



LHC Data Interchange Working Group (LDIWG) Phase 2

Brief Overview

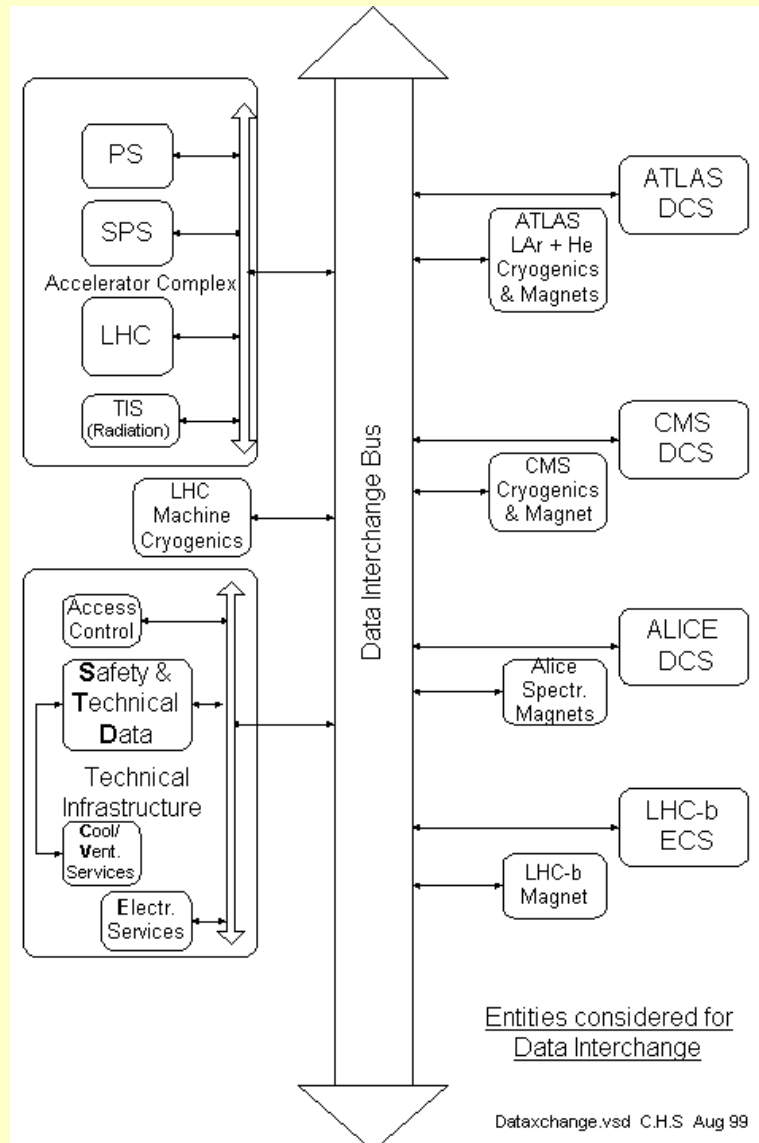


LDIWG History

- ◆ Set up in February 1999 by the CERN Controls Board
 - ☞ Define a single data exchange mechanism between all systems involved in the LHC operations
- ◆ Phase 1 gathered the requirements and its report was delivered on 14th June 2000
 - ☞ Reliable 'databus' (DIP) supporting:
 - ❖ Publish-subscribe data exchange
 - ❖ 250 Kbytes/s and 100 messages/s
 - ❖ Highest bandwidth required between cryogenics and machine
 - ❖ Latency of the order of 1 second
- ◆ Second phase started 1st October 2002



