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CODAC Core System

The Software distribution produced by the ITER Organization (IO) for configuring all systems (terminals, servers and controllers) both at ITER site and at the construction sites

THE CODAC SOFTWARE DISTRIBUTION FOR THE ITER PLANT SYSTEMS

Abstract

In order to support the adoption of the ITER standards for the Instrumentation & Control (I&C) and to prepare for the integration of the plant systems I&C developed by many distributed suppliers, the ITER Organization is providing the I&C developers with a software distribution named CODAC Core System. This software has been released as incremental versions since 2010, starting from preliminary releases and with stable versions since 2012. It includes the operating system, the EPICS control framework and the tools required to develop and test the software for the controllers, central servers and operator terminals. Some components have been adopted from the EPICS community and adapted to the ITER needs, in collaboration with the other users. This is the case for the CODAC services for operation, such as operator HMI, alarms or archives.

CODAC Server

Archiving

Alarm handling

I&C monitoring

PLCs Gateway

Fast Controller:

RT control

SDN

I/O interface

I&C coordination

HPN interfaces: TCN,

Other components have been developed specifically for the ITER project. This applies to the Self-Description Data configuration tools. This software has also been used for the production of the first I&C applications in Cadarache for the monitoring of power stations.

Software components for operation

Alarm

server

PSH

IOC

PSH

PLC

IOC

PLC

PON / CA

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Mini-CODAC **CODAC** Terminal Control System Studio HMIs **Operator Interface (OPI)** Alarm views Data plots

PCF

IOC

1/0

Archive

Server

Fast Controller

TCN SDN DAN

RT task -

Development tools



✤ Includes

- Software infrastructure
 - Read Hat Enterprise Linux (RHEL)
 - EPICS
- The software components required for the target system,
- The development tools when required
- Regular releases twice a year
 - New components
 - Improvements
 - Bug fixes
- ✤ If required, maintenance release and patches
- Issue tracking and change management with Bugzilla
- Regular test process prior to each release
- On-line support with dedicated team and issue tracking

✤ Training

- On-site (Cadarache)
- At Domestic Agencies (KO, US, JA...)
- On-line (new)

RHEL 5.3	V1.0 Feb-10	V1.1 Jun-10			Preliminary
RHEL 5.5	V2.0 Feb-11	V2.1 Feb-12			Deprecated
RHEL 6.1 MRG-R 2.0	V3.0 Feb-12	V3.1 Jul-13			Supported
RHEL 6.3 MRG-R 2.1	V4.0 Feb-13	V4.1 Jul-13	V4.2 Feb-14	V4.3 (TBC) Jul-14	Supported
<i>RHEL 6.5</i> <i>EPICS 3.15</i>	V5.0 TBD				

2013 supported hardware (Linux + EPICS)

- Siemens S7/400 S7/300
- PXI/PXIe chassis
- NI PXI-6259, PXI-6682/6683-H, PXI-6528

14A FF	31-Aug-13	Features freeze. Specifications approved.
14A B1CF	30-Sep-13	Beta 1 code freeze (inc. documentation and test plans)
14A B1	07-Oct-13	Beta 1 released (preliminary version, no users.)
14A B2CF	31-Oct-13	Beta 2 code freeze (inc. documentation and test plans)
14A B2	07-Nov-13	Beta 2 released, for IO tasks only.
14A B3CF	30-Nov-13	Beta 3 code freeze (inc. documentation and test plans)
14A B3	06-Dec-13	Beta 3 released for IO tasks and beta testers
14A DOC	07-Dec-13	User documentation ready for review by users and testers.
14A CF	20-Dec-13	4.2 Code freeze
14A TST	20-Dec-13	Tests ready, all test plans approved
14A B4	10-Jan-14	Beta 4 released – Release candidate 1 for 4.2
14A DOCOK	31-Jan-14	User documentation approved
14A TSTOK	07-Feb-14	Tests reports approved
14A OK	14-Feb-14	4.2.0 Released
14A PUB	01-Mar-14	4.2.0 Public tar file available
14A TRNOK	31-Mar-14	Training updated. Presentations and exercises approved.
14A UCOK	31-Mar-14	Use cases updated.
14B FF	31-Mar-14	4.3 Features freeze.
14B B1CF	30-Apr-14	Beta 1 code freeze
14B B1	07-May-14	Beta 1 released
14B TST	31-May-14	Tests ready, all test plans approved.
14B DOC	31-May-14	User documentation (new + updates) ready for review
14B B2CF	31-May-14	Beta 2 code freeze
14B B2	07-June-14	Beta 2 released – Release candidate 1 for 4.3
14B DOCOK	15-Jun-14	User documentation approved
14B TSTOK	15-Jun-14	Tests reports approved
14B OK	22-Jun-14	4.3.0 Released
14B PUB	08-Jul-14	4.3.0 Public tar file available
14B TRNOK	31-Aug-14	Training updated. Presentations and exercises approved.
14B UCOK	31-Aug-14	Use cases updated.

