

MANAGING INTERFACE CONTROL DOCUMENT CREATION

Electron Ion Collider

OVERVIEW

During the requirements/interface collection effort, it will be necessary to develop Interface Control Documents (ICDs) that define the characteristics of the interfaces that connect different sub-systems. Depending on how these are created, the number of documents created can be extremely large. This can be illustrated by looking at a hypothetical system that contains ten Level 2 (L2) systems, each of which contains ten L3 systems, which in turn have ten L4 systems.

In the worst case scenario, where every L4 system is connected to every other L4 system and an ICD is created for each relationship, it will be necessary to create 1,000,000 Interface Control Documents. If, instead, all of the L3 interfaces are connected, the number of ICDs is decreased to 10,000 --- which is still a formidable number. Conversely, if a single ICD is created that represents the relationships between each L2 system, the number of documents decrease to 100, however, each document becomes exceptionally large.

As an alternative, in this document we propose a hybrid solution for creating Interface Control Documents which is described below.

HYBRID (L3 TO L2) SOLUTION FOR INTERFACE CONTROL DOCUMENTS

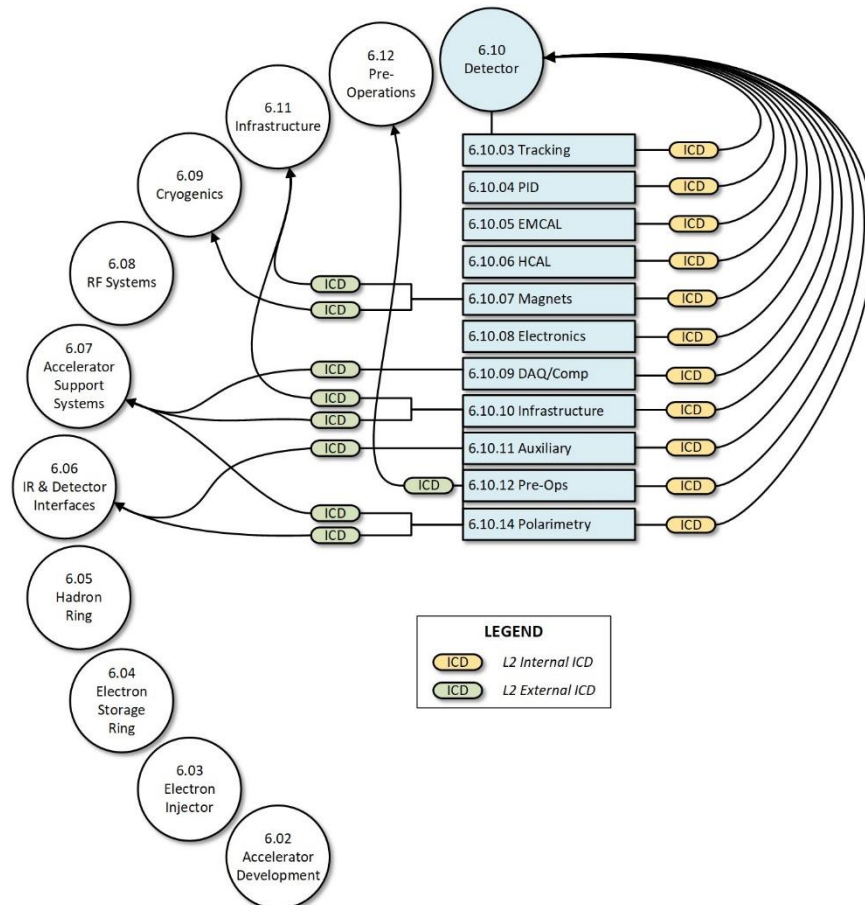


Figure 1: Model of the Hybrid L3 to L2 Solution

We recommend to follow the model shown in Figure 1 for most Interface Control Documents. In this figure, which is developed from the perspective of the Detector L2 Group, there are fourteen Level 3 systems. Some of these do not have interfaces with other sub-systems. Eleven of these L3 systems are interconnected with one another and have a significant number of interfaces. To address this, each L3 sub-system will be responsible for writing a single Interface Control Document that identifies and describes all of its interconnections within the Detector L2 system. This will result in eleven internal ICD documents (shown in yellow).

Each of these L3 systems MAY HAVE interfaces that connect to L3 or L4 systems in OTHER L2 systems. In this case, they will write a single ICD for each parent L2 system. The document will contain the interface information for all of the L3/L4 sub-systems within that parent's domain. This is illustrated by the green connectors in Figure 1. Some of the Detector's L3 systems have no connections outside of the detector, several have one connection, and three have connections to two L2 systems. This keeps the number of external ICDs to a very reasonable number.

Note: The terms "internal" and "external" are used for illustrative purposes only. The structure of the interface control documents for either group is identical.

SPECIAL CASES

There may be circumstances where the number of external connections to an L2 system is extremely high OR the number and variety of interfaces within an Interface Control Document is very large. In this case, it may be necessary to allow ICD's to be directed to a specific L3 system. As an example, if the Infrastructure L2 system contains electrical systems, cooling systems and cryogenic systems, then the total number of interfaces may be enormous. In this case, the L2 manager may ask that Interface Control Documents be directed to the individual L3 sub-system to reduce the complexity of the documents and minimize the volume of information in each ICD.

Other similar conditions may occur, and the system should retain the flexibility to allow the Interface Control Documents to be configured in a manner that makes the most sense for the application.

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