DMP title

Project Name C3-GARLIC-DMP

Grant Title C3/21/025

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Project Data Contact David Maes

Description Electronic devices and appliances are wasting a lot of energy while they are in standby mode. This so-called vampire energy can be higher than the energy that the device consumes in its operational mode due to the long standby time and the short active mode for typical applications. We propose a solution that is based on a CMOS chip, which is intrinsically small, cheap and low-power. Based on previous research performed in MICAS, we will develop a Generic ARchitecture for a Low-loss Integrated Converter, or GARLIC, eliminating the vampire energy in electronic devices and appliances by taking care of the power supply in the standby mode. The scientific challenges that need to be tackled during the project are mainly the compatibility of the CMOS chip with the high input voltage and the capacity to deliver enough output power for a large variety of applications. We have already proven the basic concepts that help answer these challenges, but in GARLIC, we will evolve towards the full system level and towards the validation in a demo setting. We will validate our research by realizing a hardware set-up, with an innovative chip at its core. This implies that we will create the following types of data: simulation data, design data and measurement data. This DMP describes our strategy for handling these data types.

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1. Data Description

What data will you collect or create? Fill out the table below and/or describe.

Simulation data

The functioning of integrated circuits is simulated with dedicated software such as Cadence Spectre, Ansys HFSS, and Mentor Graphics QuestaSim, making use of physical and electrical models that are provided by the chip fabrication companies.

Measurement data

The functioning of integrated circuits is validated by performing measurements in the IC-lab, using equipment such as Arbitrary Waveform Generators, Vector Network Analysers and Digital Oscilloscopes to generate input signals and measure the corresponding output signals.

Design data

The integrated circuits are designed with specific software such as the Cadence design suite. Depending on the level of abstraction, certain formats are used, such as VHDL (high level circuit description) or GDSII (geometric shapes of the layout).

Type of data	Format	Volume	How created?
e.g observational, experimental, reference data,...	e.g. textual, numerical, multimedia	e.g 200MB, 1GB	Computer task, observations, blood sample, ...
simulated	numerical	10GB	computer task
experimental	numerical	10GB	measurements on electronic systems
design	VHDL, Cadence database format	10GB	computer task

Do you intend to reuse existing data?

No, we will create new data.

Do you use personal data (i.e. all data possibly identifying an individual)?

- No

2. Documentation and Metadata

Describe the documentation that will be created for the data. This section deals with the way in which you will document how the dataset was created and subsequently processed.

Simulations data

Raw simulation data will be collected per simulation test, including a text file with a clear

description of what the data represent and how they were generated. The input files used for the simulation will be kept inside the same folder. The name of the folder will contain the simulation conditions. A text file explaining the naming will be maintained.

Design data
Details on the conceptual, architectural and topological design of the circuits will be documented in word files. Links to the folders in which the design data are stored will be included, as well as all the necessary metadata to be able to extract and reuse the design data: technology node, flavour, etc.

Measurement data
Raw measurement data will be collected per measurement test, including a text file with a clear description of what the data represent and how they were generated. The input-files used for the measurements will be kept inside the same folder. The name of the folder will contain the measurement conditions. A text file explaining the naming will be maintained.

Describe the metadata for the data. This section deals with metadata: information contained in your dataset about the research data.

There is no formally acknowledged metadata standard specific to our discipline. However, in our research group, we have a standardized method of structuring our data. Our researchers are obliged to use this method. This method is available on our intranet and its importance is stressed during the yearly introduction session for new researchers.

3. Ethical, Legal and Privacy Issues

Are there any ethical issues concerning the creation and/or use of the data?

There are no ethical issues.

Did you consider all issues about copyrights and IPR?

The work in this project will result in new concepts, architectures and designs of integrated electronic circuits and systems. These findings will certainly have potential for valorisation. Valorisation will most likely be implemented by means of follow-up research projects with industrial partners.

The design data will be protected by trade secrets. Patents are difficult to obtain in this field. The results of this C3 project will form background knowledge in follow-up projects. The typical background licenses will be granted to the partners in such follow-up projects.

We will involve LRD if the need arises.

Are the collected data considered to be â€œdata containing personal informationâ€ and are all the requirements about the collection of these data met?

The data will not contain personal information.

4. Data storage and Backup during Research

How and where will the data be stored during research?

- Centrally on storage facilities of the research unit

We will use the central storage facilities of our research department.

Which back-up procedures are in place?

The data will be stored on our servers with automatic daily back-up procedures.

Describe the data security procedures and who has access to the data.

Confidential data is stored on file servers which are only accessible by authorized people with specific account settings. The servers are located in a secured room with access limited to system administrators. For data related to specifc, very advanced and exclusive technologies we have physically separate file servers.

5. Data selection and Preservation after Research

What is the long-term preservation plan for these dataset(s)?

The data will be stored on our central servers (with automatic back-up procedures) for at least 10 years, conform the KU Leuven RDM policy.

Data Selection: Which data will have long time value for the research and will be preserved?

At least the following data will be retained for the expected 10 year period after the end of the project:

- the data needed to reproduce and verify published research results
- the data needed to prove and increase the value of research results that have valorization potential
- all design data

Retaining the data of every single simulation or measurement experiment would take to much physical storage space.

6. Data Sharing

Are there any restrictions for sharing the data?

For the design, simulation and measurement data that are related to valorisable results, carefull IPR management will be needed, meaning that the data will not be shared outside the university without a prior agreement on confidentiality and IPR.

If there are no restrictions, which mechanisms will be in place to assure that the data are discoverable, accessible and intelligible?

Standard file formats will be used so that the data is technically interoperable. (See the description of the data types.)

There is no formally acknowledged metadata standard specific to our discipline. However, in our research groups, we have a standardized method of structuring our data.

The simulation, design and measurement data will be made available for reuse through our internal archiving facilities. Publications will be accessible through the established channels.

How will you share the data?

- Repository

The data will be made available for sharing through our internal archiving facilities.

With whom will the data be shared?

- Within the research unit only

To maintain the valorization potential of the data, they will not be shared outside the research unit.

7. Responsabilities and Resources

Who is responsible for Data Management during the project? This will be the person who might receive questions on the data management aspects of the research project.

Contact person for DMP: David Maes.

The end responsibility for updating and implementing the DMP is with the supervisor (promotor).

Which additional resources are needed for the execution of the Data Management Plan?

All required expertise, hardware, software and budgets are available within the research unit.

Did you read the KU Leuven Data Management Policy? (find the link to the policy in the guidance).

- Yes