NOVEL ARCHITECTURE FOR MULTIMEDIA HARDWARE ACCELERATION

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Motivation of the work

The technology of telecommunication networks has been evolving in the last years (4G and 5G).

Multimedia communication usage (mainly video) is growing so rapidly (video traffic will be 79 percent of all consumer internet traffic in 2018, up from 66 percent in 2013 [1]).

New architectures have to be developed in order to provide new services for 4G and 5G networks and guarantee the quality of experience for users (extend bandwidth and minimize latency and start-up time).

Research Plan

First stage(first year 2014/2015)

- Establish an essential knowledge of GStreamer [2].
- Establish an essential knowledge of hardware video acceleration [3][4].
- Establish an essential knowledge of the media server [5].
- Review the data sheets of different. manufactures of hardware video acceleration.
- Initial design of architecture for multimedia hardware acceleration.

Second stage(second year 2015/2016)

- Establish an essential knowledge of the GPU virtualization.
- Test video processing in different embedded boards.
- Participate in a workshop in English Academic Writing.

Third stage(third year 2016 /2017)

- Participate in an international conference[6].
- Establish an essential knowledge of different techniques of GPU virtualization , cuda[7], docker[8] and nvidia-docker[9].
- Design a "Virtualized Media Server" Architecture.

Next Year Planning

- Implement the "Virtualized Media Server" Architecture and test its performance. ,
- Submit a journal paper.
- Write the final report.

Thesis Objectives

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- Design a "Virtualized Media Server" Architecture.
- Design new architecture of hardware accelerated mechanisms to manipulate video.

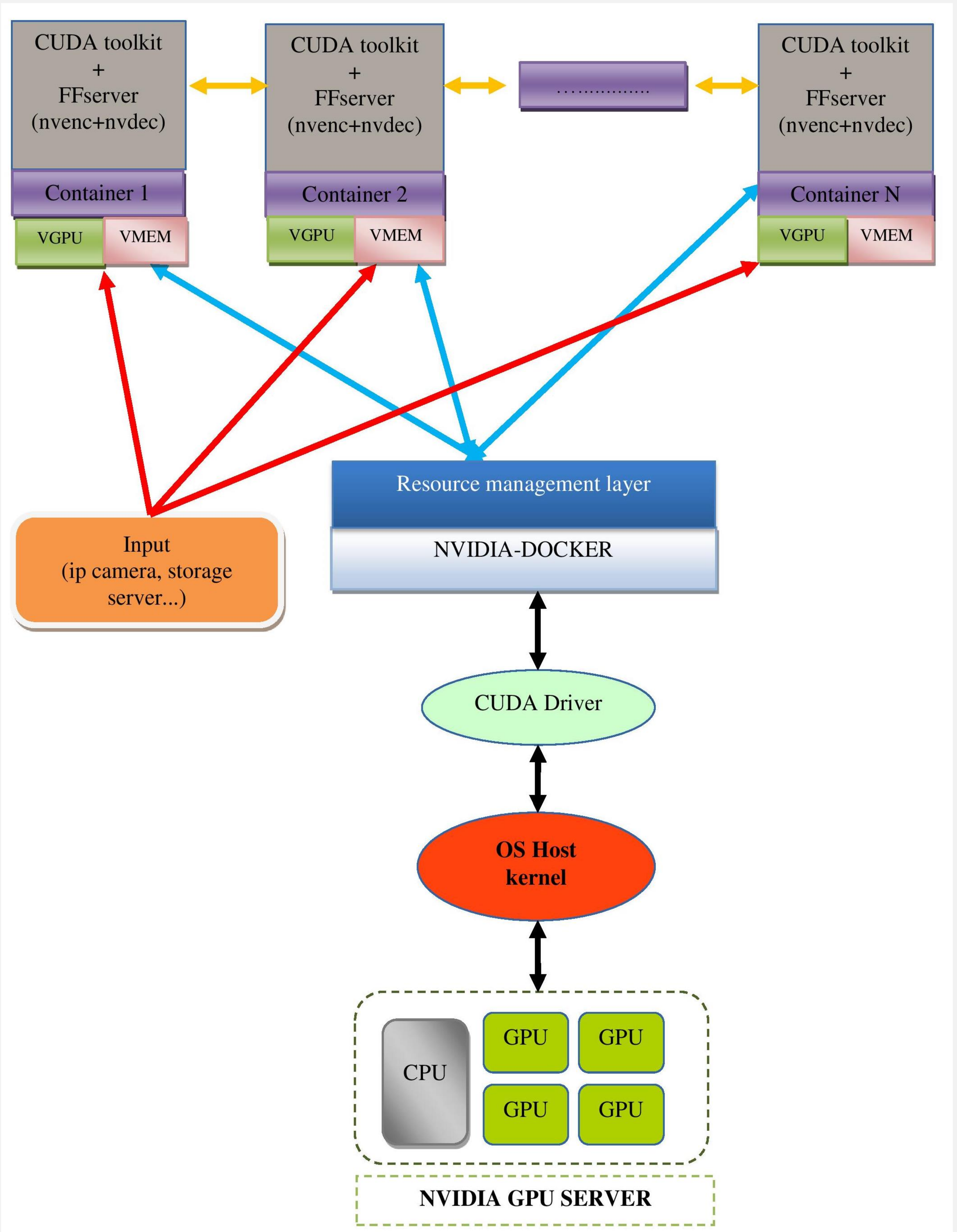
Results

System-on-Chip Evaluation for the Implementation of Video Processing Servers [6]

- The possibility of performing complex real time video operations with a system-on-chip.
- The possibility of using a system-on-chip to implement a Media Server.

GPU virtualization

- NVIDIA-DOCKER can virtualize the NVidia GPUs with high performance.
- Multi-containers can run simultaneously with NVIDIA-DOCKER but the number of those containers are limited due to the bad management of computing and memory resources.
- The main issue of NVIDIA-DOCKER is the lack of management of the resource between different containers.



References

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[6]**G. El Haj Ahmed,** F.-G. Castiñeira, E.-C. Montenegro, P.-C. Soto ," System-on-Chip evaluation for the implementation of video processing servers" , 5th World Conference on Information Systems and Technologies(WorldCIST), April 2017.

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Workshop on Monitoring PhD Student Progress, June 22-23, 2017, Vigo, Spain