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Report

CODAC Core System Version 6.1 Release Notes

This note is a supplementary document for the CODAC Core System (CCS) to provide users with information on the changes introduced with the release of the CCS 6.1.0 version

Approval Process			
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Change Log			
CODAC Core System Version 6.1 Release Notes (Y92E73)			
Version	***Latest Status***	***Issue Date***	***Description of Change***
v0.0	In Work	14 Feb 2019	
v1.0	Signed	27 Feb 2019	For the release, except for the list of documents (last chapter).
v1.1	Approved	05 Mar 2019	Update the list of documents with final list & version for the release of CCS 6.1.0

CODAC CORE SYSTEM VERSION 6.1 RELEASE NOTES

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This note is a supplementary document for the CODAC Core System (CCS) to provide users with information on the changes introduced with the release of the CCS 6.1.0 version. See **warnings** in these notes for changes that may have a significant impact on existing I&C applications. Those that are present since previous versions are indicated with a **reminder**.

This document is complemented with on-line information that is available at the **CODAC Core System Community Pages** that provides the CCS users with the up-to-date status of:

- The **documentation**
- The **changes** introduced in each components (improvements and bug fixes)
- The **known issues** remaining in the 6.1.0 version
- The **roadmap**
- The **training** material - these will be updated for CCS 6.1.0 workshops in April 2019.

The **CS-Studio release notes** are in a separate document: CODAC Core System Version 6.1 CS-Studio Release Notes (Y86FS7)

Warning I&C projects developed with a previous versions of CCS shall be migrated following the instructions available in the CODAC Core System Migration Guide (7JCFUD).

Main changes in CCS 6.1.0

1. PostgreSQL upgrade (v10)
2. Unification of programs and IOC process with better control of those.
3. New syntax of health monitoring variables (SYSM)
4. Stable OPC UA support
5. Fixes of issues in services handling for operational systems
6. PSOS definition less coupled to COS mapping
7. Full support (Linux driver and EPICS Device Support) for NI PXIe-6363 board
8. S7PLC driver supports mbbiDirect/mbboDirect record types

COMPONENTS UPDATE

	Components	5.4.0	6.0.0	6.1.0
Operating System	RHEL	6.5	**7.4**	
EPICS	EPICS	3.15.5	7.0.1	**7.0.2**
	EPICS V4	4.6.0		
Shared Units	Java	1.8.0	1.8.0	1.8.0
	Eclipse	4.5.2	4.6.3	**4.7.3**
	PostgreSQL	9.3.5	9.6.2	**10.5**
	Tomcat	8.0	8.5.13	8.5.13
	Firefox	24.7.0	**52.3.0**	52.3.0
Control System Studio	CS-Studio	4.4.7	4.5.2	**4.6**
Self Description Data	SDD tools	5.4	**6.0**	**6.1**
Maven Tools	Maven tools	5.4	**6.0**	**6.1**
Health Monitoring	Health Mon	1.6	1.7	**2.0**
PLC Driver	S7PLC ASYN	1.4	1.5	**1.6**
	SPSS	3.2	3.4/1.0	**3.5/1.1**
TCN Support	TCN API	3.2.1	3.3.0	3.3.1
	TCNd	5.1.0	5.2.0	5.2.0
	Unified PTPd	1.0.0	1.1	1.1
SDN Support	SDN API	2.1.2	2.2.0	2.2.0
	SDN Archiver	1.1.0	1.1.0	1.2.0
DAN Support	DAN API	2.2.3	**3.1.0**	**3.2.0**
Logging Library	LOG API	1.3.0	1.3.4	1.3.4
NI Sync	NI SYNC	2.1.3	2.2.0	2.2.0
	NI SYNC EPICS	2.1.2	2.1.2	2.1.2
PXI-6259	PXI-6259	2.5.1	2.5.1	2.5.2
	PXI-6259 EPICS	2.6.1	2.6.1	2.6.1
PXI-6528	PXI-6528	1.3.0	1.3.1	1.3.1
	PXI-6528 EPICS	1.3.4	1.3.4	1.3.4
PXIe-6368 / PXIe-6363	PXIe-6368	2.2.0	3.0.0	3.0.0
	PXIe-6368 EPICS	1.5.0	1.5.0	1.6.1
NI RIO	NI RIO	2.0.0	2.1.0	2.1.1
	IRIO EPICS	1.1.2	1.1.2	1.1.2
OPC UA	OPC UA Support	p0.9.1	p0.9.2	0.3.1
	OPC UA library	1.5.4	1.5.5	1.5.5

Reminder From version 6.0, NDS has been removed from the CCS distribution and will be distributed separately.