Release	Fixed issues
3.0.0 (2012-02-15)	468
3.1.0 (2012-06-22)	305
4.0.0 (2013-02-15)	428
4.1.0 (2013-06-22)	411

- Automated build with standardized process (compile/test/package)
- Supported versions: *major_nb.minor_nb.maintenance_nb*
- ✤ All versions pushed to a distribution server
- Official versions downloaded by the end users (yum)
 - On-site systems
 - Anywhere with a network path to IO (registered users only)
- Daily version for continuous integration and tests (trunk)
- Beta versions for pre-release tests.

ITER Source repository (SVN)

• NI PXIe-6368 (beta version)

2014 candidate features

- Tests tools (plant system I&C tests)
- Data archiving (scientific data and other) large data)
- NI FlexRIO support
- Support for RT programs (EPICS interface, tuning)

Distribution Server (RHEL satellite server)









1. IPFN-IST: Lisboa, Portugal
2. CIEMAT: Madrid, Spain
3. Procon: Badalona, Spain
4. F4E: Barcelona, Spain
5. CCFE: Abingdon, UK
6. Tessella: Abingdon, UK
7. NI France: Nanterre, France
8. Atos Origin: Paris, France
9. ECRIN: Paris, France
10. EADS: Paris, France
11. ITER IO: Cadarache, France 🛛 📉 🎽
12. CEA Cadarache: Cadarache, France
13. Intermodalics, Leuven, Belgium
14. ITER-NL: Eindhoven, Netherlands
15. DMCS-TUL: Lodz, Poland

16. NIIEFA: St.Petersburg, Russia 17. IOFFE-RF: St. Petersburg, Russia 18. ITER-Russia: Moscow, Russia 19. Wigner RCP: Budapest, Hungary 20. Alceli: Meisterschwanden, Switzerland 21. INFN-LNL: Legnaro, Italy 22. Consorzio RFX: Padova, Italy 23. ENEA: Brasimone, Italy 24. ENEA: Frascati, Italy 25. Cosylab: Ljubljana, Slovenia 26. BNL: Brookhaven, USA 27. PPPL: Princeton, USA 28. General Atomics: San Diego, USA 29. ITER-U.S.A.: Oak Ridge, USA 30. ORNL: Oak Ridge, USA

31. ORNL-FED: Oak Ridge, USA 32. IntegritySim: Cumming, USA 33. SRNS: Savannah, USA 34. NFRI: Daejeon, Korea 35. Hitachi: Hitachi, Japan 36. JAEA: Tokaimura, Japan 37. NIFS: Toki, Japan 38. RXPE: Anshan, China 39. IPP: Hefei, China 40. ITER-China: Suzhou, China 41. SWIP: Chengdu, China 42. ITER-India: Gandhinagar, India 43. IPR: Gandhinagar, India 44. TCS: Pune, India

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6 October 2013, San Francisco

Presented by Franck Di Maio The views and opinions expressed herein do not necessarily reflect those of the ITER Organization.

