WR Switch and WR PTP Core

status and plans

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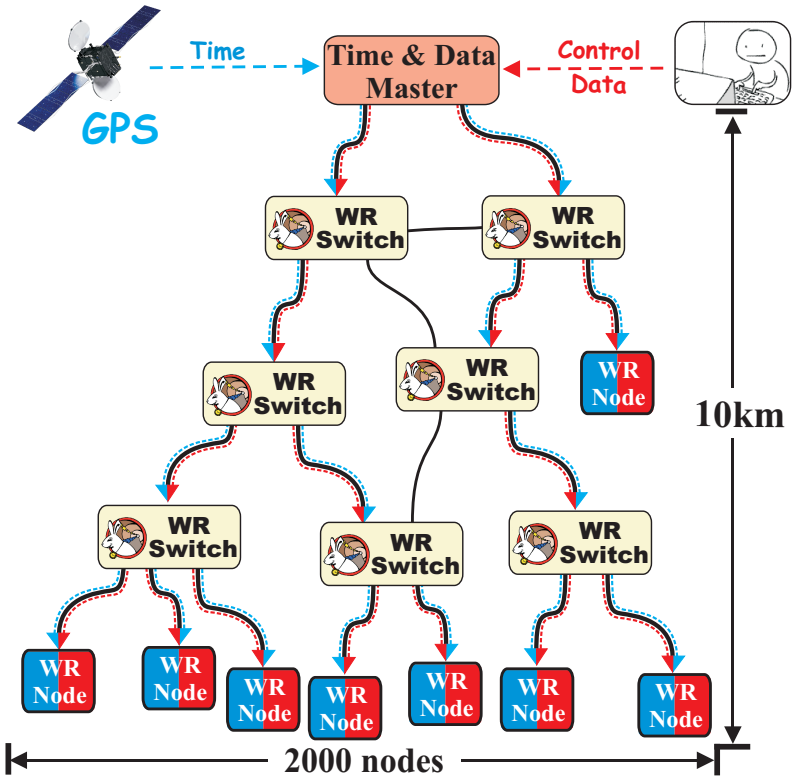
CERN BE-CO-HT

14 March 2016

Outline

1. WR Switch
   - Gateware
   - Software
   - Plans for the future
2. WR PTP Core
   - Release v3.0
   - Plans for the future

WR Switch - overview



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- 18 port gigabit Ethernet switch with WR features
- optical transceivers: up to 10km, single-mode fiber

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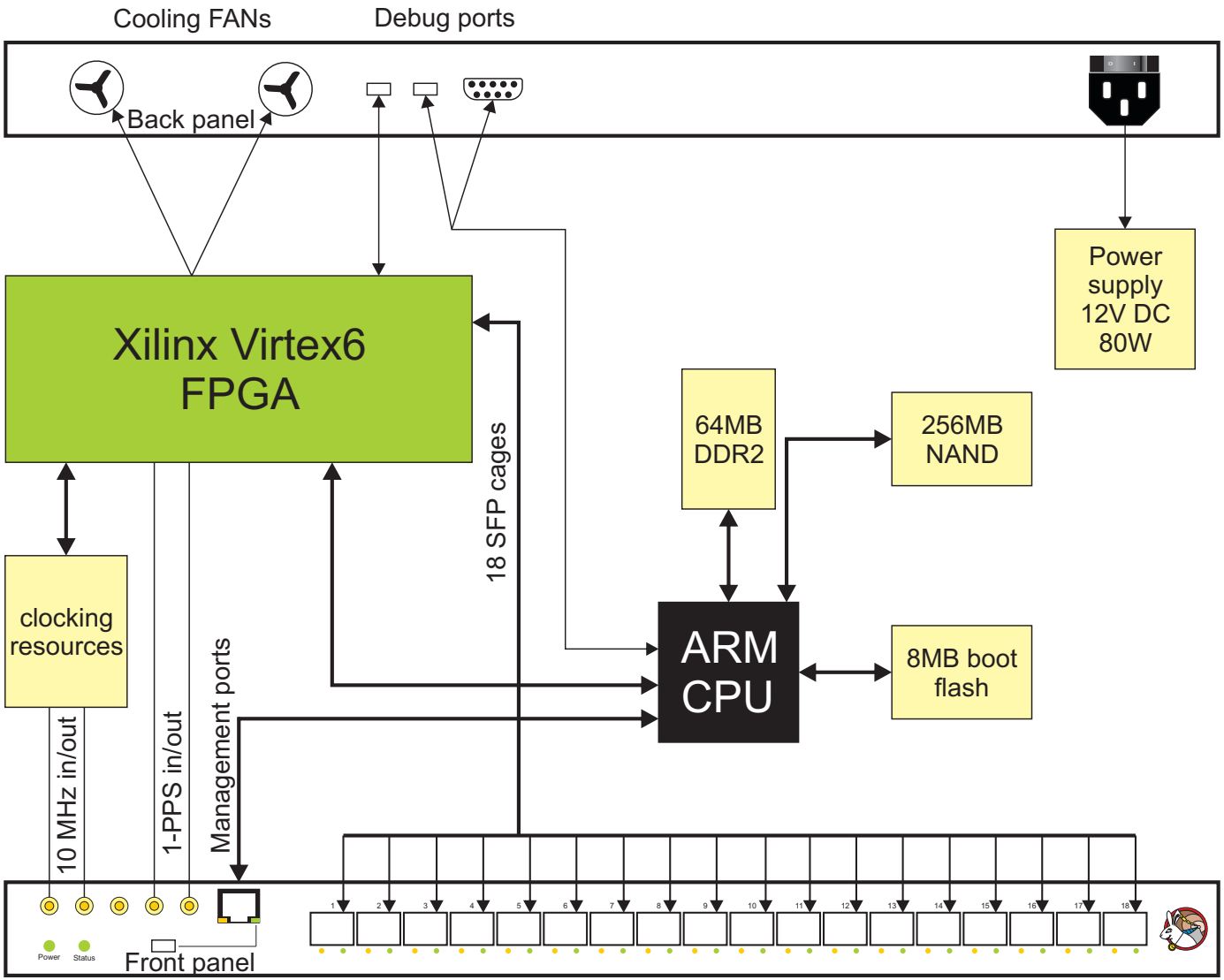

