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EXTERNAL REFERENCE / VERSION

Report

CODAC Core System Version 6.2 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 6.2.0 version

Approval Process			
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Change Log			
CODAC Core System Version 6.2 Release Notes (2R7D3Q)			
Version	***Latest Status***	***Issue Date***	***Description of Change***
v0.0	In Work	20 Feb 2020	
v1.0	Approved	06 Mar 2020	First version, updated for 6.2 as of late afternoon 06/03/2020.

CODAC CORE SYSTEM VERSION 6.2 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 6.2.0 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 6.2.0 version
- The **roadmap**
- The **training** material.

The **CS-Studio release notes** are in a separate document: CODAC Core System Version 6.2 CS-Studio Release Notes (YTRPBC)

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 6.2.0

1. Java has been updated from version 8 to version 11, moving from from Oracle Java to the OpenJDK Java distribution.
2. The Eclipse framework has been updated to version 4.11.
3. FullHD support for CS-Studio OPI development has been dropped; using 4K resolution is now mandatory for OPI development. The FullHD parts are still shipped, but frozen at their state in the 6.1 release.
4. The OPC UA device support is now fully integrated into SDD.
5. The management of system services (including user programs and EPICS IOCs) using systemd has been improved and made more robust. The “run levels” of the previous SysV init.d system are not supported anymore.

COMPONENTS UPDATE

	Components	6.0.0	6.1.0	6.1.1	6.1.2	6.2.0
Operating System	RHEL	**7.4**				7.4
EPICS	EPICS	7.0.1	**7.0.2**			**7.0.3.1**
	EPICS V4					
Shared Units	Java	1.8.0	1.8.0			**11.0.3**
	Eclipse	4.6.3	**4.7.3**			**4.11.0**
	PostgreSQL	9.6.2	**10.5**			10.5
	Tomcat	8.5.13	8.5.13			8.5.13
	Firefox	**52.3.0**	52.3.0			52.3.0
Control System Studio	CS-Studio	4.5.2	**4.6**	4.6.2	4.6.202	4.6.307
Self Description Data	SDD tools	**6.0**	**6.1**	6.1.1	6.1.2	**6.2.0**
Maven Tools	Maven tools	**6.0**	**6.1**	6.1.1	6.1.2	**6.2.0**
Health Monitoring	Health Mon	1.7	**2.0**			2.0.1
PLC Driver	S7PLC ASYN	1.5	**1.6**			1.6.1
	SPSS (300/1500)	3.4/1.0	**3.5/1.1**			**3.6**/1.1
TCN Support	TCN API	3.3.0	3.3.1	3.3.1		3.3.1
	TCNd	5.2.0	5.2.0	5.2.3		5.2.3
	Unified PTPd	1.1	**1.2**	1.2.1		1.2.1
SDN Support	SDN API[1]	2.2.0	2.2.0			2.2.0
	SDN Archiver	1.1.0	**1.2.0**			1.2.1
DAN Support	DAN API	**3.1.0**	**3.2.0**	3.2.1		3.2.3
Logging Library	LOG API	1.3.4	1.3.4	1.3.6	1.3.7	1.3.7
NI Sync	NI SYNC	2.2.0	2.2.0		2.2.1	2.2.1
	NI SYNC EPICS	2.1.2	2.1.2		2.1.2	2.1.2
PXI-6259	PXI-6259	2.5.1	2.5.2	2.5.3		2.5.3
	PXI-6259 EPICS	2.6.1	2.6.1	2.6.1		2.6.2
PXI-6528	PXI-6528	1.3.1	1.3.1			1.3.2
	PXI-6528 EPICS	1.3.4	1.3.4			1.3.4
PXIe-6368 / PXIe-6363	PXIe-6368	3.0.0	3.0.0			3.0.1
	PXIe-6368 EPICS	1.5.0	1.6.1			1.6.1
NI RIO	NI RIO	2.1.0	2.1.1			2.1.1
	IRIO EPICS	1.1.2	1.1.2			1.1.2
OPC UA	OPC UA Support	p0.9.2	0.3.1	**0.5.1**		0.5.2
	OPC UA library	1.5.5	1.5.5	1.5.5		1.5.5

Legend **Bold**: new version (major/minor) – Underlined: new version (bugfix)

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

[1] Although still used by the SDD generated programs, the templated SDN API will eventually become deprecated in favour of the SDN Core library. For all new developments, it is recommended to use the SDN Core library.

