiler

Performance CDS-51585

Compilerversion 3.5.9.60

Since V3.5 SP9 Patch 1 an assignment of strings was done by byte to byte copy. This is only necessary for some special devices. Therefore we reimplemented the old code (dword-copy), to enable the byte-copy, you have to use the new targetsetting codegenerator\\memcopy-bytewise". (Default is false).

2 Not released / not tested

Test	Description	Reference
Profinet CIFX Controller	CifX Driver for the new Profinet Stack from Hilscher Currently not available on Big-Endian Systems. Requires Firmware > V3.1.0.0, which is contained in setup, but is not referenced by default (has to be done manually, file cifxpnmV3.nxf). Reconfigure not implemented (not possible in IRT Mode).	CDS-38707
Profinet CIFX Master	Reconfiguration (at runtime) of enabled/diabled slave fails. The original enbaled/disabled state remains.	CDS-49512
Profinet – Beagle Bone Black	Profinet does not work.	CDS-49105
Runtime-Full – Linux SH4	No working test hardware available.	
SoftMotion – CAN Nanotec	Drive is no longer supported from CODESYS V3.5 SP9.	
SoftMotion – ETC Servotronix_CDHD	Servotronix has sporadic faults.	SM-252
SoftMotion – ETC KEB H6	Regression test not executed due to problems with test hardware.	SM-51

3 OEM information from JIRA

To read up on implemented features and changes you can use your JIRA account. Please find some example filters below.

List of features and changes:

fixVersion = "V3.5 SP9 Patch 6"

List of features and changes since CODESYS V3.5 SP9:

fixVersion = "V3.5 SP9 Patch 6" OR fixVersion = "V3.5 SP9 Patch 5" OR fixVersion = "V3.5 SP9 Patch 4" OR fixVersion = "V3.5 SP9 Patch 3" OR fixVersion = "V3.5 SP9 Patch 2" OR fixVersion = "V3.5 SP9 Patch 2" OR fixVersion = "V3.5 SP9 Patch 1" OR fixVersion = "V3.5 SP9"

List of issues with compatibility information:

fixVersion = "V3.5 SP9 Patch 6" AND (text ~ COMPATIBILITY_INFORMATION OR text ~ KNOWN_LIMITATIONS)

4 History

Created: Rico Ottliczky (QA)
Reviewed: Peter Zenker(QA)
Released: Rico Ottliczky (QA)