1 Operating System

The RHEL version is RHEL 7.4.

The kernel version is 3.10.0-693:

- 3.10.0-693.2.1 for the default installation
- 3.10.0-693.rt56.617 for the RT enhanced one (MRG-R).

Reminder From CCS 6.0.0:The NTP service daemon `ntpd` has been replaced by `chronyd`.

- System V / BSD init system, `initd`, has been replaced with `systemd` for services management.
- Linker became stricter with respect to external library references (see Migration Manual for details)

2 EPICS

EPICS 7 is included in the CCS 6.x distributions. It comprises the modules previously versioned as EPICS Base 3.x.x (3.15.5 in CCS 5.4.0) and the pvData/pvAccess modules (aka EPICS V4).

The details for all the EPICS components included in the CCS 6.1 distribution are available in the CCS 6.x EPICS Roadmap: EPICS Related Roadmap for CCS 6.x (UL8KVQ)

The included versions are the following:

Module	Version
EPICS 7	7.0.2
areaDetector (*)	Core: 3.4 SimDetector: 2.8
ASYN	4.34
Autosave	5.9
Busy	1.7
CA Gateway	2.1.0.0
CaSnooper	2.1.2.3
JCA	2.4.1
Multi-Core Utilities	1.2.1
PCAS	4.13.2
pvaPy	1.2.0
PyEpics	3.3.1
Sequencer	2.2.6
Std	3.5
StreamDevice	2.8.4
VisualDCT	2.8.1

(*) the RPMs are not installed as part of a CCS system profile but shall be installed as required, see the CCS 6.x EPICS Roadmap for details.

3 Shared Units

Changes:

- (11076) CCS 6.1 comes with the new major version of PostgreSQL, v10. All database applications have been migrated to this new version. Note that the switch back to CCS

6.0 is not clean (known issue 11505), and will require reboot after switching, before the 6.0 system can be used;
- (10787) CCS 6.1 comes with the new version of Eclipse, v4.7.3 (Oxygen). SDD tools as well as CS-Studio ones have been adapted to this version;
- (10511) `iter-rhn-*` family of commands, like `iter-rhn-register`, will no longer require root shell to operate (`sudo` is implicitly used);
- (10470) `codac-uninstall` command now will ask for confirmation. In scripts, use `-y` flag to force non-interactive execution;
- (10654) Similarly to `TCN_INTERFACE_NAME` and `DAN_INTERFACE_NAME`, a `PON_INTERFACE_NAME` environment variable is now made available to designate the network interface configured for PON connection.

4 Control System Studio (CS-Studio)

Main enhancements:

- Date & Time ISO Format
- New CSS Project Shortcuts
- Message History integrated in the Operator Interface
- PV Write History
- ITER Composite Alarm Root
- Improvement of the PV connection delay when running OPI
- Optimisation of the archive configuration import
- Starting and stopping services generate log messages
- css-dbmanager tool uses the generic codac-dev user
- Electrical Symbols Library Update

Main fixes:

- ISO time format issues fixed on the alarm table and messages history
- Archived sample timestamps were rounded up
- Subclipse usage reporting popup at startup
- Connectors issues

The details are provided in dedicated release notes: CODAC Core System Version 6.1 CS-Studio Release Notes (Y86FS7)

5 Self Description Data Tools

Main changes:

- (10996) EPICS IOCs are now presented as programs, which can be explicitly deployed on controllers. One can thus add or remove IOCs at will. It is, however, recommended to leave the default IOCs intact, in order not to disturb the generation process;
- (11001) Full support for OPC UA communication with PLCs. SDD Editor now allows management of OPC UA sessions and subscriptions of the IOCs concerned. An I&C project global setting was added to select between S7PLCAsyn and OPC-UA PLC interface;
- (11033, 11079) Support for new naming convention for health monitoring. Instead of an automatically assigned controller or cubicle index, it is now necessary to provide an ITER-valid component name to make this function working properly;

