CODAC OPERATIONAL APPLICATIONS VERSION 1.1 RELEASE NOTE

ITER_D_ S3WV58

This note is a supplementary document for CODAC Operational Applications version 1.2, shipped together with CODAC Core System (CCS) version 5.4.0 to provide users with information on features introduced with the release of the CODAC Operational Applications version 2.0 and any remaining known issues.

This document is complemented with on-line documentation available at the **CODAC Core System Community Pages**.

CODAC Operational Applications are released based on CCS 5.4.0.

Executive Summary

CODAC Instrumentation and Control (I&C) projects are primarily defined using the SDD editor tool. This tool defines the structure of a project and documents all of the process variables and their default values. The task of defining specific configuration values relevant for a particular machine task, and for communicating those values to the I&C processes falls within the scope of the Pulse Schedule Preparation System (PSPS) and the Supervision and Automation (SUP) software.

The interface between these tools is provided via *Configuration Objects.* A Configuration Object is a data structure which represents those process variables tagged in the SDD project as requiring a configuration interface, along with constraint rules that ensure consistency and correctness of values selected for those variables. Configuration interface requirements include process variables which can be configured, process variables which are referenced in constraints, and process variables which are referenced by external systems. More information can be found in Concept for the configuration of the ITER machine (KGXH3K).

A Configuration Object is defined partly by the SDD *ConfigurationSpecification*, and subsequently by the Plant System (PS) designer through use of the editor tool with supplementary structural and logical design elements. The plant system I&C can be *configured* or *set up* from a Configuration Object. The set up process does not need to know about the structure, nor about the constraints. It needs only the process variable names and the selected values. This information is extracted from the Configuration Object as a *ConfigurationSetup.* A simplified outline of the relationships is given in Figure 1-1.

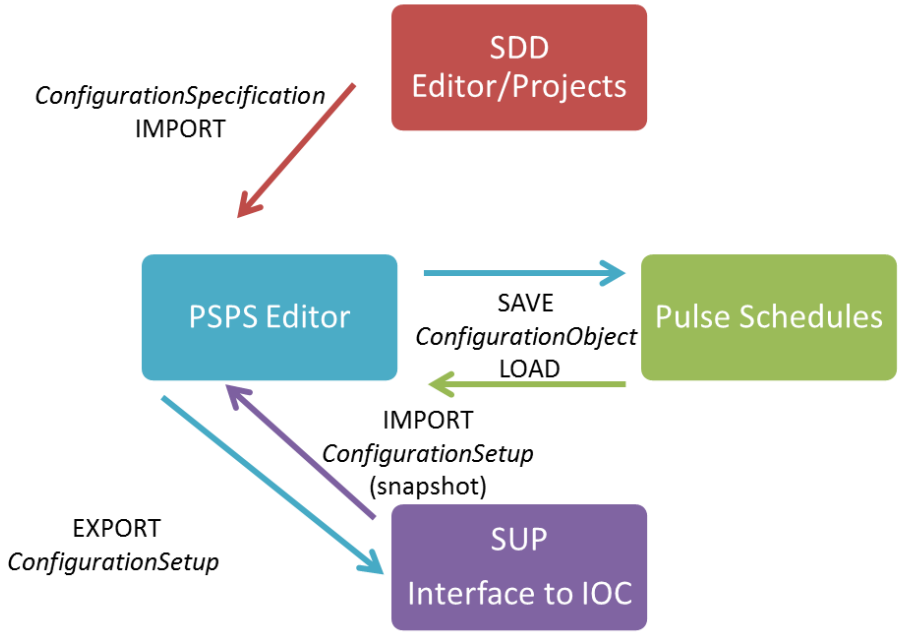


Figure 1-1: Simplified view of the relationship between the key system components and objects.

The key functionality and workflows required to support FAT and SAT activities have been implemented in the current version of the PSPS editor and SUP software, tailored for deployment on MiniCODAC.

The PSPS editor supports two activities: structural editing of a Configuration Object, and value editing of a Configuration Object. Structural editing defines a Configuration Object and prepares a coherent view of the otherwise flat list of process variables by grouping related items together, providing user friendly labels to make navigation more practical, and defining supplementary variables and constraint rules. When this task is complete, the same editor tool is then used with this refined view to prepare multiple instances of the Configuration Object with values chosen so as to accomplish a particular task e.g. to execute a specific factory acceptance test, or to bring a subset of I&C equipment into a state ready for a site acceptance commissioning pulse.