Phase 1 Design





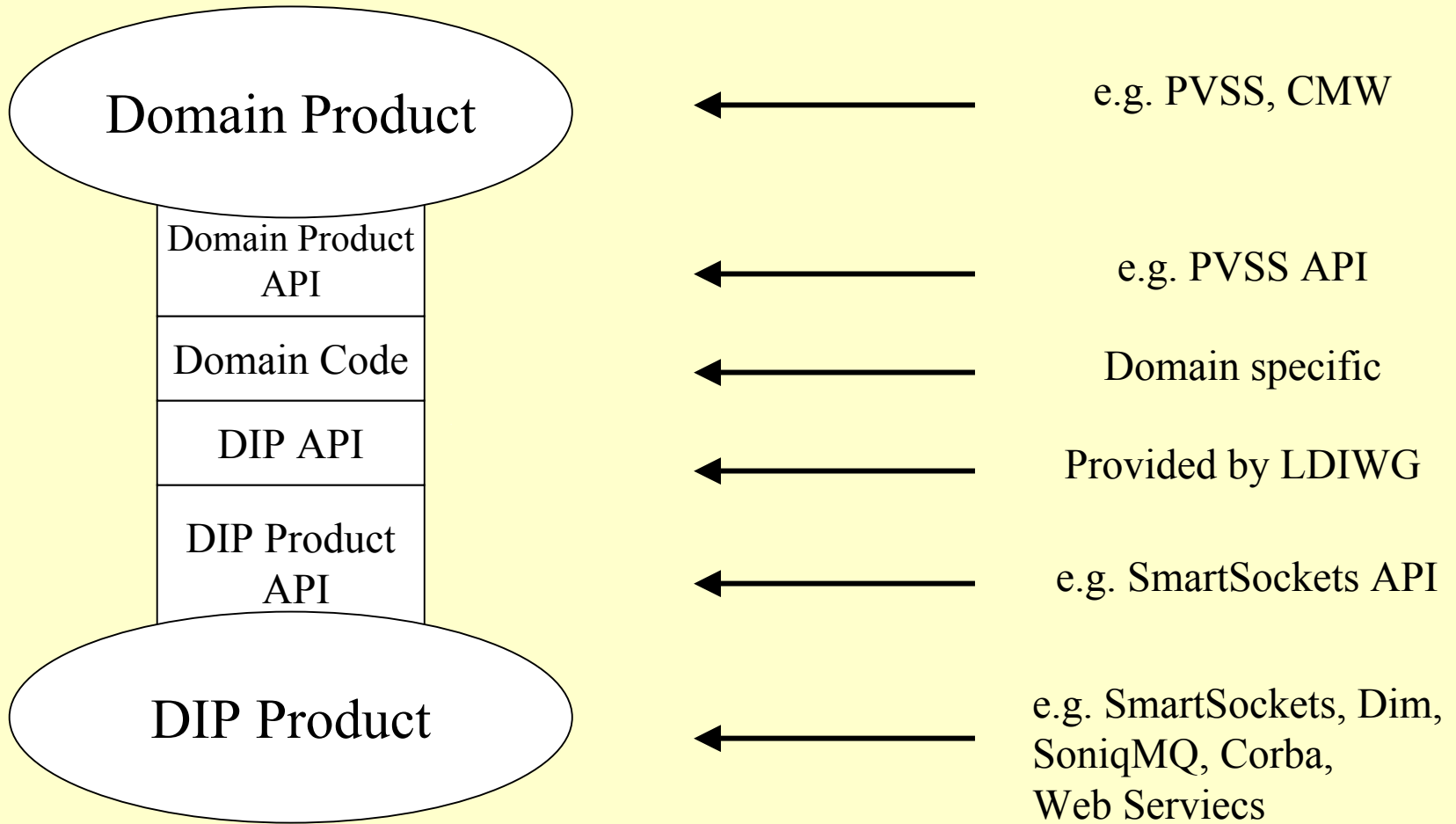
Phase 2

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- ◆ Review validity of users requirements
- ◆ Create system requirements
- ◆ Review products in use at CERN for applicability
 - ☞ Unfortunately each member of the group has his own preference (all are different)
- ◆ Define the DIP protocol
- ◆ Select a suitable product
- ◆ Develop a DIP API



DIP Integration





DIP Problem Statement

DIP should be able to exchange relatively small amounts of real-time data between very loosely coupled heterogeneous systems. These systems do not need very low latency. The data is assumed to be mostly summarised data rather than low-level parameters from the individual systems, i.e. cooling plant status rather than the opening level of a particular valve.



Status

- ◆ Now have a better definition of the requirements, i.e. system rather than user requirements
- ◆ Will have reviewed 5 of the possible 6 proposed solutions by Xmas and the last one in early January
- ◆ Initial feeling - can all be made to work
 - ☞ Hence, decision is likely to be more managerial, i.e. resources and responsibilities
- ◆ DIP definition planned for end of 1st quarter 2003
- ◆ DIP prototype implementation 2nd quarter 2003



Assumptions - I

- ◆ The output of the first phase of the LDIWG is valid.
- ◆ There is a negotiated contract between the consumer and the provider.
- ◆ Providers are capable of updating the data at a rate which is suitable for the consumers.
- ◆ DIP should be able to take care of byte swapping, etc., transparently
- ◆ Consumers and providers connect to DIP via its API
- ◆ It is not necessary to restrict the providers/consumers to one per domain.
- ◆ There is only one publisher per item.



Assumptions - II

- ◆ DIP does not have to handle redundancy implicitly.
- ◆ On reconnect the client can decide either to get automatically the 'current' value for all the data items he subscribes to or not to get it.
- ◆ DIP supports an on-change and also 'at a defined frequency' data exchange.
- ◆ DIP should be kept as simple as possible. It should be easy to integrate with the various domains and require a low level of maintenance.
- ◆ DIP should support arrays but not more complex structured data.
- ◆ Wildcard subscription is not mandatory, would be nice to have if it doesn't add significant extra complexity.



Assumptions - III

- ◆ It is not necessary to have self-describing data
- ◆ Security:
 - ☞ Only publishers from within the CERN domain
 - ☞ Only one publisher per item
 - ☞ Simple authentication mechanism
- ◆ Administration:
 - ☞ Possibility to check whether a publisher is on-line
 - ☞ Possibility to check whether a publisher is working correctly, e.g. alive-mechanism
 - ☞ Possibility to check whether the DIP infrastructure is working correctly
- ◆ No filtering