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).

Changes:

- (12103) syslog will now log messages with microsecond precision, which should help when comparing events recorded in several different logs or machines. Previous setup was using second precision.

Reminder Since 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	**7.0.3.1**
areaDetector (*)	Core: **3.8** SimDetector: **2.10**
ASYN	**4.37**
Autosave	**5.10**
Busy	1.7.2
CA Gateway	2.1.2
CaSnooper	2.1.2.3
JCA	2.4.3
Multi-Core Utilities	1.2.1
PCAS	4.13.2
pvaPy	**2.0.0**
PyEpics	**3.4.0**
Sequencer	2.2.8
Std	**3.6.1**
StreamDevice	2.8.10
VisualDCT	2.8.2

(*) 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:

- (11142) Java 11.0. This release marks the switch from Oracle Java to the OpenJDK Java distribution. All Java applications have been migrated to this new version;
- (11665) Eclipse 2019-03 (4.11). This release adopts the new, rolling release model of Eclipse. Both CS-Studio and SDD tools have been migrated to this new Eclipse;
- (12165) ELK 7.4 (Elasticsearch/Logstash/Kibana);
- (12397) cython 0.29;
- (11893) ffmpeg 4.1 (new component).

4 Control System Studio (CS-Studio)

Main enhancements:

- OPI runtime - The system is targeting a refresh rate of 300 ms
- Main ITER canvas includes the updated site map (27X5FM v3.8)
- Simplification of the navigation within mimics reusing the information from the navigation XML configuration files
- opibuilder.scriptUtil support of PV access security level allowing any PV write access check within scripts
- Trend XY Graph widget primary Y axis scaled according to main PV limits
- New Alarm Tree widget integrated in the alarm pane and alarms list
- OPIs Map enhancements with new layouts – mosaic and text
- Databrowser plot Mean and Count values added
- css-dbmanager new analyse and vacuum options to manage databases

Main fixes:

- CS-Studio image buttons/icons scaling and refresh issues linked to Linux GTK 2 issues
- OPI runtime issues and improvements: loading of faceplates improved, scripts are prevented to write error messages in cs-studio console, errors from pv connection layer are handled better
- Databrowser plot issues related to system fonts
- Web OPI issues, in particular the full support of ITER canvas (alarm, faceplate/control and navigation panes)

The details are provided in dedicated release notes: CODAC Core System Version 6.2 CS-Studio Release Notes (YTRPBC).

5 Self Description Data Tools

Main changes:

- (11479) This release brings a possibility to (re)assign EPICS variables to specific IOCs. Previously, this decision was fully at the discretion of SDD Translator. It is still recommended not to modify default IOC assignments without a good reason, as it may lead to I&C integration issues later on;
- (11442) Special system monitoring templates were made visible in SDD Editor, similar to user-defined variables. It is now possible to deploy them manually, or suppress their use altogether. Consequently, SYSM variables are now visible in SDD Editor as well;