- (11083) SDD Editor now allows manual assignment of control unit indexes. If not used, indexes are assigned automatically from 0, as in previous releases. The base number of index counting can be now adjusted in the I&C project properties;
- (10995) Support for user-defined variable attributes. It is now possible to attach arbitrary name-value pairs to variables to store additional user-defined properties. Note that in CCS 6.1 these properties are persisted in Excel export only, but not in `sdd.xml` (known issue 11688);
- (10997) Initial support for generation of CS-Studio PVTable and PACE configuration. These tools are used at runtime to monitor, and, possibly, modify PV values;
- (10596) The functionality of the `sdd-cryo` addon, generating additional mapping files for large PLC projects, was integrated in SDD tools. The tool was dropped from the distribution. The new settings are now available in the SDD Editor Preferences window, as well as the `sdd-translator` options `-genmapping`, `-maxvarudt`;
- (11016) Support for mbbiDirect/mbboDirect records in PLCs;
- (11093) Support for 31-bit mask for mbbi/mbbo records on PLC. The previously supported mask was limited to 16 bits;
- (10032) Support for generation of PSOS machine in absence of defined COS-PSOS mapping, which often comes later in the design;
- (10853, 10855) SDN and DAN variable descriptions are now exported by translator, as they contain information valuable for post-processing;
- (8862) MAC address management is no longer considered to be in scope of SDD, so the corresponding fields were removed from the UI;
- (10843) Support creation of non-existing CBS levels from variable names on Excel import. Previously, all such variables were placed under `ORPHAN` function and had to be manually moved;
- (10794) Support for Excel export/import of DAN variables;
- (10209, 11389, 11569) SDD OPI files generation was aligned with the current practice, to avoid generating mimic canvases and get rid of the remaining hardcoded macros;
- (10406) SDD generated OPIs were improved to pass better the CS-Studio OPI checker. Some warnings may still be manifested. Also, general OPI usability feedback was taken into account (8280);
- (8804) SDD-generated OPIs now allow invocation of record-specific faceplates;
- (9020) Alarm page OPI mimic names were improved to replace the "`:`" variable name separator with "`__`" instead of "`_`", to avoid possibility of two valid names to collide;
- (10845) `sdd-sync` will now properly warn about attempts of loading newer project on older CCS systems. Previously, an unclear "`Unable to import`" message was displayed. Overall error reporting was also improved (10628);
- (11322) `sdd-sync-direct` (high performance `sdd-sync`) release v0.12. See changelog in `/opt/codac/sdd/sdd-sync-direct/doc/changelog.txt`;
- (10713) The hard ceiling of 1GB for memory heap was removed from SDD Editor to facilitate treatment of large I&C projects. It now defaults to the JVM's default heap

size. If that's not enough, it can be increased, as usual, with the "`sdd-editor -vmargs -Xmx`" option;

- (10567, 10660, 10702, 10793, 10796, 10944, 11021, 11099, 11102, 11107, 11134) Many usability improvements (but also few new inconveniences – 10575, 11564, 11635 – due to unfinished Eclipse migration);
- (11015) `file(1)` utility was enhanced to recognize some I&C project files. Example of the outputs before and after:

```
CCS-600:~/m-plc-sample> file -z *
pom.xml:    exported SGML document, ASCII text
sdd.xml.gz: XML 1.0 document, ASCII text, with very long lines (gzip
compressed data, from FAT filesystem (MS-DOS, OS/2, NT))
src:        directory

CCS-610:~/m-plc-sample> file -z *
pom.xml:    Maven project "plc-sample" version 0.0.0, packaging:
codac 6.1.0, ASCII text
sdd.xml.gz: ITER CODAC SDD IandCProject "plc-sample" version 0
(format 6.1.0), ASCII text (gzip compressed data, from FAT filesystem
(MS-DOS, OS/2, NT))
src:        directory
```

Versions of SDD reference data in this release:

- PBS snapshot version 20190204;
- CBS snapshot version 20190204;
- GBS snapshot version 20190204;
- TTT snapshot version 20190205;
- AAAA snapshot version 20160613 (no changes);
- SS snapshot version 20140129 (no changes);
- Units of measure snapshot version 20180130 (no changes);
- Equipment catalog snapshot version 20190205, including:
  - ITER slow controller catalog 333J63 v4.1 (11 Aug 2017);
  - ITER fast controller catalog 345X28 v2.7 (19 Dec 2018).