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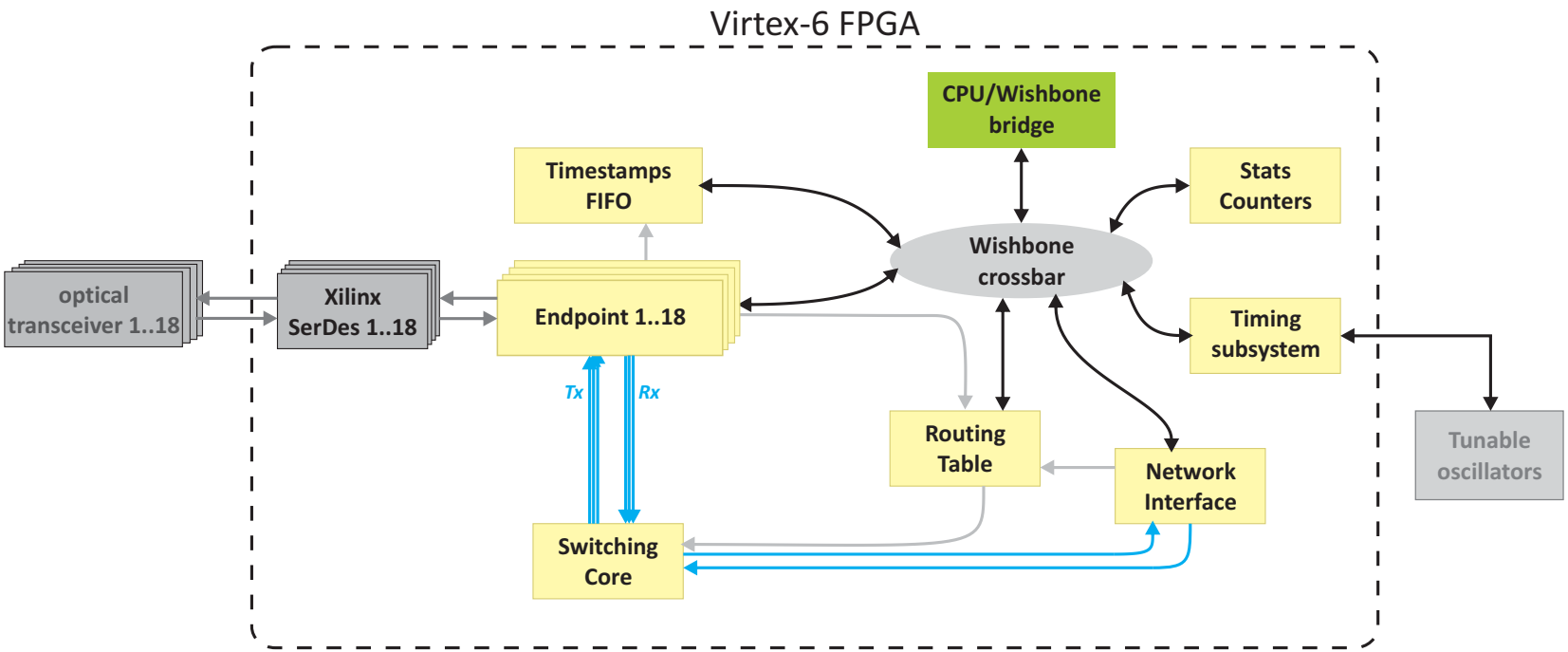
Gateware

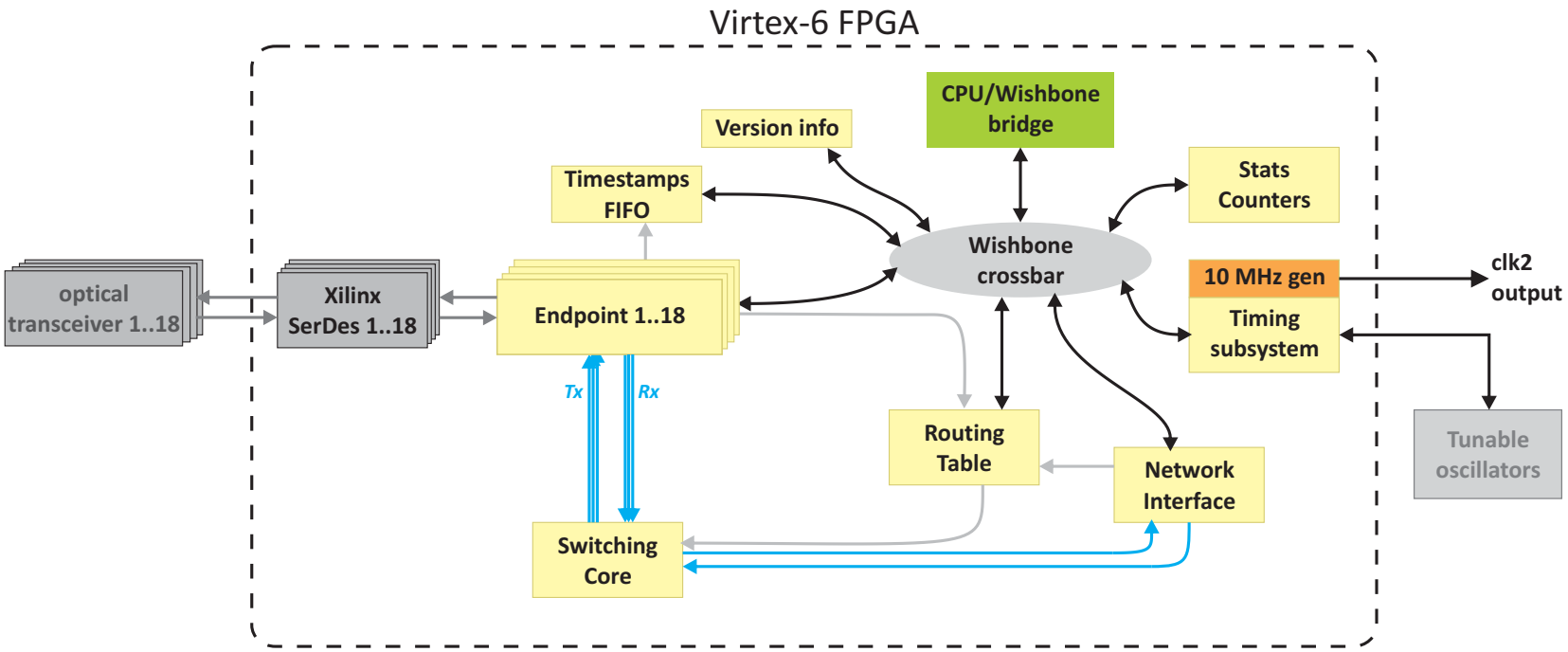

Virtex-6 FPGA
CPU/Wishbone bridge
Timestamps FIFO
Stats Counters
Wishbone crossbar
optical transceiver 1..18
Xilinx SerDes 1..18
Endpoint 1..18
Timing subsystem
Tx
Rx
Routing Table
Network Interface
Tunable oscillators
Switching Core