- (11002) It is now possible to assign alarms to operator roles, creating independent BEAST configurations. This may help in creating more targeted alarm displays. CCS by default comes with one role `ps-oper`; users can create others as needed. Note that in 6.2.0 these changes are not yet stored in the user project (known bug 12677);
- (11613) Variable batch edition was enhanced to allow batch editing of BEAST guidances, displays, commands and automated actions. In particular, it is now possible to change an alarm notification email for many variables at once;
- (10828) SDD Editor now provides support for deletion of EPICS device support descriptions. A new section Epics Support was added to the Templates tab; from there, one can reach the device support of choice and delete it. This feature is useful for users developing new or custom device support and testing its integration with SDD;
- (11514) SDD-generated EPICS makefiles will now check for presence of `user.mk` snippets, which can be used to provide additional definitions to the generated makefiles;
- (11706) Hidden helper script `.stop_localhost_ioc.sh` was no longer in use, so its generation was suppressed;
- (11480) SDD Editor will no longer allow creating more than 1920 events per PLC, as the underlying EPICS driver does not support it;
- (12012, 12013) It is now possible to use record types `int64in`, `int64out`, `longin`, `longout`, `lsi`, `lso`, `aai`, `aao` for OPC UA variables. Special record type `opcuaItem` was equally enabled for use;
- (12010) The default for OPC UA session's `autoconnect` option was changed from "No" to "Yes", to accommodate for the most expected behavior;
- (12011) One can now designate a specific OPC UA session when creating a new subscription. This is helpful in the case there is more than one session defined in the project;
- (12162) SDD Translator will now automatically adjust the size of the callback queue in presence of OPC UA variables. Previously, the size was fixed to 1000, which was causing a "*callbackRequest: cbLow ring buffer full*" message in projects having more than 1000 OPC UA variables;
- (10567) SDD Translator will now raise a warning if a DAN source is declared as structure, but no corresponding structure definition was found;
- (11646) Assigning a DAN variable to two different DAN sources is no longer possible;
- (11109) IOCs serving POC-without-CA controllers will now have their monitoring PVs archived, similar to monitoring of all other IOCs;
- (10892) From now on, CCS minor releases will never share the SDD database on the same machine. Upon installation of new minor release next to the existing one, SDD content will have to be copied from the old to new database using `sdd-sync` command. This will exclude scenarios when the database had been edited with newer SDD and then used with the older one, which could corrupt the database content or render SDD applications dysfunctional;
- (10991) This release facilitates direct access to SDD database. The password of `sdd` account is no longer built-in in the application, but is generated during installation and stored in `$CODAC_CONF/sdd/sdd.properties` file. A special utility `passwd-sdd` is provided to change the passwords if needed. For read-only access (recommended), a new database account `sdd_ro` has been added. Newly introduced commands `psql-sdd` and `psql-sdd-rw` enable read-only or read-write command-line access to the database. Note that this change does not mean introducing a new public interface, so no I&C-specific workflows shall be built on top of this feature. Also note that changing

database content directly voids any warranty on SDD functioning, as SDD expects certain content to be in certain places in addition to data integrity assured on SQL level;

- (10991) It is now possible to reset the SDD database without reinstalling software. Use the following sequence of commands (the last two are optional):

```
$ sudo initdb-sdd -o
$ sdd-sync load -all
$ sudo sdd-loadproj
$ sudo sdd-import-examples plc-sample
```

- (10991) This release facilitates SDD database backup by introducing a pair of commands `sdd-backup` and `sdd-restore`;
- (12525) `sdd-sync-direct` (high performance `sdd-sync`) release v0.13. See changelog in `/opt/codac/sdd/sdd-sync-direct/doc/changelog.txt`;
- (12322) SDD web services were removed from CCS distribution as a feature not being employed in CODAC Core development process. The corresponding Tomcat instance was removed as well;
- The SDD Editor user manual has been reworked to be almost half the original size. Separate "sdd-sync" user manual was dropped from the distribution. Its content has been incorporated into the SDD Editor manual;
- 56 various bug fixes (OPC UA support, cubicle monitoring, Excel import/export, generation of OPI, stability and usability fixes, …).

Versions of SDD reference data in this release (no change with regard to SDD 6.1):

- 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 since version 6.0.0. Use the SDD Editor for local development. The central web application can be consulted at https://sdd.iter.org.

6 Maven Tools

Changes:

- (11648) This release marks completion of migration from `initd` to `systemd`. Major effort has been made on smooth integration of client applications (EPICS IOCs and I&C programs) into Red Hat 7 `systemd` infrastructure;
- (11648, 12460) New include type `danstreamer` in `pom.xml` now allows smooth packaging of DAN programs along with the corresponding DAN streamer services. Previously, they had to be handled separately, which led to complex packaging and startup sequence;

- (12628) Compilation options of C/C++ code coverage tests will no longer include the `-DDEBUG` option, in order to exclude debug code from coverage;
- (12587) Packaging process will now prevent attempts to package files destined to `/var/opt/codac`, as this area is considered as volatile runtime data. Applications should either refrain from bringing files into that area, or do this as a post-install activity;
- (12546) Packaging process will no longer fail due to missing runtime dependencies in the case the build actually completes successfully. Note that passing `-DcheckDeps` flag will still fail dependency check for such cases;
- (11503) `mvn stop` will now gracefully stop the IOC instead of killing it with a signal;
- (9588) Javascript files in Maven Editor will now be open within Eclipse IDE instead of calling `emacs` editor;
- 13 bug fixes (project migration fixes, fixes in `mvn sonar`, …).