Reminder The SDD web application has been removed from the CCS distribution from version 6.0.0. Use SDD Editor for local development. Central web application can be consulted at https://sdd.iter.org.

6 Maven Tools

Changes:

- (10720) Maven Editor was aligned with `mvn` command line to allow operating on non-SDD projects. Previously, an error message "`Bad unit location or unit doesn't have sdd.xml or sdd.xml.gz file!`" was displayed on project import attempt;
- (11000) Similarly to SDD Editor, it is now possible to do "Save as New" in Maven Editor. It allows cloning projects seamlessly for further modification;
- (10463) Similarly to `dbl` command, the results of `dbla` command (list database aliases) will now be stored on disk during the IOC startup. Existing projects will have to be regenerated to benefit from this feature;

- (11100) ITER Maven plugin was enhanced to support C/C++ code coverage out of the box. To produce `lcov` coverage report, run "`mvn clean test -Dcoverage`";
- (11230) "`mvn sonar`" command was enhanced to support SonarQube project components. Previously, for multi-module software units, one Sonar project was produced per each module.

7 Health Monitoring

Changes:

- Synthesis health status of PCF, PSH, Cubicle and other components.
- New naming convention for including the component name in the PV name.
- Added dedicated process monitoring for PCF and PSH (VAR: PS)
- Added process monitoring option: The user can select process monitoring option (R: Must Run, S: Must stop, O: optional)
- (10559) CPU load is correctly calculated now.

Warning The PV names convention has changed. The names of the PVs linked with components are now built from the component name instead of a component type and index.

For a component named $(***PPPPPP)-$(TTT)-$(NNNN)***, the PV are named as: ***$(CBS)-SYSM-$(PPPP)-$(PP):$(TTT)$(NNNN)-[CCCC]-VAR*** instead of: ***$(CBS)-SYSM:$(X)$(nnn)[CCCC]-VAR***

8 PLC Driver

Changes:

- SPSS v3.5 for S7-300/400
- SPSS v1.1 for S7-1500
- Addition of mbbiDirect & mbboDirect record types
- mbbi and mbbi records support 32 bits integers in PLC.

Note Some issues have been fixed for redundant configurations but some conditions, such as the lost of time reference, need additional actions to be taken. Users of redundant PLC setups should contact codac-support for details.

9 TCN Support

New feature:

- Development of a TCN agent service collecting TCN-related information on every host and making it available as EPICSv7 (pvData/pvAccess) structured record to facilitate health assessment, human-friendly monitoring.

Reminder The support for the legacy NI PXI 6682 board is stopped from CCS 6.0 and the ptpd-nisync daemon has been removed from the distribution.

10 SDN Support

New features:

- Introduction of an AsynchronousSubscriber class in SDN core library to facilitate support for callback-style programming.
- Development of a SDN2PON gateway to expose SDN topics in the form of EPICSv7 (pvData/pvAccess) structured record natively supported in CS-Studio, e.g. extend monitoring widgets in BOY to display SDN-related variables and data.

Reminder Interoperability across little/big endian platforms introduced in 6.0.0 with some limitations.

Check CODAC Core System Version 6.0 Release Notes (VQYPWG) for details.

11 DAN Support

New features:

- Addition of metrics (number of lost samples at streamer and archiver level)
- Bug fixes

12 Logging Library

No Changes

13 NI Sync

No Changes

14 PXI-6259

No Changes

15 PXI-6528

No Changes

16 PXIe-6368 / PXIe-6363

Change:

- Full support for the PXIe-6363 board (lower cost, no simultaneous sampling at maximum rate) in the EPICS device support

17 NI RIO

Changes:

- (11230) NI RIO locking directory IRIO automatically created when driver module loaded. Previously, NI RIO fails to start if lock directory /var/lock/nirio is missing.