Gateware release v4.2

- Released on 28 August 2015

Gateware release v4.2

- 10MHz generation (only hardware v3.4)



Gateware release v4.2

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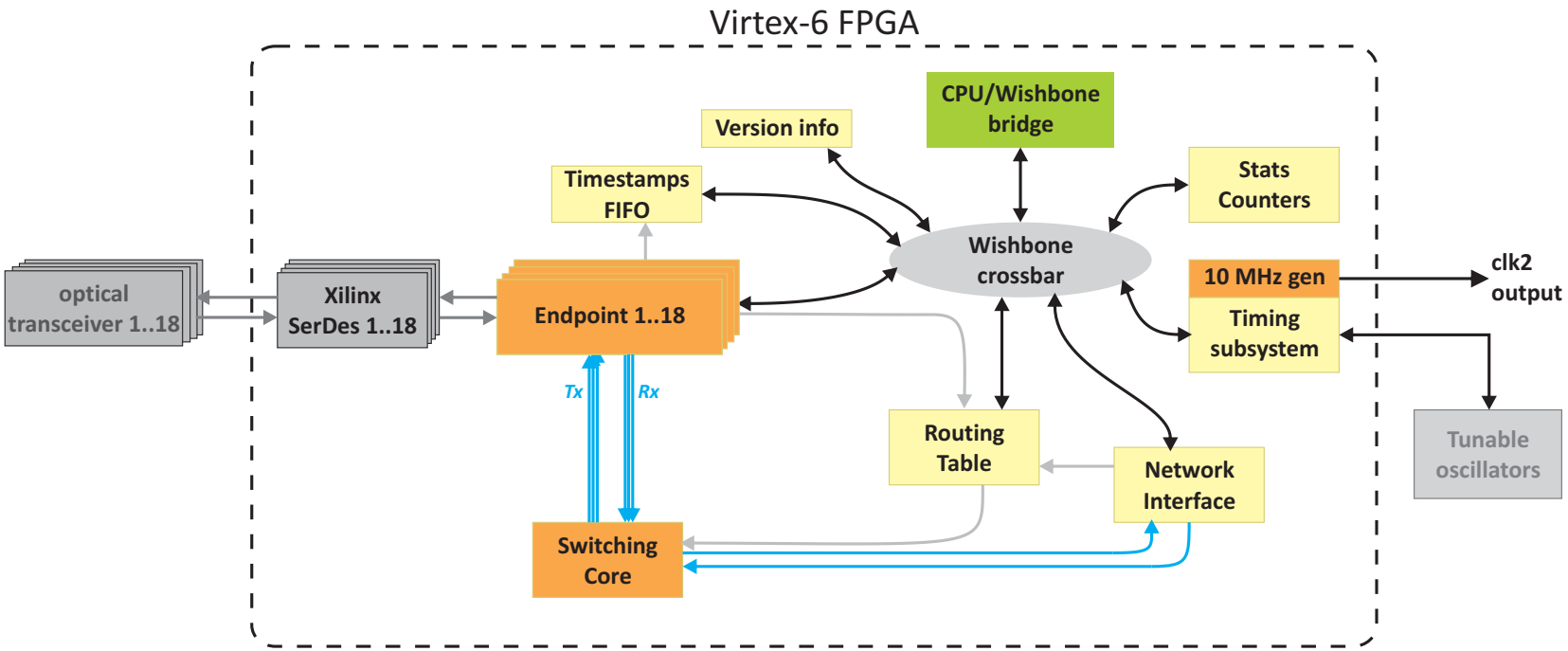
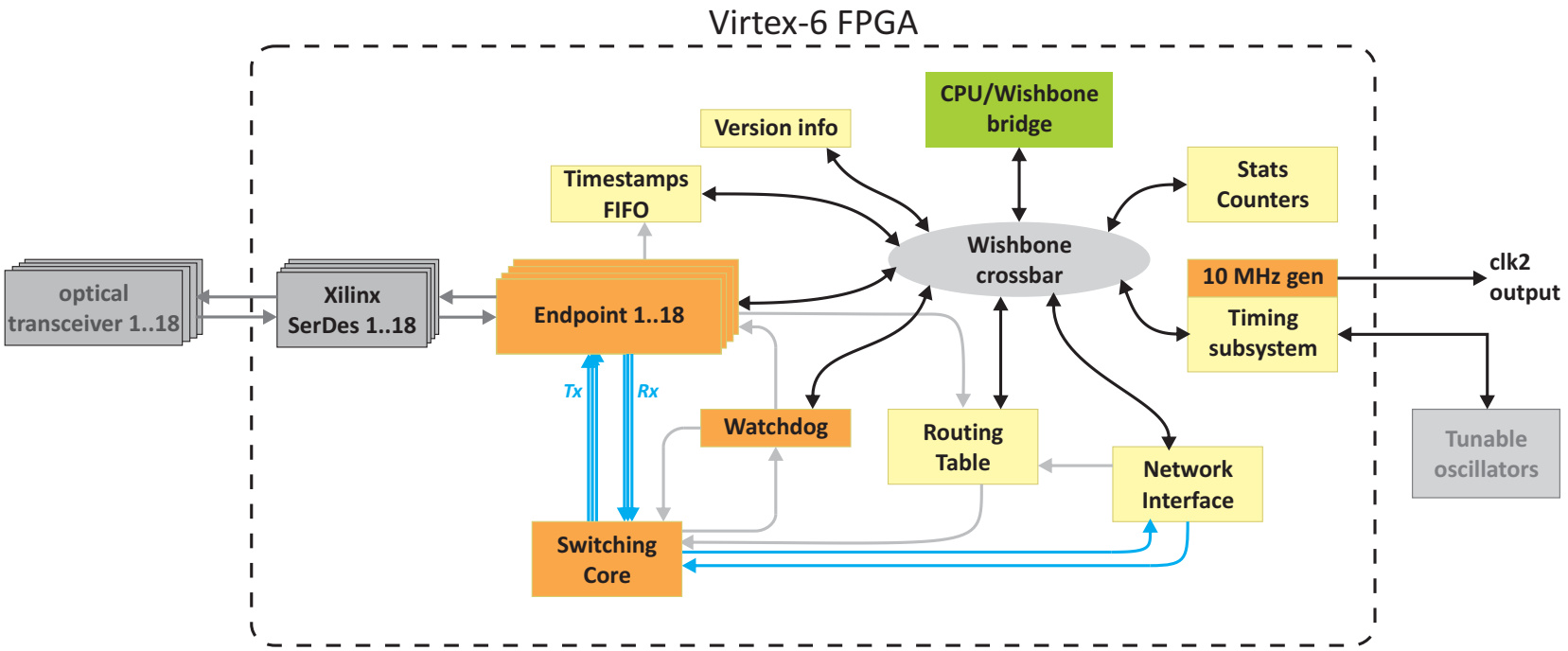