7 Health Monitoring

Changes:

- Module versions: Cubicle monitoring 2.0.0, ioc monitoring 1.8.0, sysmon 2.0.1, CFA633 monitoring 1.1.0, PICMG monitoring version 1.1.0
- (12487) TCN related monitoring PVs aren't working – fixed.

Reminder With CCS release 6.1.0, the health monitoring PV name 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

SPSS versions:

- SPSS v3.6 for S7-300/400
- SPSS v3.5 for S7-400H
- SPSS v1.1 for S7-1500

Changes / Fixes:

- (12204) In 6.1.1, PLC health monitoring PV names are different in the IOC and in <CBS1>-<CBS2>-SYSM.opi
- (11016) mbbi/mbboDirect support for PLC in SDD
- (11013) mbbi/mbboDirect support for PLC
- (11466) SDD database not properly initialized when upgrading from 6.0
- (11324) Error when trying to save control unit Editor with index as 0
- (11822) S7 plc template record name wrong

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

Changes:

- (12069) The routine used to get process id by name was made re-entrant to ensure safe operation in the multi-threaded implementation of the TCN Agent
- (11869) Changed configuration for chronyd when running as NTP master to allow connections from any host
- (12070) Fixed regression bug in CCS 6.1.2 which caused PTPd to run at 100% CPU

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

10 SDN Support

Changes:

- (12056) Changed SDN configure to no longer configure the network interface on systemd-based systems
- ccs::ucast and ccs::mcast namespaces are now provided with the sdn-core library (SDN Core)
- (12271) Provided API to retrieve collected packet drop logs (SDN Core)
- (11743) Re-added the timespec_to_ns() function that disappeared in 6.1 [backward compatibility issue] (SDN Core)
- (12006) Changed SDN topic header file to provide SDN metadata including the data type specification (SDN API)
- (12488) SDN archiver: Add a new option to configure RCV_BUF;
- (12493, 12476) SDN archiver: Improve stopping of the sdn archiver to close properly the HDF5 file

Warning Although still used by the SDD generated programs, the templated SDN API will eventually become deprecated in favour of the SDN Core library. For all new developments, it is recommended to use the SDN Core library.

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 / changes:

- (12380) Graphical environment is not mandatory to retrieve statistics from dan-plot and sdn-plot;
- (12374) HDF5 library has been updated to version 1.12;
- (11898) logrotation support for DAN;
- (11891) support for downsampler at folder level;
- (11131) DAN and SDN splotters now work with Python3.

Bug fixes:

- (12068) Set type returns an error if the field name contains invalid characters;
- (12044) Socket leak in case of connection error.

12 Logging Library

Changes:

- (11846) Fixed duplicated symbols in ccs-core and log libraries.
- (12191) Fixed a bug that led to rsyslog failing to start correctly (affecting system logging of other applications).

13 NI Sync

No changes.

14 PXI-6259

No changes.

15 PXI-6528

Changes:

- (12375) Fixed a bug where the same value was sampled two times.

16 PXIe-6368 / PXIe-6363 (X-Series)

Changes:

- (10779) Fixed a bug with conflicting types between /opt/codac/include/common/types.h and xseries-lib.h.

17 NI RIO

No changes.

18 OPC UA

Changes:

- Fix failing range check for negative float/double values (#56)
- Avoid calling the registerNodes service when there are no nodes to register (#53)
- Avoid calling the readRequest and writeRequest services when the connection is down (#54)

Reminder Since CCS 6.1, the prototype OPC UA support component has been replaced with 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 is not recommended.

