IMPRESS in the CERBERO H2020 EU Project

IMPRESS has been used in the Cerbero toolchain to allow the design of just-in-time hardware composition applications.

Just-in-time hardware composition refers to the ability to build different accelerator at run-time using a predefined set of reconfigurable modules. Two proof of concept applications have been developed in Cerbero.

The first one is an application to generate accelerators from software descriptions without control flow statements. The second one uses high-level goals and references to build accelerators using a scalable BbNN.

IMPRESS has also been integrated within the ARTICo3 framework to reduce the implementation times and the memory footprint of the partial bitstreams.

Open Source Framework

IMPRESS has been released as an open-source tool at **https://github.com/des-cei/impress** under a GNU General Public License

IMPRESS

MORE INFO AT

https://des-cei.github.io/tools/impress

https://github.com/des-cei/impress

CEI UPM | Centro de Electrónica Industrial

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IMPRESS

IMPRESS is an open-source tool for implementing highly flexible **reconfigurable systems in Xilinx Series 7 FPGAs**.

It includes support to combine **different reconfiguration granularities in one design**.

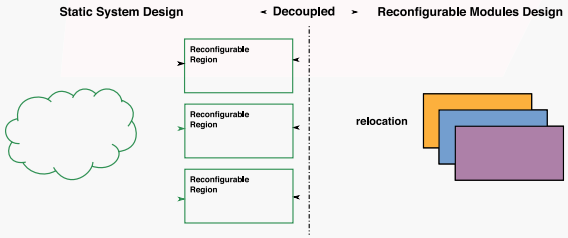
This work has received funding from the EU Commission's H2020 Programme under grant agreement No 732105

Key tool features

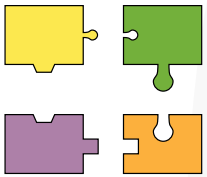
IMPRESS extends Vivado reconfiguration flow capabilities to allow the design of complex reconfigurable systems. Below are listed some of the main features that IMPRESS supports:

1) The implementation of the static system and the reconfigurable modules is decoupled.

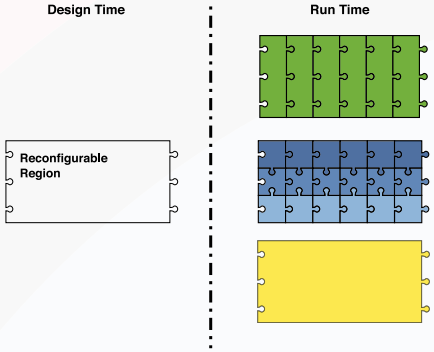
2) Reconfigurable modules can be relocated in compatible reconfigurable regions. Thus, reducing the overall memory footprint produced by partial bitstreams.



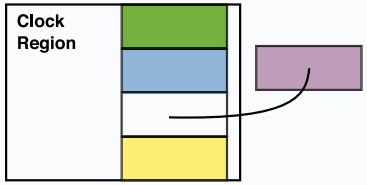
3) Reconfigurable modules can connect to each other directly without needing predefined static connections.



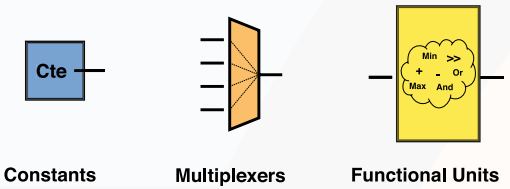
4) A reconfigurable region can be populated with one or multiple reconfigurable modules with different interconnection styles.



5) It is possible to include multiple reconfigurable modules in the same clock region.



6) Different fine-grain components can be instantiated in a design.



Main benefit of the tools

The main strength of IMPRESS is the ability to combine different granularities in the same reconfigurable system. The coarse-grain granularity is used to exchange monolithic reconfigurable modules for adapting the behaviour of the system. In contrast, medium-grain granularity is most suited to be used with mesh-type reconfigurable architectures as systolic arrays and other general-purpose overlays. Lastly, fine-grain reconfiguration is used to reconfigure individual components of a netlist (e.g., LUT truth table).