Structural editing to define a Configuration Object consists of the following workflow:

1. Importing a baseline Configuration Object from an SDD project file.
2. Adding external Configuration Variables.
3. Creating a hierarchical tree structure of folders to group related items.
4. Adding additional Configuration Constraints.
5. Saving the resultant Configuration Object structure file. This file acts as a template from which specific Configuration Objects with fully populated values can be prepared.

Workflows to support value editing to create fully defined Configuration Objects from a stable template can apply a number of strategies and may well be used iteratively, but combine the following actions:

1. Searching for relevant configuration variables within the overall structure.
2. Editing the values for such variables in a custom editing palette.
3. Executing the constrain rules and identifying and resolving issues.
4. Exporting a validated Configuration Object in a form that can be executed by the SUP system to update running Process Values in an IOC.
5. Merging values from previously defined Configuration Objects, or from snapshots of values read back from an IOC by the SUP system.

COMPONENTS UPDATE

	Components	5.0.0	5.1.0	5.2.0	5.4.0
Configuration Editor	PSPS editor	1.4	1.4	1.4	1.5
Supervision & Automation	SUP	1.0	1.0	1.0	1.1
SDN Tools	SDN Tools	1.0	1.0	1.0	1.0.5

1 Configuration editor

The configuration editor is a java programme which allows editing, managing, saving and exporting a configuration object to SUP. The programme is platform independent and relies only on an installation of a current version (v. 8.x) of the java suite.

The current version focuses on features needed during the design and implementation of plant systems and the support necessary during Factory and Site Acceptance Tests. The requirements covered can be found in Software requirements specification (SRS) for pulse schedule configuration tools (RTH42B).

A detailed description of all features is available in the user documentation User Manual for CODAC Operational Applications v1.0 (RUZCJ9).

1.1 New features and Enhancements

1.1.1 for CCS 5.4

- Bugfixes and major internal rework without impact to user experience
- Minor enhancements to workflow for export of configuration to SUP

2 Supervision and Automation

The Supervision and Automation (SUP) v1.0 supports Plant System Instrumentation and Control (I&C) Factory and Site Acceptance Tests by providing the following:

- Implementation of Plasma Operation State (POS) sequence and Common Operational State (COS) aggregation and partitioning function.
- Support for the Pulse countdown phase, Pulse number and time.
- Support for the Plant System I&C automated configuration and snapshot in the execution of the POS sequence.

The SUP v1.0 deployed on MiniCODAC is also referred to as MiniSUP in other CODAC and CCS documentation.

2.1 New features and enhancements

2.1.1 For CCS 5.4

- POS sequence integration with elog application
- Data archive for pulse number management
- Various bugfixes