DOCUMENTATION UPDATE

Document	ID	6.0.0	6.1.0	6.1.1	6.1.2	6.2.0
CODAC Core System v6.2 Release Notes (this document)	2R7D3Q					**v1.0**
OVERVIEW						
CODAC Core System Overview	34SDZ5	v6.1	v6.2	v6.2	v6.2	v6.2
CODAC Core System User Manual	43PSH9	v3.10	v3.11	v3.11	v3.11	**v3.12**
INSTALLATION & SUPPORT						
CODAC Core System Installation Manual	33JNKW	v6.0	v6.0	v6.0	v6.0	**v6.1**
CODAC Core System Migration Guide	7JCFUD	v5.7	v5.8	v5.8	v5.8	**v5.9**
DEVELOPMENT & TESTING						
CODAC Core System App Developer's Manual	33T8LW	v5.5	v5.6	v5.6	v5.6	**v5.7**
SDD Editor User Manual	32Z4W2	v8.7	v8.8	v8.8	v8.8	**v9.0**
SDD Synchronization Guide	46AAXR	v1.18	v1.18	v1.18	v1.18	-
How to include a new I/O module in SDD	A4WQDZ	v2.0	v2.0	v2.0	v2.0	v2.0
Maven Editor User Guide	7MT2YC	v5.8	v5.9	v5.9	v5.9	**v5.10**
System Health Monitoring Variables	35XFCY	v1.19	v2.0	v2.0	v2.0	v2.0
Logging library - Software User Manual	QEK784	v1.5	v1.5	v1.5	v1.5	v1.5
CONTROL SYSTEM STUDIO						
CODAC Core System 6.2 CS-Studio Release Notes	YTRPBC					**v1.0**
CODAC Core System CS-Studio User Guide	QVBYD8	v1.2	v1.3	v1.3	v1.3	**v1.5**
Operator Interface standardisation - CSS BOY Edition and Runtime	7367JQ	v1.9	v1.10	v1.10	v1.10	**v1.11**
Operator Interface standardisation - CSS BOY Industrial Symbol Library	A69URK	v2.1	v2.2	v2.2	v2.2	v2.2
SLOW CONTROLLERS (PLC)						
SPSS User Manual	G4UMX5	v2.2	v2.6	v2.6	v2.6	v2.6
s7PLCAsyn EPICS Driver User's Manual	PJAHXJ	v1.9	v1.10	v1.10	v1.10	v1.10
PLC Sample Guide	2N8C3M	v4.2	v4.2	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	v2.7	**v2.8**
NI Sync EPICS Driver User's Guide	33Q5TX	v2.14	v2.14	v2.14	v2.14	v2.14
NI PXI-6259 Linux Driver User's Guide	32GTJY	v1.19	v1.19	v1.19	v1.19	v1.19
NI PXI-6259 EPICS Driver User's Guide	3DEY52	v2.12	v2.12	v2.12	v2.12	v2.12
NI PXI-6528 Linux Driver User's Guide	3ZHXQ9	v1.8	v1.8	v1.8	v1.8	v1.8
NI PXI-6528 EPICS Driver User's Guide	433VEW	v1.13	v1.13	v1.13	v1.13	v1.13
NI X-Series Linux Device Driver User's Guide	3LTMR6	v1.7	v2.0	v2.0	v2.0	v2.0
NI X-Series EPICS Driver User's Guide	3P4N3R	v1.9	v1.9	v1.9	v1.9	v1.9
NI-RIO Linux Device Driver User Manual	LW3UFH	v2.10	v2.10	v2.10	v2.10	**v2.14**
NI-RIO EPICS Device Driver User Manual	RAJ9P8	v1.7	v1.7	v1.7	v1.7	v1.7
IRIO Library user's manual	RATM8Z	v1.3	v1.3	v1.3	v1.3	v1.3
IRIO Design Rules for LabVIEW for FPGA	QQMYTY	v1.4	v1.4	v1.4	v1.4	v1.4
FAST CONTROLLERS – HPN						
TCN API - Software User Manual	N4XTGG	v1.16	v1.16	v1.16	v1.16	v1.16
PTPd User Manual	U2TTSZ	v1.4	v1.4	v1.4	v1.4	**v1.5**
TCNd User Manual	MUYNT6	v2.6	v2.6	v2.6	v2.6	**v2.7**
SDN Software User Manual	B7SKFU	v2.12	v2.13	v2.13	v2.13	v2.13
SDN Archiver User Manual	SD29MG	v1.4	v1.5	v1.5	v1.5	**v1.7**
DAN User manual	Q6GULS	v3.0	v3.2	v3.2	v3.2	**v3.6**