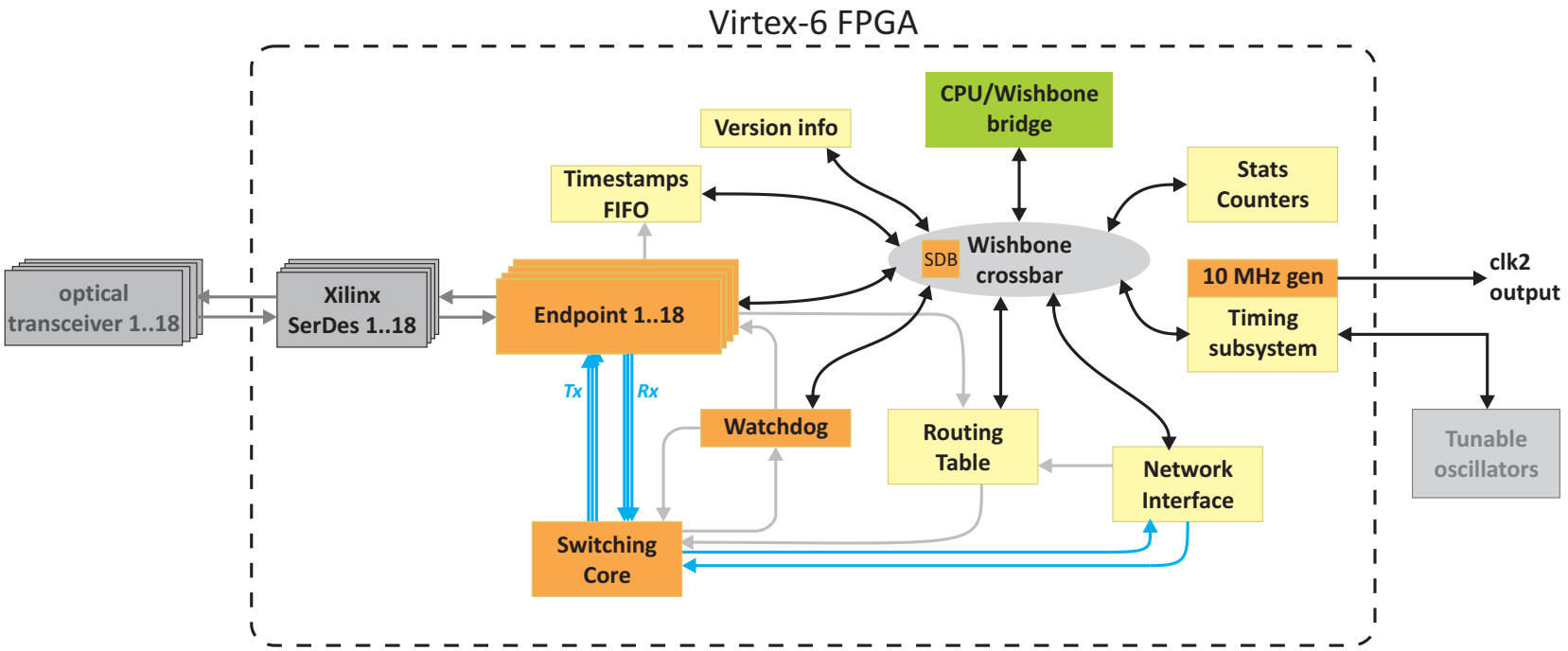
Gateware release v4.2

- HDL watchdog module



Gateware release v4.2

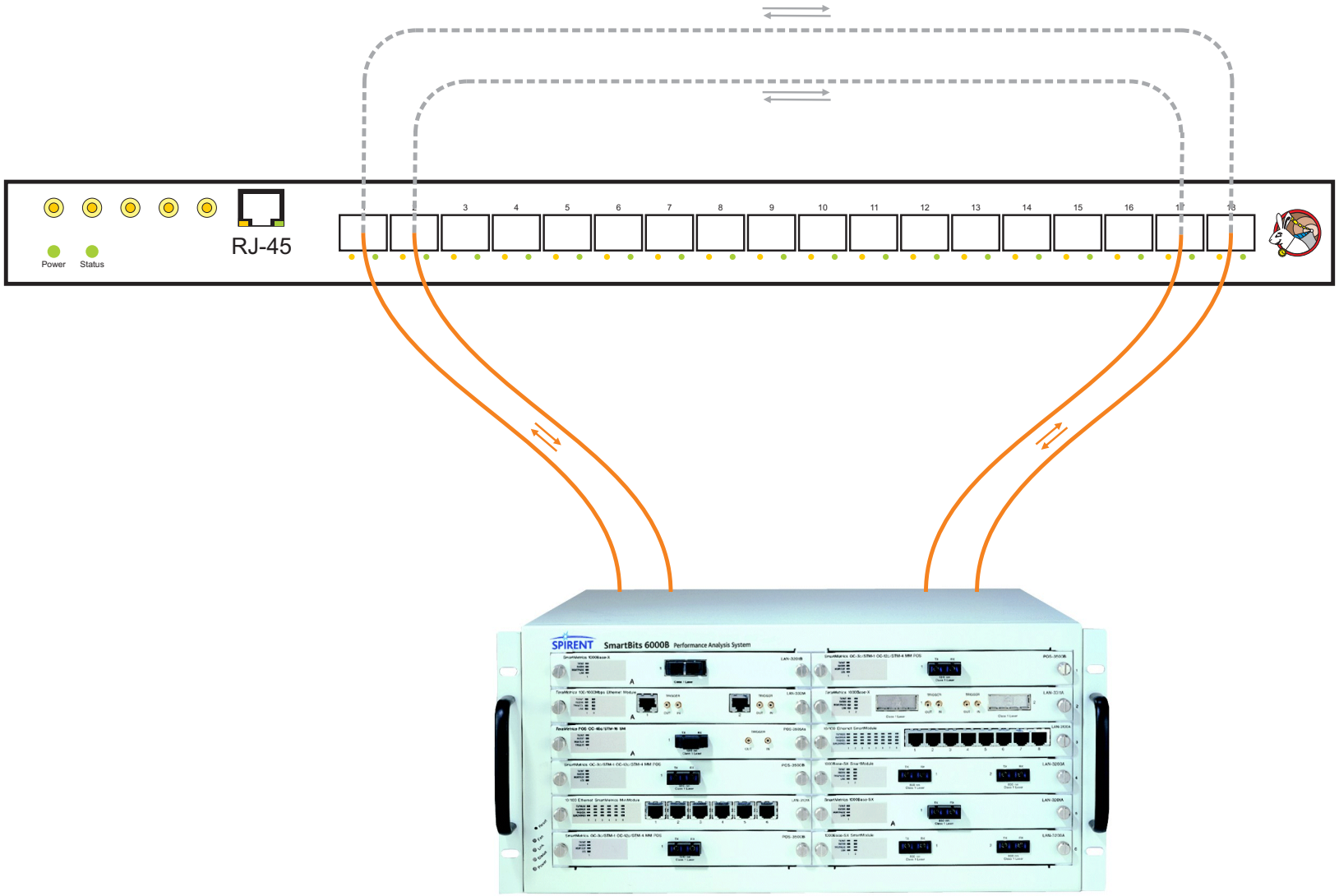
- autogenerated SDB metadata for firmware information



