CMS DD Migration to DD4Hep

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Migration Plan

- CMS is fully committed and plan to complete migration by the end of 2019

- DD4Hep has been integrated in CMSSW as an external tool

- Build rule is introduced in scram

- CMS sub-detector group geometry experts have been invited to check and port their sub-geometries

 - The feedback is expected by the end of summer

Migration Strategy

- Keep current XML description, but use DD4Hep plug-in mechanism to build DD using CMS-specific C++ algorithms
  - Most of the XML files do not need any modifications
  - Geometry configuration files (Python) will change
- Introduce CMS-specific shapes to DD4Hep
  - Shapes validation is on the way
- Assess TGeo performance impact
  - For example, there are 2104786 volumes in 2017 geometry scenario
- Introduce a compact view (DAG) if needed

TGeo Concerns

- We do have concerns about TGeo:
  - its memory size, performance, and possible loss of precision
    - For example, due to units conversion in matrices
- We cannot evaluate the impact yet - we need a full geometry port
- Hopefully, we can find a common solution if it becomes a problem
  - For example, introduce a lightweight DAG (aka DDCompactView)

CMS Detector Description
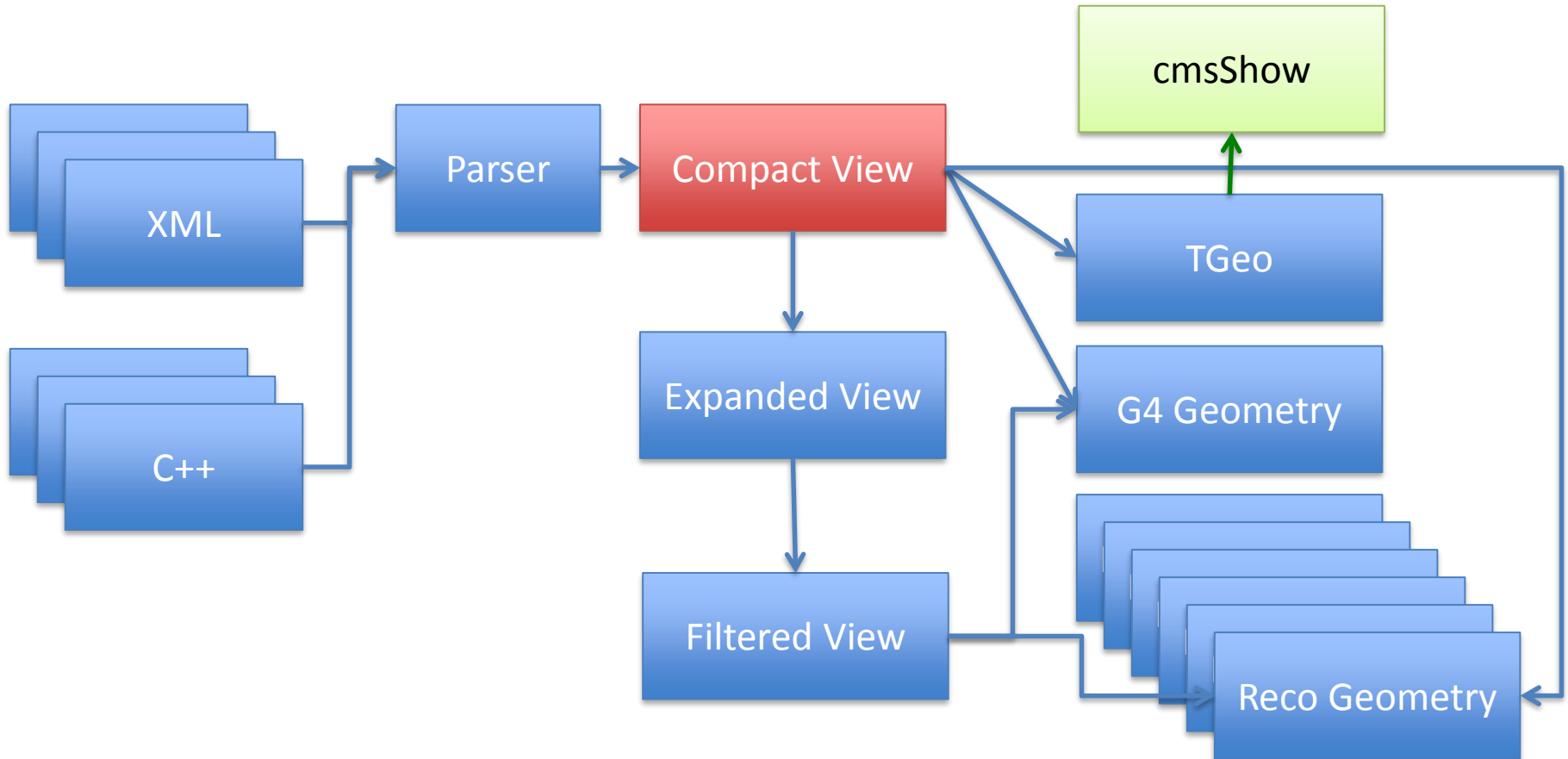
CMS DD4Hep
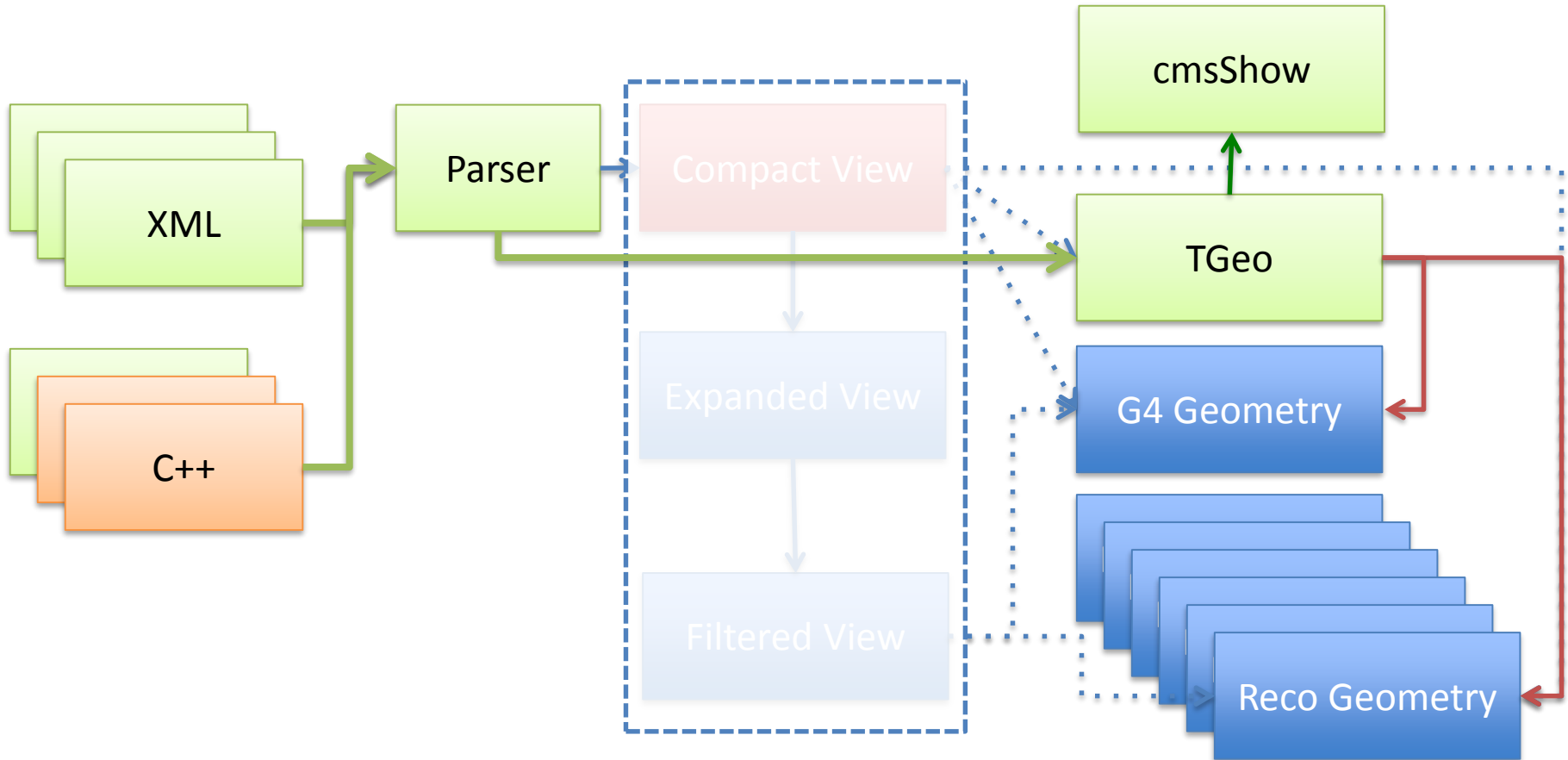
Summary

- Like:
  - DD4Hep error handling and debugging
  - Fast feedback and development cycle

- Port is a serious stress test for DD4Hep:
  - For example, there are 2104786 volumes in 2017 CMS geometry scenario

- We plan for success