

# New WRS-4 Introduction

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**New WRS-4 Workshop**  
2020-06-26

# Workshop Agenda

13h30 – 13h40: Welcome

13h40 – 14h00: Introduction

14h00 – 14h30: State of the art and requirements

14h30 – 15h15: Hardware features + questions (no discussion)

15h15 – 15h30: break

15h30 – 16h15: Main board + questions (no discussion)

16h15 – 17h30: Feedback and discussion

**While we will accept questions for clarifications during the presentations, please keep our feedback until the last session.**

# Agenda

- Goals of WRS-4 project and this workshop
- Project Roadmap
- Strategy for WRS-4 dev. and WRS-3 support
- Current status and plans
- [side note] Migration to IEEE1588-2019 High Accuracy

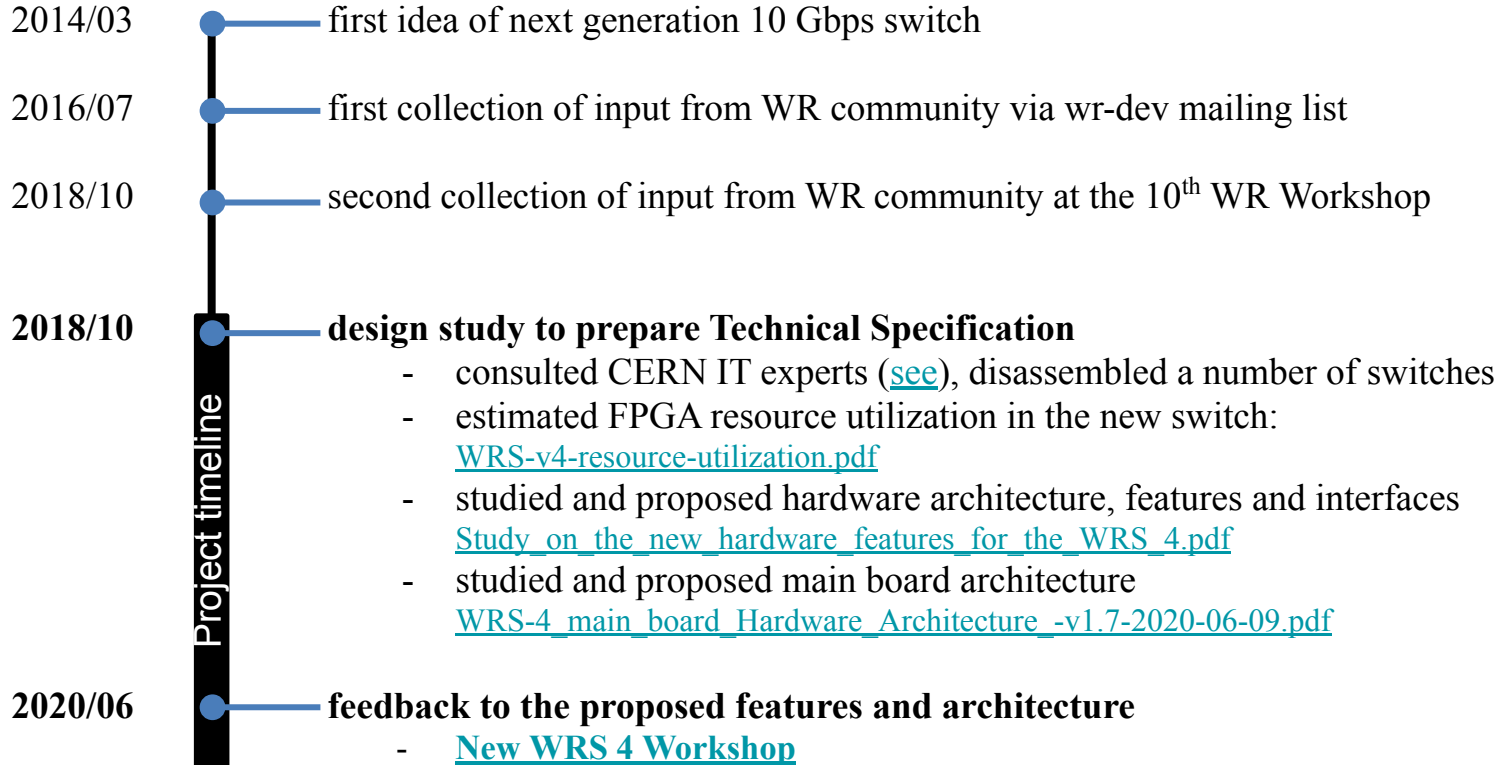
# Introduction

- The current WRS-3
  - Provides only 1GbE ports
  - Getting old - component obsolescence
  - Limited FPGA resources - hard to add new features
- The new WRS-4
  - Discussed since long (2014)
  - Project: <https://ohwr.org/project/wr-switch-hw-v4/wikis/home>

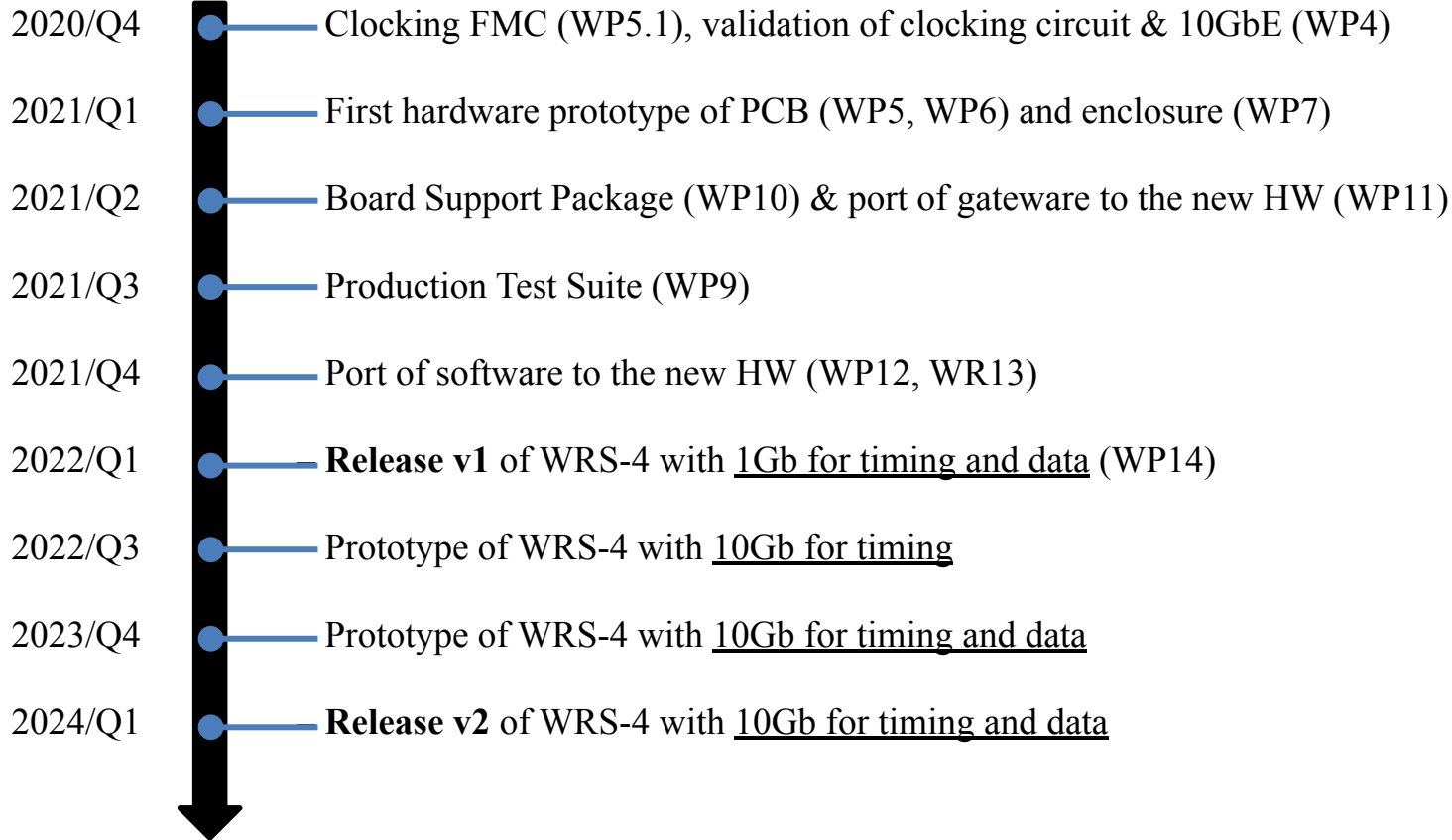
# Goals of the new WRS-4 project and this Workshop

