

Zero Release Definition

Write here the version of the delivery

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1. Executive summary

The purpose of the following document is to define the Zero Release that will be shown to the end users (CAF and SAAB) in the next face to face meeting (M6) so that they have a first contact with the type of platforms they will work with since M18.

The following requirements have been taken into account during the development of the Zero Release:

* The effort to put this release should be minimized.
* Low Power features will not be included in the release.
* Work on the interaction between partners so that interfaces are clear for next releases.
* It should provide final platforms so that end users can use them and provide a feedback.

1. DEsCription of the GLOBAL APPLication

In this section the basis of the global application and the high level architecture used in the ZYNQ will be explained.



*Figure-1: Zero release high level architecture*

As it is shown in the picture, we will have **two soft-cores** (Microblaze instantiations) and the two ARM hard-cores. Two bare metal partitions will be hosted within these two ARM cores. A synthetic application on the Microblazes will send a message periodically (e.g., 4 seconds) to the ARM. The specific message that they will share will be:

* Identification of the soft-core: byte that will identify the origin of the information.
* Token: A byte that will be incremented in one every time the new information is shared.

The **PS (ARM)** part will use both COREs hosting two XtratuM partitions and on the top of each an application will be launched:

* Debug Application: This application will shown in the UART the information shared by both soft-cores.
* I/O Application: This application will update LEDs
  + OuputA: It will be only activated when the input is switched on.
  + OutputB: It will be updated when the token received from the first Microblaze change. Actually it will be updated to the opposite value it was before the information/token was changed.
  + OutputC: It will be updated when the token received from the second Microblaze change. Actually it will be updated to the opposite value it was before the information/token was changed.

1. DETAILED DESCRIPTION OF THE PLATFORMs

In the project three different platforms have to be defined: evaluation board based platform, PCB and virtual platform. For Zero Release PCB won't be provided. In this section detail about how to implement the remaining platforms will be explained.

* 1. ZC702/ZC706 Evaluation Board based platform detail

The evaluation board based platform will include the following elements:

* The code to run in the PS part running over Xtratum. That is to say, the code required to put working both partitions (one over each core) using the input/outputs and the uart. This will be common for both platforms (EPK and ZC70X).
* The bitstream that will integrate:
  + Nostrum: NoC Interface for each Micro blaze and each core of the ARM and the network interconnection.
  + Two Microblazes.
* The boot to launch all the required elements in the ZYNQ platform.

Everything will be integrated into a SD image that could be loaded into a SD card and put easily running into a ZC702/ZC706 board. Take into account that ZC706 and ZC702 ARM applications will be slightly different because the inputs/outputs (button and led) are mapped differently.

* 1. Virtual platform detail

The virtual platform will include the following elements that will be connected among them by the AXI bus interface: ARM dual core with Xtratum on it, two soft cores, UART module and some input/output registers.

Although AXI will be the physical bus mechanism the implementation specific aspects of the bus are not implemented in the virtual platform. This interconnect is therefore only a logical memory connection. Each microblaze will have a local private memory for HEAP/stack etc but this does not need to be shown.

Regarding the ‘LED’ output, it will initially be provided using logged information in stdout.



*Figure-2: Zero release high level virtual-platform architecture*

1. DELIVERIES

The following extract will cover how the platforms, the elements of each platform and the development environment will be delivered and responsible for each task.

* 1. Elements delivery

The elements to deliver and the responsible are:

|  |  |  |  |
| --- | --- | --- | --- |
| **ELEMENT** | **RESPONSIBLE** | **DATE** | **VERSION** |
| XTRATUM | FENTISS | 18/04/16 | 2.0.3 |
| BITSTREAM (NOSTRUM) | USIEGEN (KTH) | 20/05/16 (29/04/16) | ¿?¿?¿?¿?¿? |
| VP\*1 | IMPERAS | 06/05/16 \*2 | ¿?¿?¿?¿?¿?¿ |

\*1: There will be a specific EPK Package to be installed and also a standard IMPERAS product Package.

\*2: On 13/05/16 the VP will assure the possibility to run XTRATUM on VP.

We have to remember that all the previous delivers should include at least the user manual document.

In order to have all of them accessible from the same place they should be uploaded in SAFEPOWER share folder, each one in the generated project and File area. However, for the Zero release after we agree with FENTISS and IMPERAS their SW deliveries will be done in their own web page.

Instead of using mails for support questions, the Issue tracking system from redmine (http://www.redmine.org/projects/redmine/wiki/RedmineIssues) could be used. There will be two different projects inside Safepower for each development: Virtual-Platform EPK, Hw Platform (PCB and Evaluation board based platforms will be integrated inside).

In redmine, issues will be created to report any bug or question. Wiki will be used to collect common questions and provide a Q&A. As it was mentioned before the File area of each project will be used to upload and provide releases.

* 1. Development environment delivery

The development and installation of the applications to run over XTRATUM requires a Linux distribution PC with some programs installed on it. At the same time, to put the Virtual platform working, a concrete Linux distribution PC and some packages installed are required. In order to minimize the required time to put the working environment ready, the proposal is to generate a Linux Virtual Machine with everything ready. However, XTRATUM and the EPK will not be included in the VM image in order to assure their privacy.

Regarding the environment for the development of the PL, taking into account that a license is required for it and, that it is considered that end users won't require to change it, Vivado full version won't be included.

However, each company, end users included, will require a HW machine with the IMPERAS EPK license key on it.

The delivery of a first version of the virtual machine will be done in the Face-To-Face of June by Ikerlan.

* 1. Platform delivery

There are two different platforms to deliver and each of the platforms involve the following tasks and responsibles:

* Virtual Platform:
  + Set Up the Safepower EPK with two Microblazes and a dual-core ARM sharing a memory to simulate the NoC. *--> IMPERAS*
  + Provide some examples and documentation of the Safepower EPK. *--> IMPERAS*
  + Generate the .elf file with the applications of the PS running on XTRATUM. --> IKL
  + Generate the .elf file with the applications of the PL. --> USI
* ZC702/ZC706: It will be delivered to end users by IKERLAN with the application running on it.
  + Provide bit stream including Nostrum and NI.*--> KTH*
  + Generate the .elf file with the applications of the PS running on XTRATUM. --> IKL
  + Generate the PL part (Microblazes with the application running on them), including the Nostrum and their NI without extension layer . --> USI