Stress-testing Ethernet switching

- Smartbits 6000C network tester
- 4 point-to-point streams
- Snake test

Point-to-point streams



Point-to-point streams

WRS firmware v4.0

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30	0,00	0,00	0,00	0,00	0,00
40	0,00	0,00	0,00	0,00	0,00
50	0,00	0,00	0,00	0,00	0,00
60	0,00	25,00	0,00	0,00	0,00
70	0,00	100,00	0,00	0,00	0,00
80	29,64	100,00	0,00	0,00	0,00
90	78,27	100,00	0,00	0,00	0,00
91	100,00	100,00	0,00	0,00	0,00
92	100,00	100,00	0,00	0,00	0,00
93	100,00	100,00	0,00	0,00	0,00
94	100,00	100,00	0,00	0,00	0,00
95	100,00	100,00	0,00	0,00	0,00
96	100,00	100,00	0,00	0,00	0,00
97	100,00	100,00	0,00	0,00	0,00
98	100,00	100,00	4,22	0,00	0,00
99	100,00	100,00	8,67	4,87	0,08
100	100,00	100,00	12,77	14,26	2,61

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40	0,00	0,00	0,00	0,00	0,00
50	0,00	0,00	0,00	0,00	0,00
60	0,00	25,00	0,00	0,00	0,00
70	0,00	100,00	0,00	0,00	0,00
80	29,64	100,00	0,00	0,00	0,00
90	78,27	100,00	0,00	0,00	0,00
91	100,00	100,00	0,00	0,00	0,00
92	100,00	100,00	0,00	0,00	0,00
93	100,00	100,00	0,00	0,00	0,00
94	100,00	100,00	0,00	0,00	0,00
95	100,00	100,00	0,00	0,00	0,00
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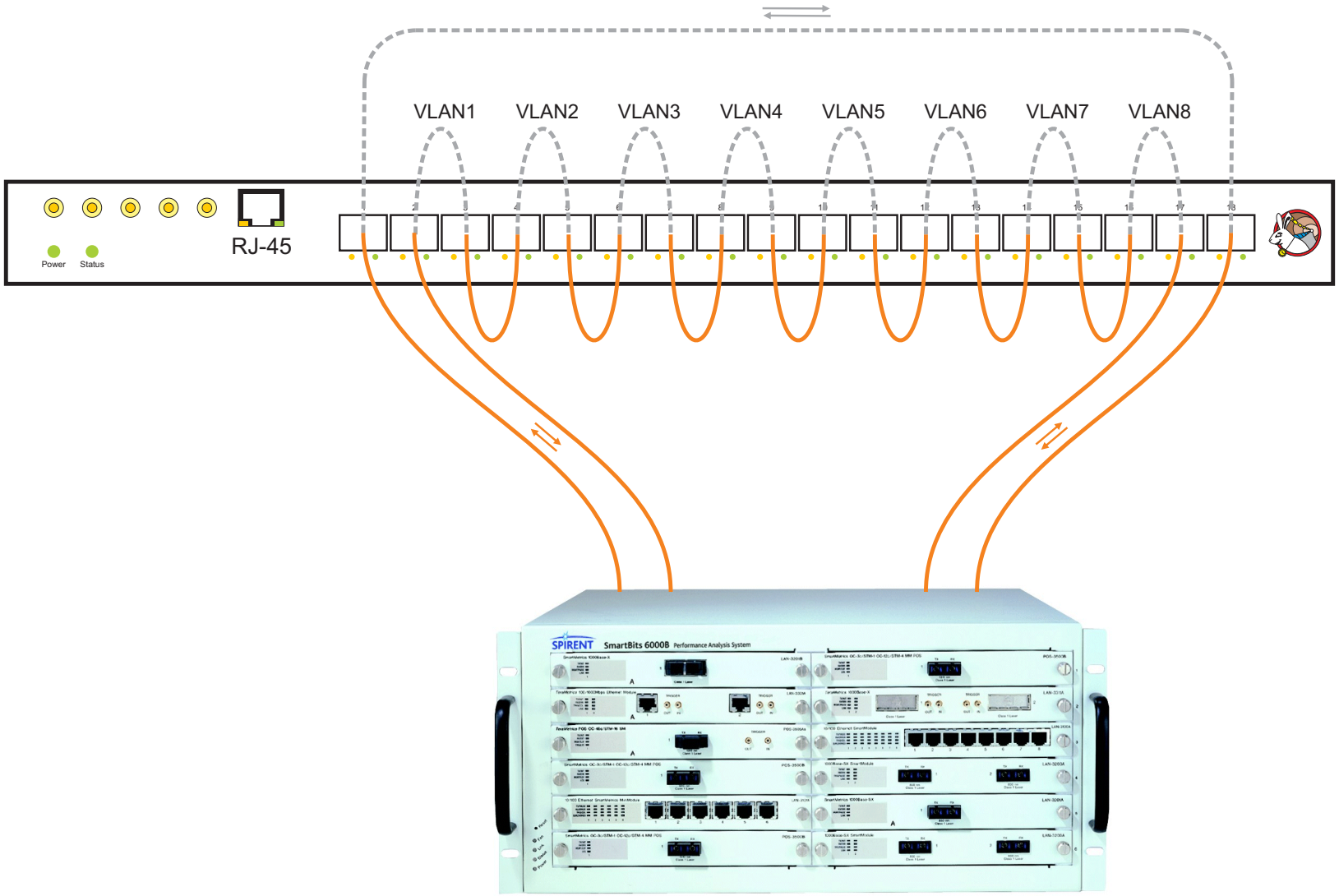
50	0,00	0,00	0,00	0,00	0,00
60	0,00	0,00	0,00	0,00	0,00
70	0,00	0,00	0,00	0,00	0,00
80	0,00	0,00	0,00	0,00	0,00
90	100,00	0,00	0,00	0,00	0,00
91	100,00	0,00	0,00	0,00	0,00
92	100,00	0,00	0,00	0,00	0,00
93	100,00	0,00	0,00	0,00	0,00
94	100,00	0,00	0,00	0,00	0,00
95	100,00	0,00	0,00	0,00	0,00
96	100,00	0,00	0,00	0,00	0,00
97	100,00	0,00	0,00	0,00	0,00
98	100,00	0,00	0,00	0,00	0,00
99	100,00	2,63	0,00	0,00	0,00
100	100,00	2,63	1,12	4,55	2,35

