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A modern Infrastructure to manage shared diagnostic and very high amount of data

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Measuring Soft X-Ray (SXR) emission in a tokamak gives access to plasma information such as impurity distribution, radiation emission, magnetic axis, etc. Current detectors used for SXR diagnostics, for instance semi-conductors, will not survive in the harsh environment of ITER caused by high neutron fluency. One solution is to use Gas Electron Multipliers (GEM) which measure X-ray emission spectrum from 1 keV to 20 keV [1] and are resilient to fast neutrons. The drawback is that this kind of detector produce a huge amount of data (100Go for a 300s pulse) that has to be stored and post-processed in a fast manner.

Storing a huge amount of data is not a big deal as soon as there is no backup needed but this requires data to be moved on a safe and temporary placeholder. Even though Networks are more and more quick, no network could work if every data unit produces in the meantime such an enormous amount of data. We will present in this paper the infrastructure developed at WEST to warrant data to be moved from detector to post-treatment area.

Considering the big amount of data, it is not always possible to compute and analyze the format in real time (even with a low frequency such as Hz), that is the reason why the infrastructure has to allow data to be analyzed in the meantime of acquiring without any interferences. This paper will explain the automatized process and architecture of GEM post-treatment as an example.

Finally, Acquisition Unit is usually a collaboration job between different Institutes or laboratories that cannot reach the intranet IRFM Network. The paper will describe the tools developed to support collaborating between WUT and IRFM-WEST.

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