

System-on-Chip Workshop

12-14 June, CERN

Closing Remarks

Summary

**First Workshop on System-on-Chip
across experiments and accelerator
at CERN:**

160 registrations



2 manufacturer presentations: Xilinx and Intel

2 overview talks: CMS and ATLAS

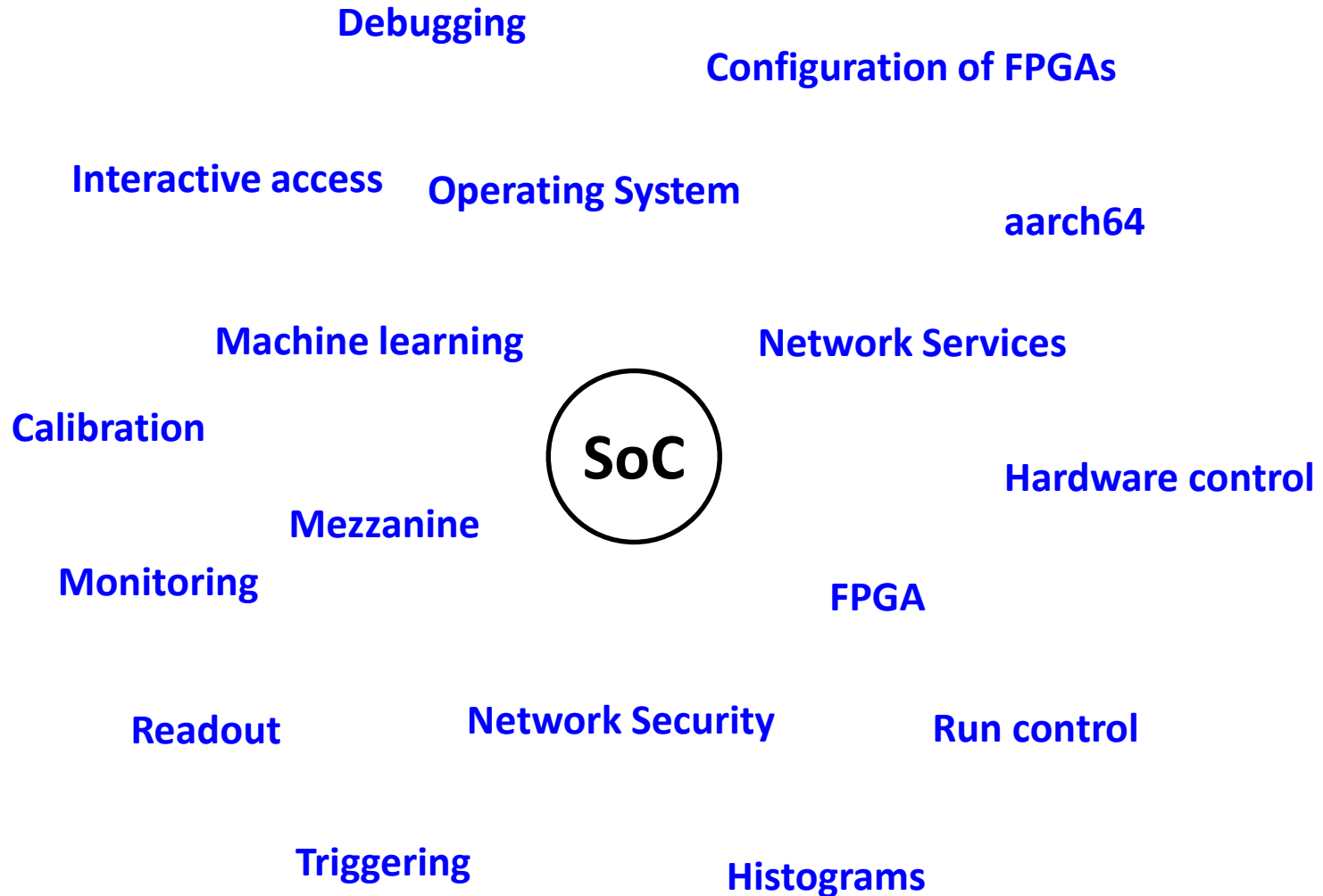
13 presentations of different uses of SoC:

LHC experiments, CLIC, Beams and Radiation Protection

5 presentations with demos/tutorials: mainly on software for SoCs

5 presentations on system-oriented aspects

Key Words (Selection)



Summary – Uses

A lot of interest in System-on-Chips:

Across experiments, accelerators, and radiation protection

Wide range of uses: some focus more on hardware control, some run elaborate software, some use it for trigger and readout

SoCs are very powerful, flexible devices with a lot of potential

A zoo of applications ... ⇒ anarchy?

A prediction for ATLAS and CMS foresees about 3000 SoCs in phase 2

Concerns about

- **How to organise SoCs into manageable systems**
- **How to provide long-term maintenance and support**

⇒ *“Overcoming the challenges will most likely rely on commonality across systems.”*

Summary - Hardware

On the hardware side:

Actually many/most/all systems are using similar hardware

There is some effort on defining a common mezzanine card to overcome the problem of hardware obsolescence

Summary - Software

On the software side:

It is not the user software, but the system and network aspects which are of concern

- **Operating system:**

- PetaLinux, Yocto, CentOS, Balena, ...
- Operating system = kernel + rootfs? Or only rootfs?
- Other system software: middleware, compiler, LCG, ...

- **Network:**

- Organisation: number of SoCs per shelf, bandwidth requirements, number of switches, ...
- Services: DHCP, TFTP, DNS, NFS, NTP, syslog, ...
- Security: firewalls, monitoring, updates, ...

⇒ Centrally managed and maintained security-certified operating system?

Outlook

How to continue from here:

- Interest group: system-on-chip@cern.ch,
organise regular meetings, possibly on selected topics,
use twiki page to exchange information/solutions:
<https://twiki.cern.ch/twiki/bin/view/SystemOnChip/WebHome>
- Create working groups on selected topics together with CERN-IT
on Linux, network security
- Organise another SoC workshop,
what is the best time, in about one or two years from now?

Thanks

- To all presenters for the presentations and the tutorials
- To all of you for the interesting discussions
- To the secretaries of EP-ESE, ATLAS, CMS for their help, in particular, for finding the rooms
- To the management of ATLAS and CMS for their support
- To EP-ESE, EP-CMD, and ATLAS for offering coffee and tea

Have a good weekend!