

# White Rabbit in Switzerland: a first loop network for long-haul dissemination of UTC(CH)

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METAS, jointly with the SWITCH foundation which operates the Swiss National Research and Education Network, the Federal Office for Defence Procurement armasuisse and the Swiss stock exchange infrastructure SIX-group, is developing a prototype network to evaluate the performances of the White Rabbit Precision Time Protocol (WR-PTP) technology as a solution for long-haul and high-performance time dissemination services in Switzerland.

The main goals of this project are to evaluate WR as a suitable technology to disseminate UTC(CH) with a picosecond level of accuracy and precision, and to demonstrate that it is a reliable alternative to satellite time-dissemination methods.

The prototype network is illustrated in Fig. 1. The green and yellow parts are already in operation and the blue part is currently being installed. The WR network is realized on the L-band DWDM channels L84 (1590.411 nm) and L84 (1591.255 nm) in an operational fiber-optic network, where data traffic is simultaneously present in the C-band.

The prototype network is a ring structure, providing topological redundancy at the various points of presence, and allows end-to-end comparison of UTC(CH) after passing the entire WR network. During the presentation, we will demonstrate the networks performance to support sub-nanosecond accuracy and stability over distances of more than 400 km.

The green segment of the link, which is short and fully passive, was used to make the first evaluations and characterization of the WR instruments. On both, yellow and blue links, the regeneration of the WR signal is made using WR switches (WRS). The chosen SFP transceivers provide enough optical power to transmit WR signals over more than 100 km, so only a few regeneration steps are required.

Finally, we will use Precise Point Positioning (PPP) on a GNSS receiver calibrated by METAS installed at SIX to perform an independent validation of the disseminated UTC(CH) timescale.

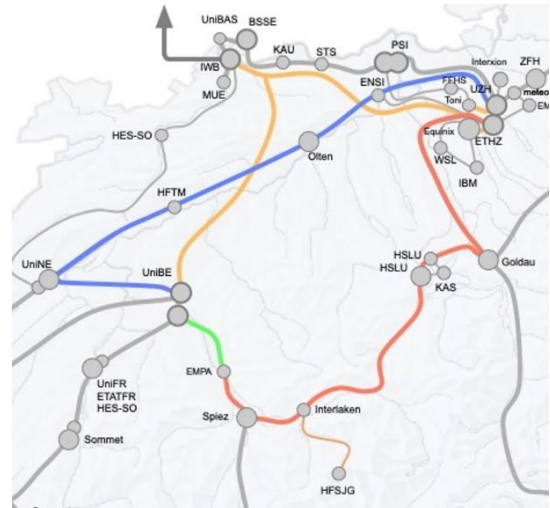


Fig. 1: Representation of the prototype network built for this project. The yellow and blue lines are the two main parts used to create a loop network. The green line is a secondary connection used to test and evaluate the performance of the instruments selected for the project. The orange line is not installed today and may be used for future improved redundancy.