Snake test


VLAN1
VLAN2
VLAN3
VLAN4
VLAN5
VLAN6
VLAN7
VLAN8
Power
Status
RJ-45
SPIRENT
SmartBits 6000B
Performance Analysis System

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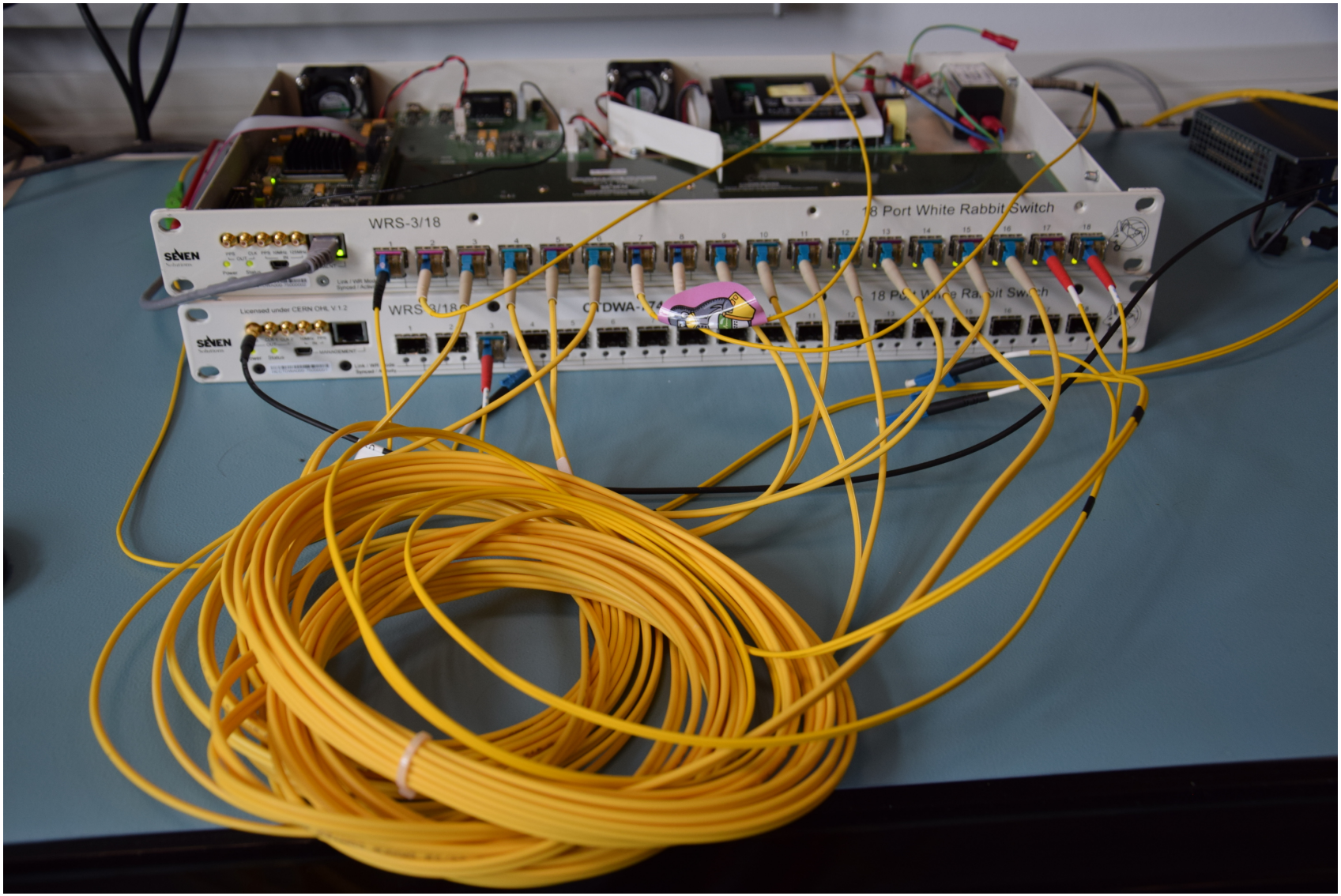

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20	29,57	100,00	0,00	0,00	0,00
30	99,26	100,00	0,00	0,00	0,00
40	100,00	100,00	0,01	0,00	0,00
50	100,00	100,00	61,79	98,48	0,00
60	100,00	100,00	83,62	100,00	100,00
70	100,00	100,00	100,00	100,00	100,00
80	100,00	100,00	100,00	100,00	100,00
90	100,00	100,00	99,99	100,00	100,00

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30	69,50	0,00	0,00	0,00	0,00
40	80,84	49,00	0,00	0,00	0,49
50	86,11	63,88	0,00	0,11	0,00
60	91,31	73,23	0,00	0,13	0,96
70	94,58	81,21	0,00	0,20	1,25
80	99,99	83,09	0,16	0,41	1,78
90	100,00	87,00	0,04	0,92	7,12

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  - Divide objects into Status and Expert groups