- **WRS-4:** create new WR switch that
  - supports 10 Gbps
  - provides industry-level reliability features
  - meets needs of the WR Community
- **Workshop:** consult with the WR Community hardware specification for the new WRS-4

# Project roadmap (so far)



# Project roadmap (into the future)



WP	Task
1	Study of WRS-4 features
2	Analysis of FPGA resource utilization
3	Proposal of WRS-4 main board architecture
4	Verification of 1Gb and 10Gb transceiver
5	Schematics design
5.1	Clocking FMC design (schematics, layout)
6	PCB layout design (DEM)
7	Enclosure design
8	Proper WR support for GTH
9	Production Test Suite (PTS)
10	Board Support Package (SW)
11	Porting of gateway + clocking
12	OS/bootloader support and port of SW with minimal integration of peripherals
13	Integration of new peripherals
14	Preparation of first release v1
15	Add support of 10Gb to the WRS (timing, not data)
16	Development of formal verification of switch RTL
17	Add support of 10Gb for data
18	Preparation of first release v2
19	Preparation of testbed for the WRS-4

<https://ohwr.org/project/wr-switch-hw-v4/wikis/Home>

# Strategy for WRS-4 dev. and WRS-3 support

- Modular HW design of WRS-4 (more in next presentation)
- Incremental GW/SW design of WRS-4
  - First: port the software/gateway of WRS-3 into HW of WRS-4
  - Second: make WR synchronization work for 10Gb  
(no support for Ethernet traffic forwarding at 10Gb)
  - Third: make Ethernet traffic forwarding work at 10Gb
- HW published under CERN Open Hardware Licence Version 2 - Weakly Reciprocal
- Long-term support for WRS-3
  - **No foreseen end-date, large installed base**
  - Very likely, the SW (PTP, RTU, etc daemons) will be common to WRS-3 and WRS-4
  - Lock HW/GW - no new features added
  - SW new features only in common SW, if HW/GW support available
  - Bug-fixes



# Status

- FPGA/CPU - US+ selected, competitive price negotiated
- WR over 1Gb GTH transceiver on US+ - validated
- Technical specification - being finalized (as we speak)
  
- Clocking FMC - under development
- WR over 10Gb GTH transceiver on US+ - ongoing work
- Main Board schematics design - to be started after summer 2020
- Enclosure design - to be started after summer 2020

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**Questions?**

# [side note] Migration to IEEE1588-2019 High Accuracy

WR Node/Switch - a device that implements **WR Spec** and/or **IEEE-1588-2019 HA**

2018-2019: Compliance tests developed for **WR Spec** and **IEEE1588-2019 HA** ([see](#))

2019 : Prototype **HA** implementation on the WR Switch

2020 : WRS-3 v6.0 release - prepared to support **WR** together with **HA**

2020 : update of **WR Specification** to reflect the current implementation

202x : Prototype **HA** implementation on the WR Node

202x : WRS-3 v6.1 release - support for **HA** and **WR**

202x : WR Node release with **HA** support

WR Nodes will support only **IEEE-1588-2019 HA** (no **WR Spec**)

WR Switches will support both **IEEE-1588-2019 HA** and **WR Spec**, providing interoperability between the legacy (WR Spec) and the new (HA) devices