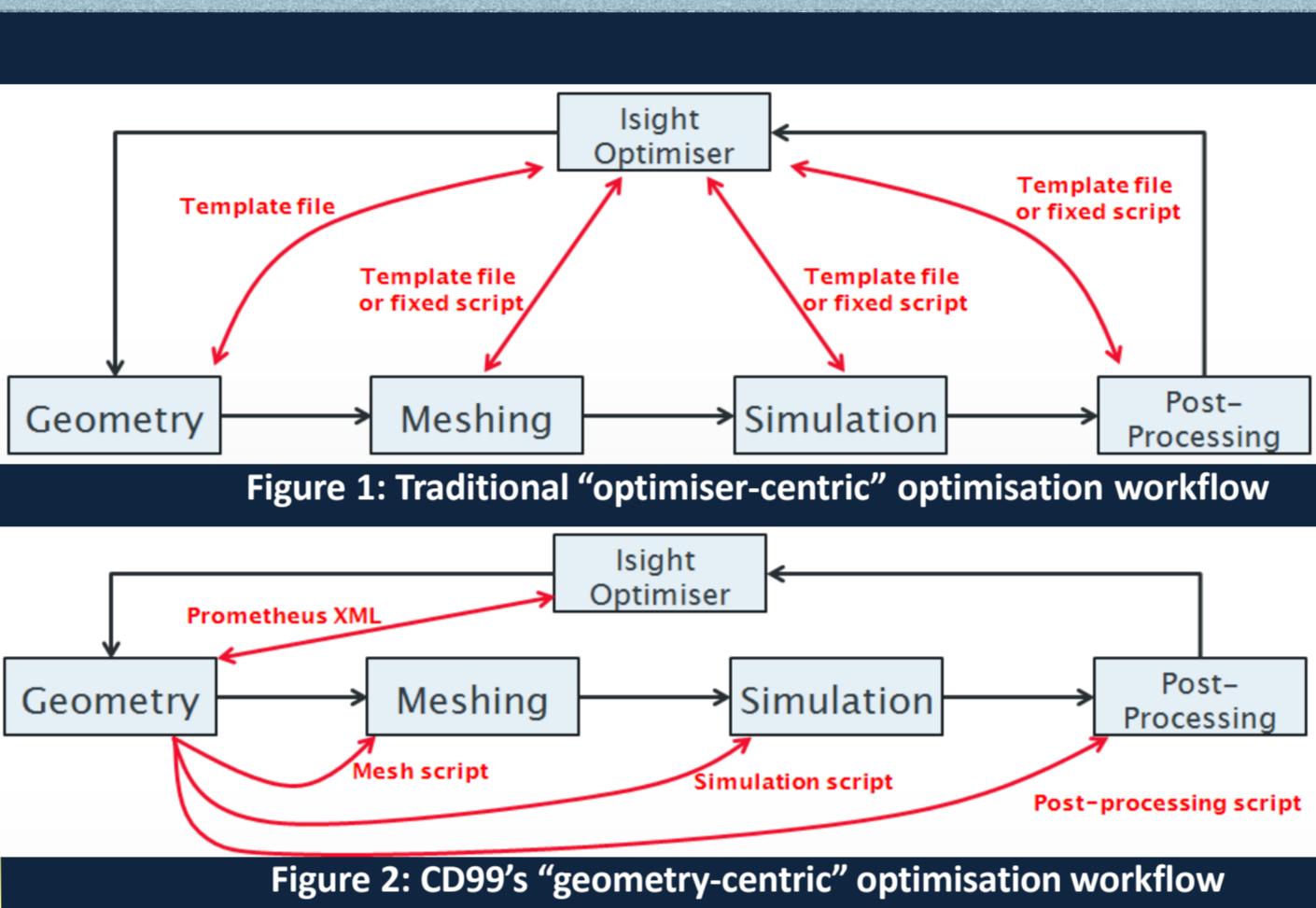


The Latest Improvements to CD99

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CD99 Overview

CD99, aka Prometheus, initially aims to develop an efficient and effective multi-disciplinary combustor design optimisation system. Rather than following the traditional “optimiser-centric” approach to optimisation as shown in Fig. 1, CD99 takes a more “geometry-centric” workflow that reduces both the level of complexity and rework. Implemented based on Siemens NXOpen API, CD99 uses a series of rule-based geometry feature recognition routines to allow all topological changes to be automatically reflected in any generated scripts for a variety of operations using embedded engineering knowledge and best practice.