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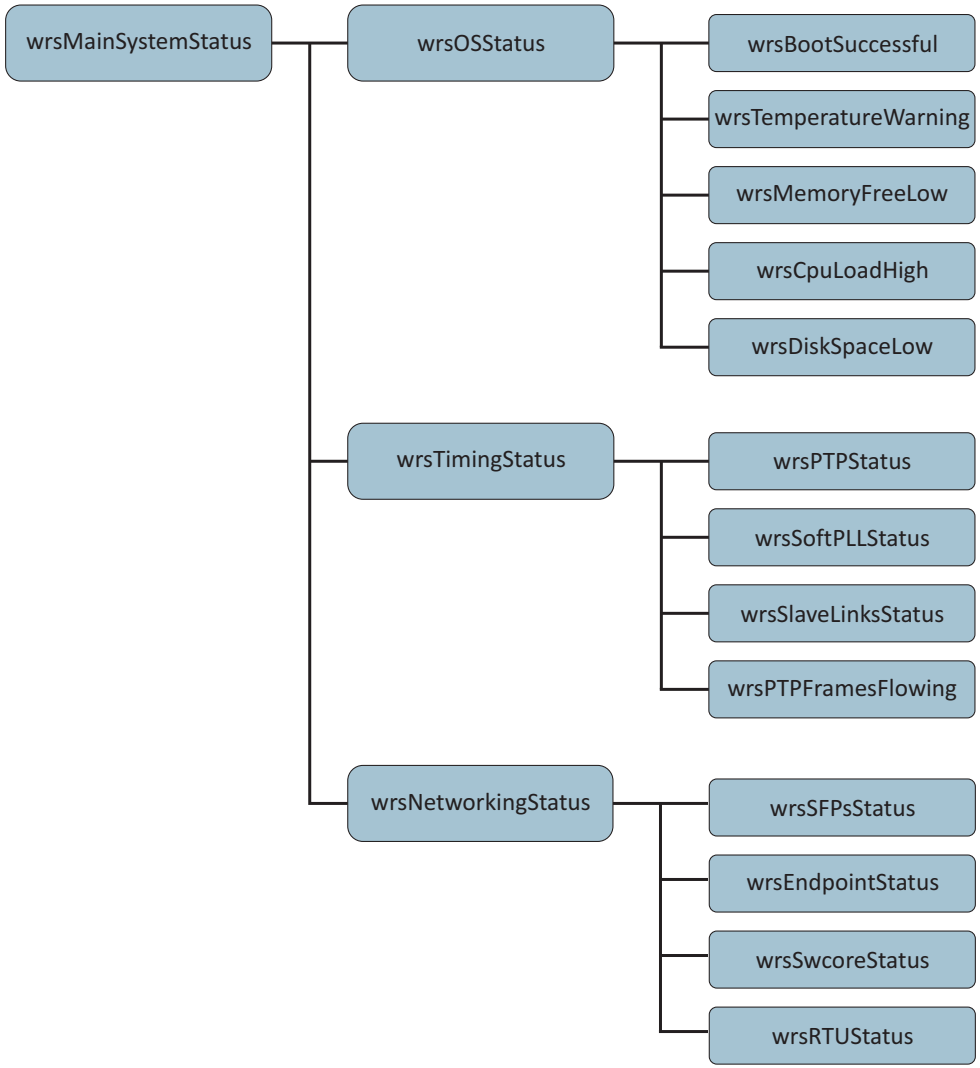

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Ongoing work and plans for the future

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  - Get rid of HWIU module
  - Separate resources in the Switching Core for HP frames
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- Software
  - Change the names of the interfaces from wr0-17 to wri1-18
  - Include Vlans configuration into dot-config
  - Link Layer Discovery Protocol (LLDP)
  - PPSi audit and compliance tests
  - Buildroot and Linux kernel uplift

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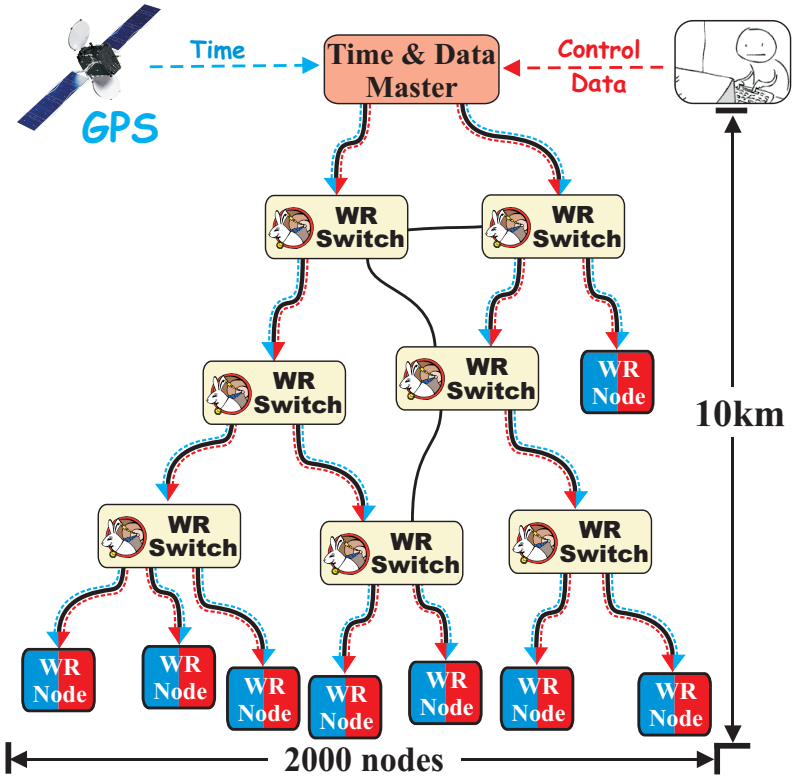