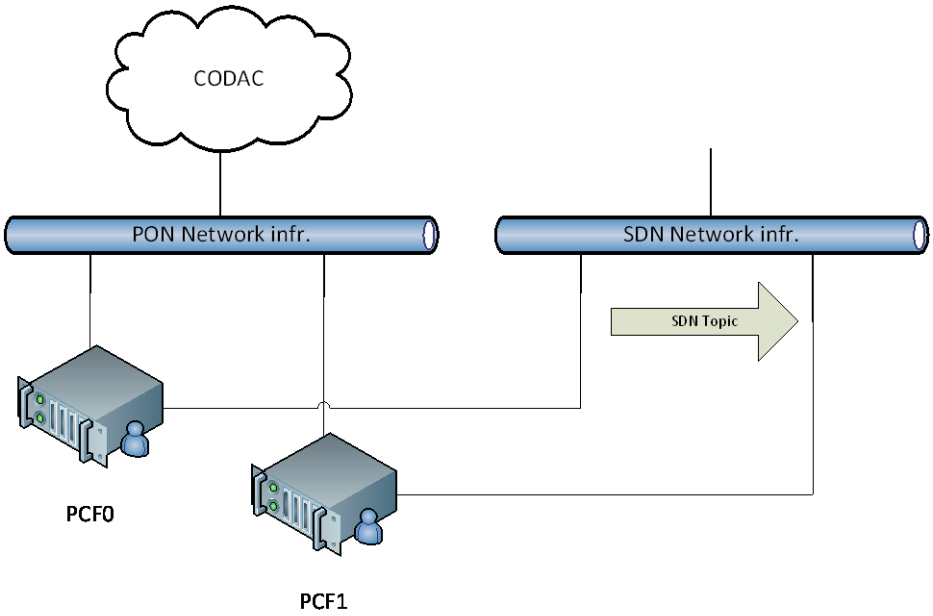
3 SDN Tools

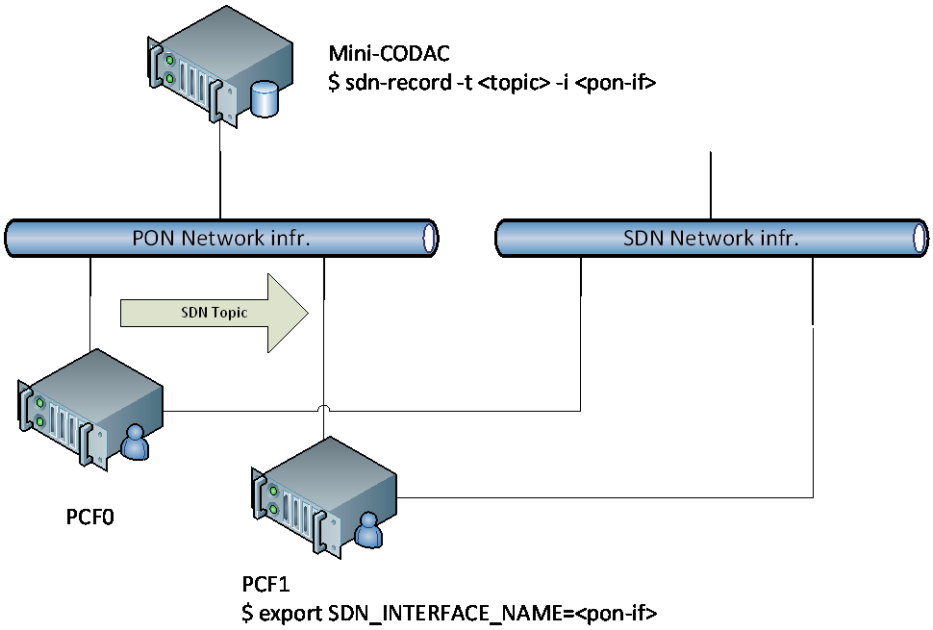
The SDN Tools aim at supporting the Plant System Instrumentation and Control (I&C) interface verification during Factory and Site Acceptance Tests and cover the following functional scope:

- Discovery of SDN participants activity over the SDN network,
- Recording of SDN traffic for later use, inspection, data processing and analyses, playback, etc.
- Streaming of SDN traffic for performance verification, fault injection, etc.

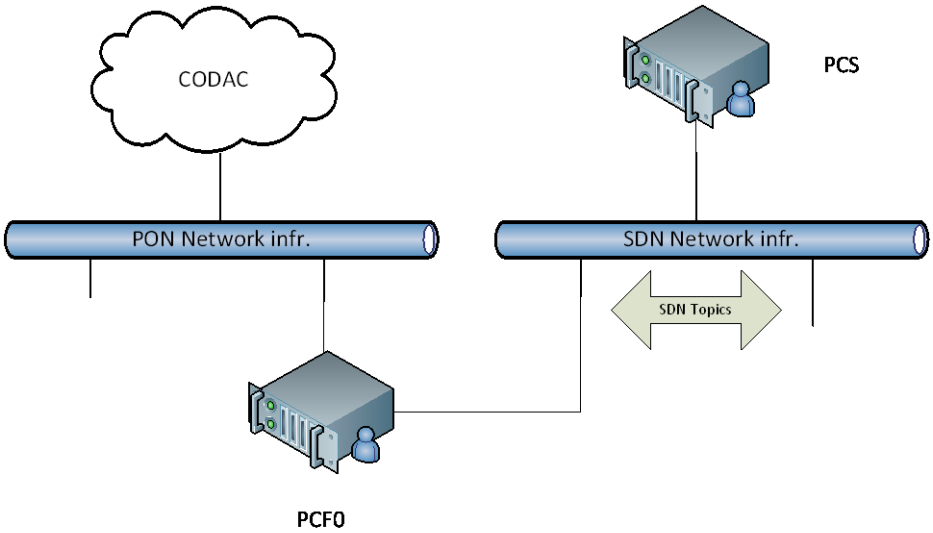
The SDN Tools cover two distinct use cases:

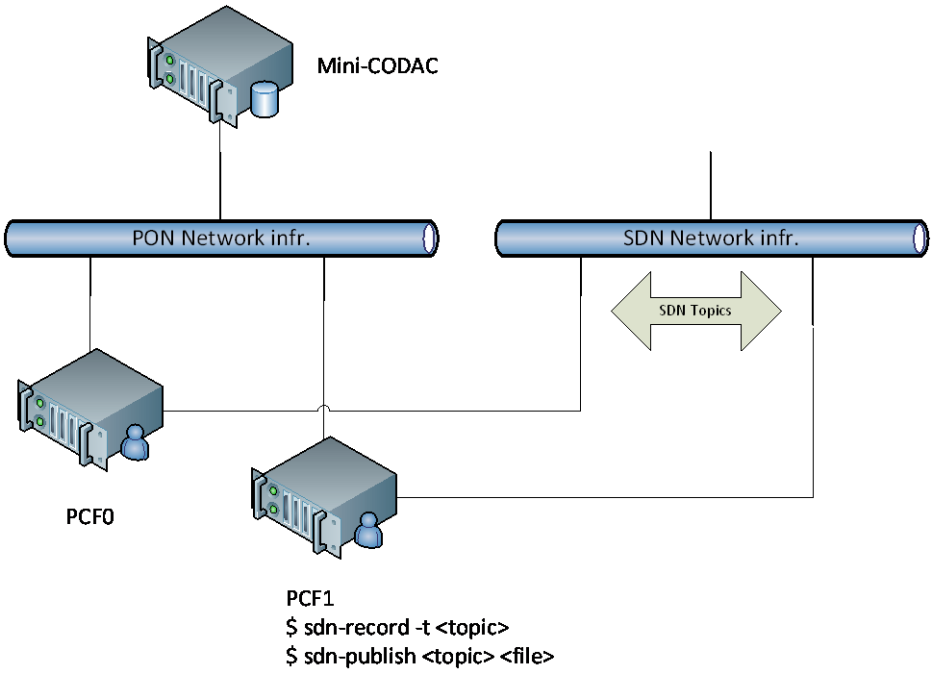
- Functional verification (stand-alone tests), where required participants interfacing to the Plant System I&C may be simulated over any network interface. In this case, the SDN Tools are deployed on a development or non-Real-Time test environment (e.g. Mini-CODAC) and SDN traffic occurs over e.g. the Plant Operation Network (PON) or any other network distinct.
- Performance verification (integrated tests), where the required participants interfacing to the Plant System I&C (be it the PCS or another Fast Controller belonging to a distinct Plant System I&C) may be simulated to conform to known Real-Time requirements over the SDN.





Use case 1 - Two PCF belonging to a Plant System I&C communicate over the Synchronous Databus Network (SDN). Topics can be recorded for inspection on Mini-CODAC by configuring the SDN traffic to be re-directed to occur over the Plant Operation Network (PON).





Use case 2 - One PCF (i.e. PCF0) belonging to a Plant System I&C participate over the Synchronous Databus Network (SDN) to the Plasma control. A test PCF (i.e. PCF1) is used to simulate the Plasma Control System (PCS) and publish/record SDN topics while meeting real-time requirements to e.g. conduct performance verification tests, inject faults, etc.

3.1 New features and enhancements

3.1.1 For CCS 5.4

- No change

4 Known issues

4.1 Configuration Editor

Windows Permissions issue:
The "Save as tag" functionality uses a file-system link to implement the tag. This action is administratively blocked in Oracle Java for Microsoft Windows. There are work-arounds but they require changes to the registry or running the configuration editor application "as administrator".
On "Save as tag", the configuration object is saved with a new minor revision, but the application is unable to create the tag "shortcut" to the revision - the operation fails with a "java.nio.file.FileSystemException: <filename>: A required privilege is not held by the client.".

4.2 Supervision and Automation

SUP OPI resolution:
The SUP operator panels have been designed for 4k screen resolution and may exhibit sharpness issues when used on MiniCODAC.

5 Documentation update

Document	ID	5.2.0	5.4.0
OVERVIEW			
Concept for the configuration of the ITER machine	KGXH3K	v3.1	v3.1
USER MANUALS			
User Manual for CODAC Operational Applications	RUZCJ9	v1.3	v2.1
SDN Tools User Manual	RGSWHS	v1.4	v1.5