Limitations of CD99 v1

CD99 has been successfully applied to several engine design & optimisation projects and deployed globally to other sites. It is proven to accelerate the design process of engine products significantly. Besides these achievements, the tight coupling between the CAD and CD99 code has its pitfalls:

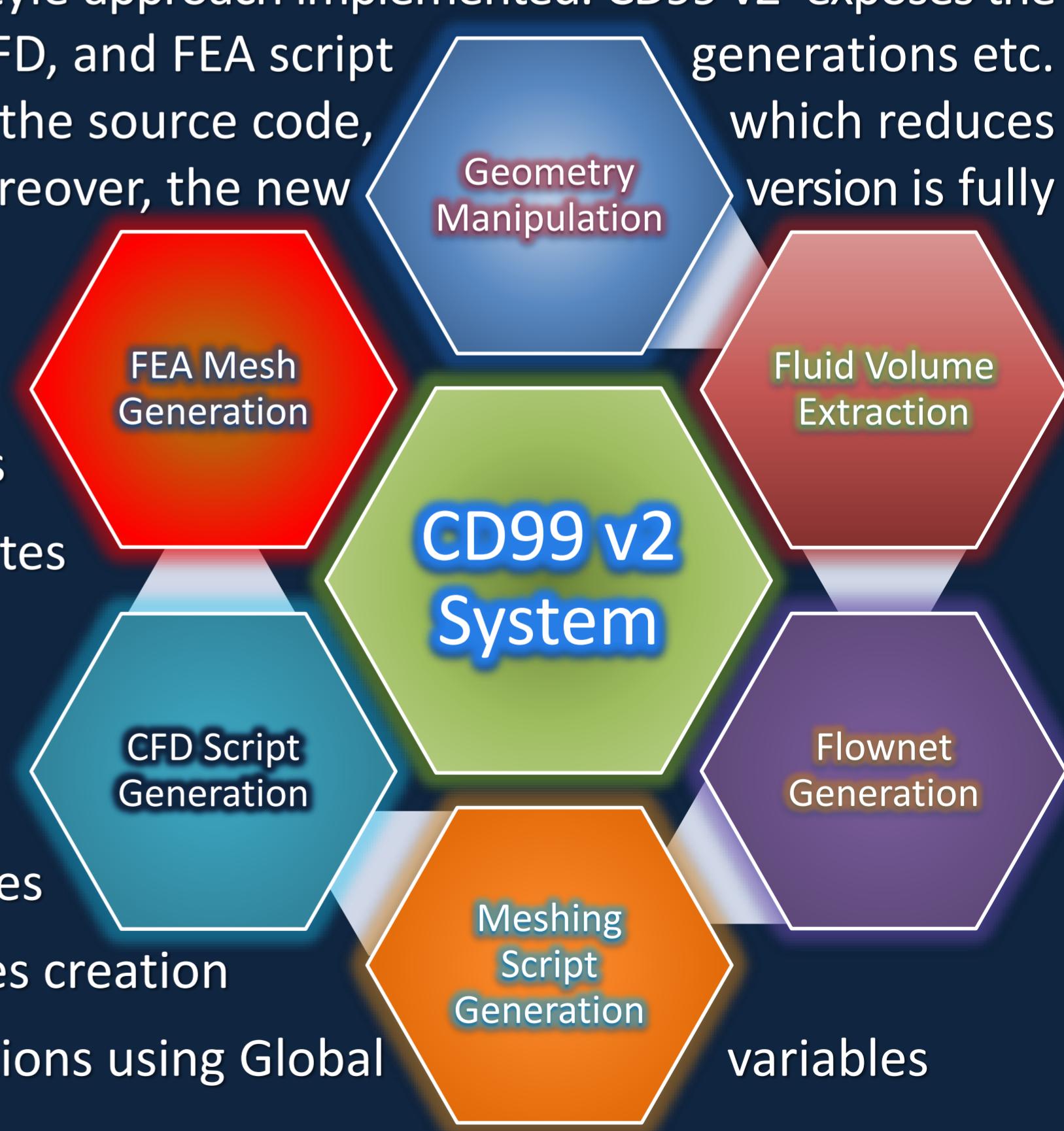
1. Logic embedded within code: new combustor might have features CD99 does not recognise, which requires source code modifications.
2. Block-box operation: the rule-based feature recognition works as a black-box since the user has no control to which rules to be applied to a specific style of combustor.
3. One-stop workflow: A proper fluid volume will be extracted along with all other associated script files if it works, or nothing if it does not.

Improvements in CD99 v2

With the latest improvements in CD99 v2, the rule-based feature recognition process is not hidden and inaccessible anymore. The user gains controls to all sorts of functionalities of CD99 thanks to the LEGO-style approach implemented. CD99 v2 exposes the individual capabilities to the user for fluid volume extraction, Flownet, meshing, CFD, and FEA script generations etc. which reduces version is fully backwards-compatible with the old version of CD99.

Key features

- Applicable to any geometry as CD99 does not need to know what the model is
- Respect assembly constraints of object positions and maintain objects' attributes
- Global variable definitions that flow down to all stages of the whole workflow
- Template-based approach to Flownet generation with the ability to modify any interested element and stitch partial networks together
- New mesh mating condition creation that reflects the latest NXOpen API changes
- Enhanced ICEM mesh control of Prism meshing, smoothing process, and curves creation
- Fully automated workflow to populate Flownet results as CFD boundary conditions using Global variables



Applications

- Combustor related projects: ENTAPS, EJ200, Trent XWB, etc.
- Exhaust related projects: ATAD, Tempest, Future Exhaust Programme

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