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- Ethernet MAC with WR features
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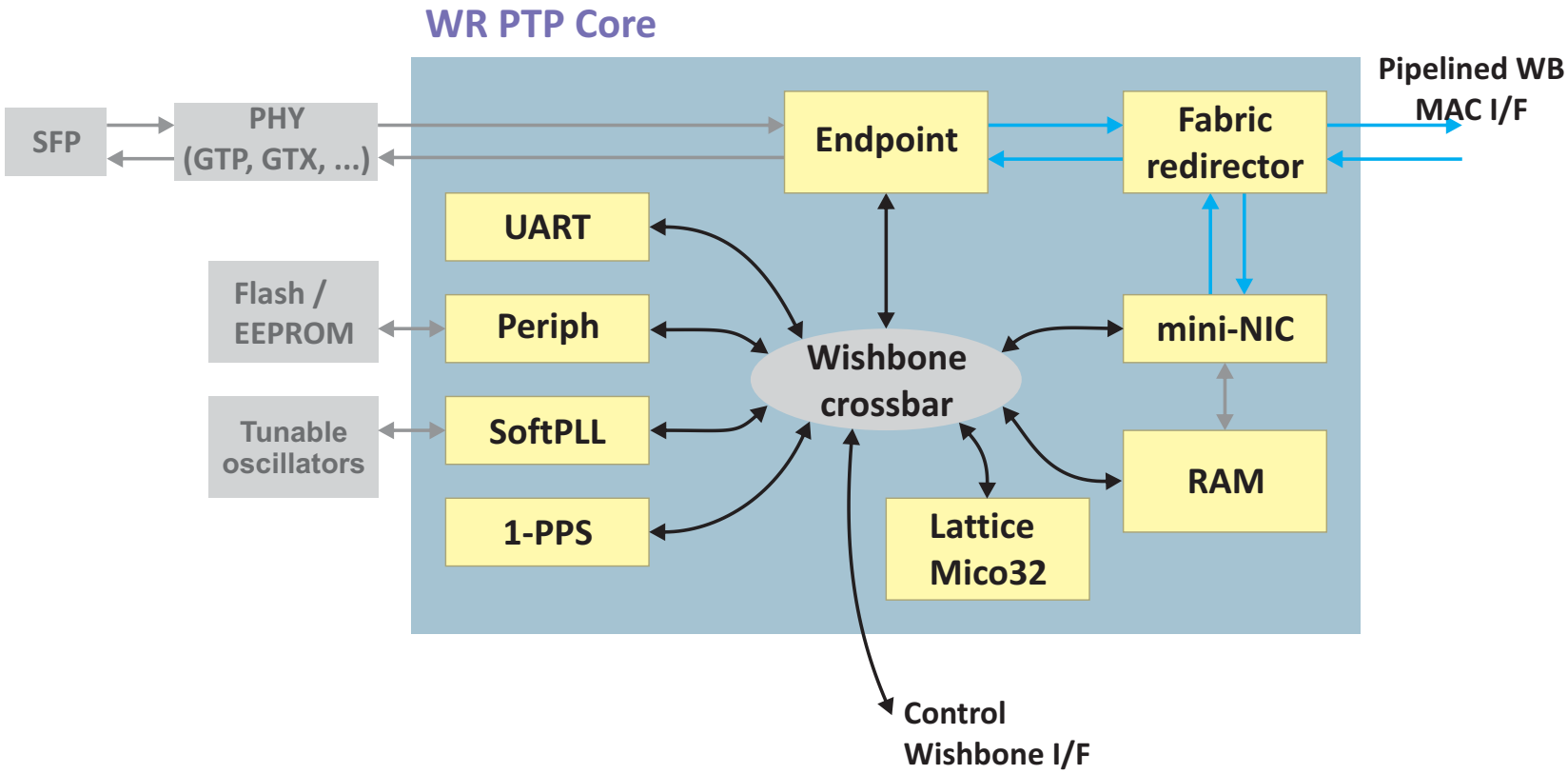

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- Tx runt frames padding
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- SNMP support for diagnostics(see demo)

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- replace LM32 with URV
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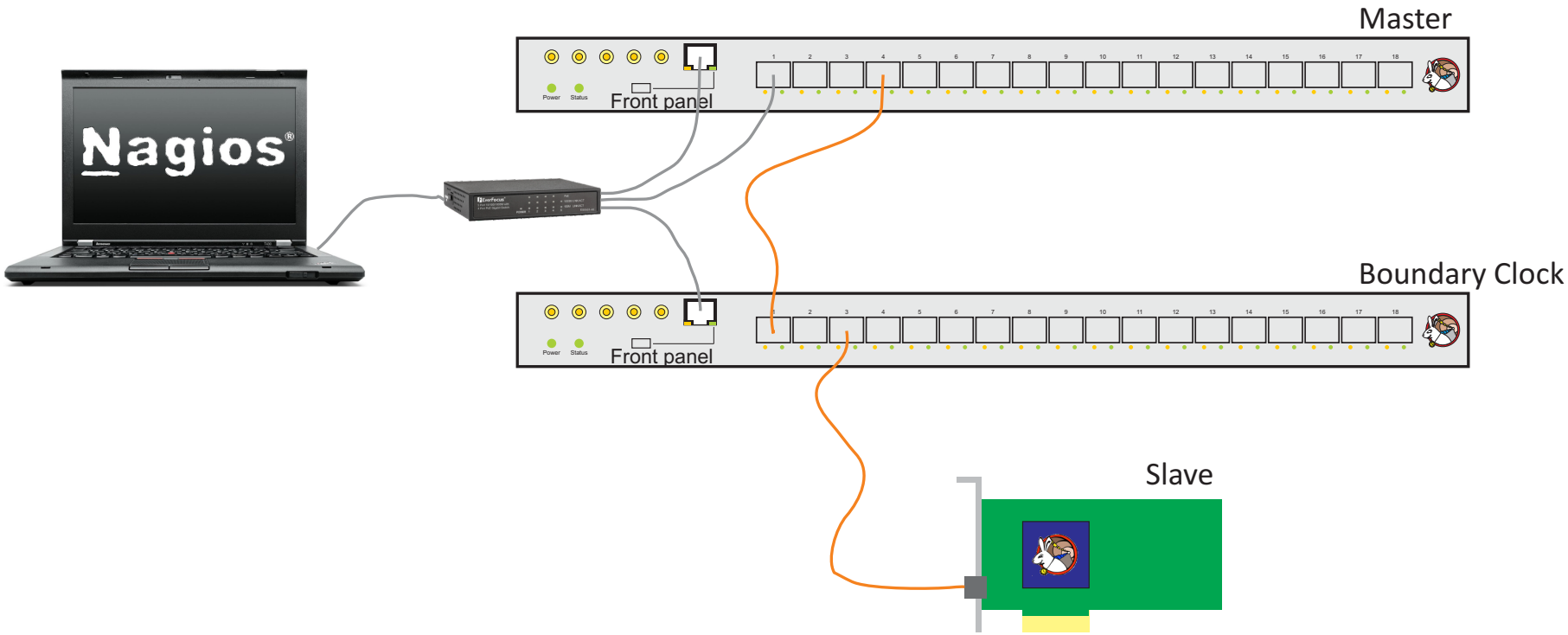
Talk by Alessandro on WRPC software tomorrow.

Thank you! It's time for demo...

More information:
http://www.ohwr.org/projects/white-rabbit/wiki/Switch
http://www.ohwr.org/projects/wr-cores/wiki/Wrpc_core

Demo setup


Master
Front panel
Nagios®
Boundary Clock
Front panel
Slave