18 OPC UA

The OPC UA support component that was distributed as a prototype version has been replaced with the current version of the final implementation. While the features are more or less the same as using the prototype, the API (Makefile support, format of database links and commands in startup script) has changed. The SDD integration creates projects for the new support; using the prototype not recommended.

DOCUMENTATION UPDATE

Document	ID	5.4.0	6.0.0	6.1.0
CODAC Core System v6.1 Release Notes (this document)	Y92E73	-		v1.1
OVERVIEW				
CODAC Core System Overview	34SDZ5	v5.4	v6.1	v6.2
CODAC Core System User Manual	43PSH9	v3.9	v3.10	v3.11
INSTALLATION & SUPPORT				
CODAC Core System Installation Manual	33JNKW	v5.3	v6.0	v6.0
CODAC Core System Migration Guide	7JCFUD	v5.4	v5.7	v5.8
DEVELOPMENT & TESTING				
CODAC Core System App Developer's Manual	33T8LW	v5.4	v5.5	v5.6
SDD Editor User Manual	32Z4W2	v8.6	v8.7	v8.8
SDD Synchronization Guide	46AAXR	v1.17	v1.18	v1.18
How to include a new I/O module in SDD	A4WQDZ	v2.0	v2.0	v2.0
Maven Editor User Guide	7MT2YC	v5.7	v5.8	v5.9
System Health Monitoring Variables	35XFCY	v1.18	v1.19	v2.0
Logging library - Software User Manual	QEK784	v1.5	v1.5	v1.5
CONTROL SYSTEM STUDIO				
CODAC Core System 6.1 CS-Studio Release Notes	Y86FS7	-	-	v1.0
CODAC Core System CS-Studio User Guide	QVBYD8		v1.2	v1.3
Operator Interface standardisation - CSS BOY Edition and Runtime	7367JQ	v1.8	v1.9	v1.10
Operator Interface standardisation - CSS BOY Industrial Symbol Library	A69URK	v2.0	v2.1	v2.2
SLOW CONTROLLERS (PLC)				
SPSS User Manual	G4UMX5	v2.1	v2.2	v2.6
s7PLCAsyn EPICS Driver User's Manual	PJAHXJ	v1.8	v1.9	v1.10
PLC Sample Guide	2N8C3M	v4.2	v4.2	v4.2
FAST CONTROLLERS - I/O				
NI Sync Linux Device Driver User's Guide	2PLQ4P	v2.7	v2.7	v2.7
NI Sync EPICS Driver User's Guide	33Q5TX	v2.13	v2.14	v2.14
NI PXI-6259 Linux Driver User's Guide	32GTJY	v1.19	v1.19	v1.19
NI PXI-6259 EPICS Driver User's Guide	3DEY52	v2.11	v2.12	v2.12
NI PXI-6528 Linux Driver User's Guide	3ZHXQ9	v1.8	v1.8	v1.8
NI PXI-6528 EPICS Driver User's Guide	433VEW	v1.13	v1.13	v1.13
NI X-Series Linux Device Driver User's Guide	3LTMR6	v1.7	v1.7	v2.0
NI X-Series EPICS Driver User's Guide	3P4N3R	v1.9	v1.9	v1.9
NI-RIO Linux Device Driver User Manual	LW3UFH	v2.9	v2.10	v2.10
NI-RIO EPICS Device Driver User Manual	RAJ9P8	v1.7	v1.7	v1.7
IRIO Library user's manual	RATM8Z	v1.3	v1.3	v1.3
IRIO Design Rules for LabVIEW for FPGA	QQMYTY	-	v1.4	v1.4
FAST CONTROLERS – HPN				
TCN API - Software User Manual	N4XTGG	v1.16	v1.16	v1.16
PTPd User Manual	U2TTSZ	v1.3	v1.4	v1.4
TCNd User Manual	MUYNT6	v2.4	v2.6	v2.6
SDN Software User Manual	B7SKFU	v2.10	v2.12	v2.13
DAN User manual	Q6GULS	v2.6	v3.0	V3.2
SDN Archiver User Manual	SD29MG	v1.3	v1.4	v1.5