The Hardware and Software of the Data Acquisition System at MLF / J-PARC

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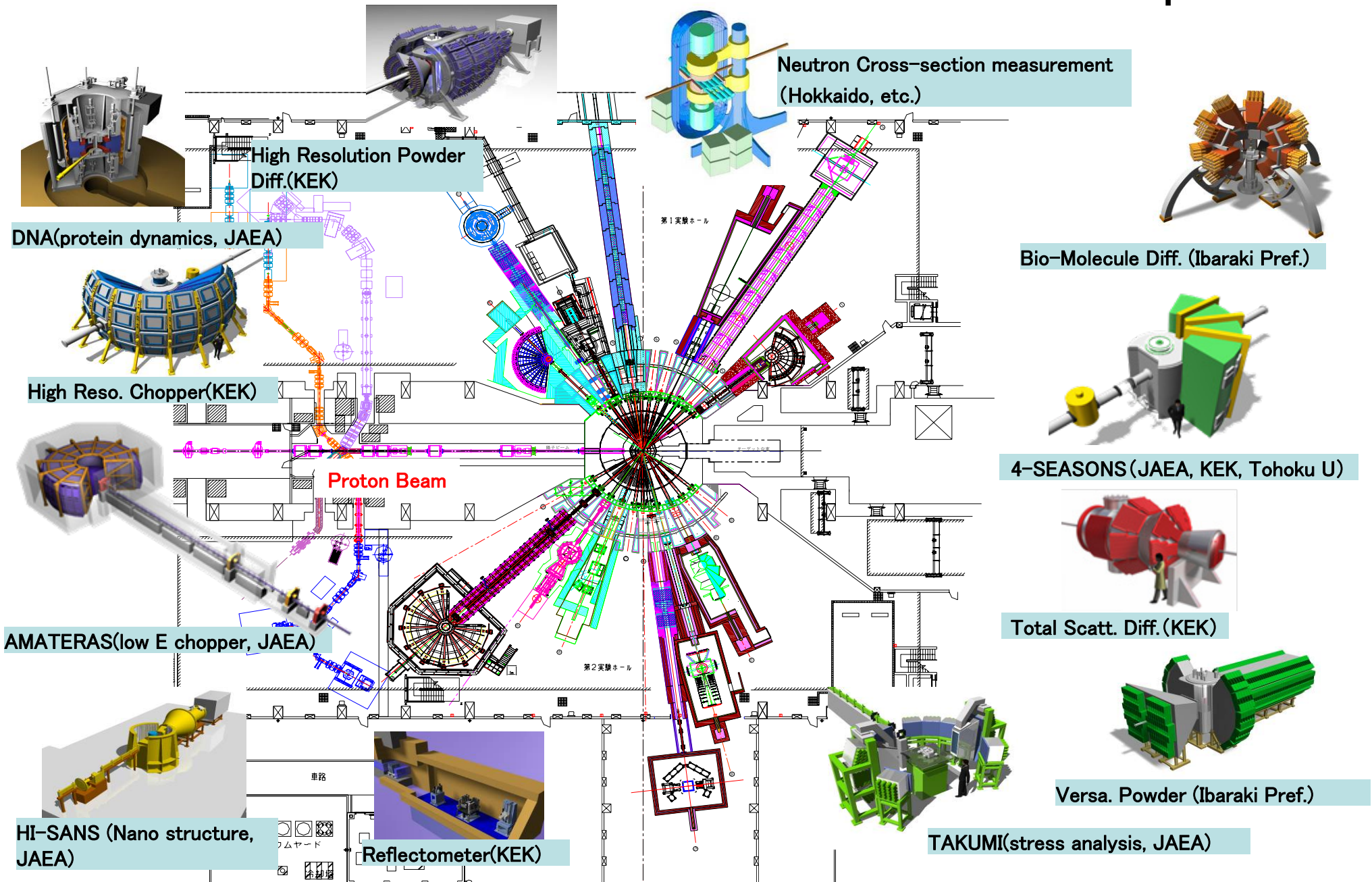
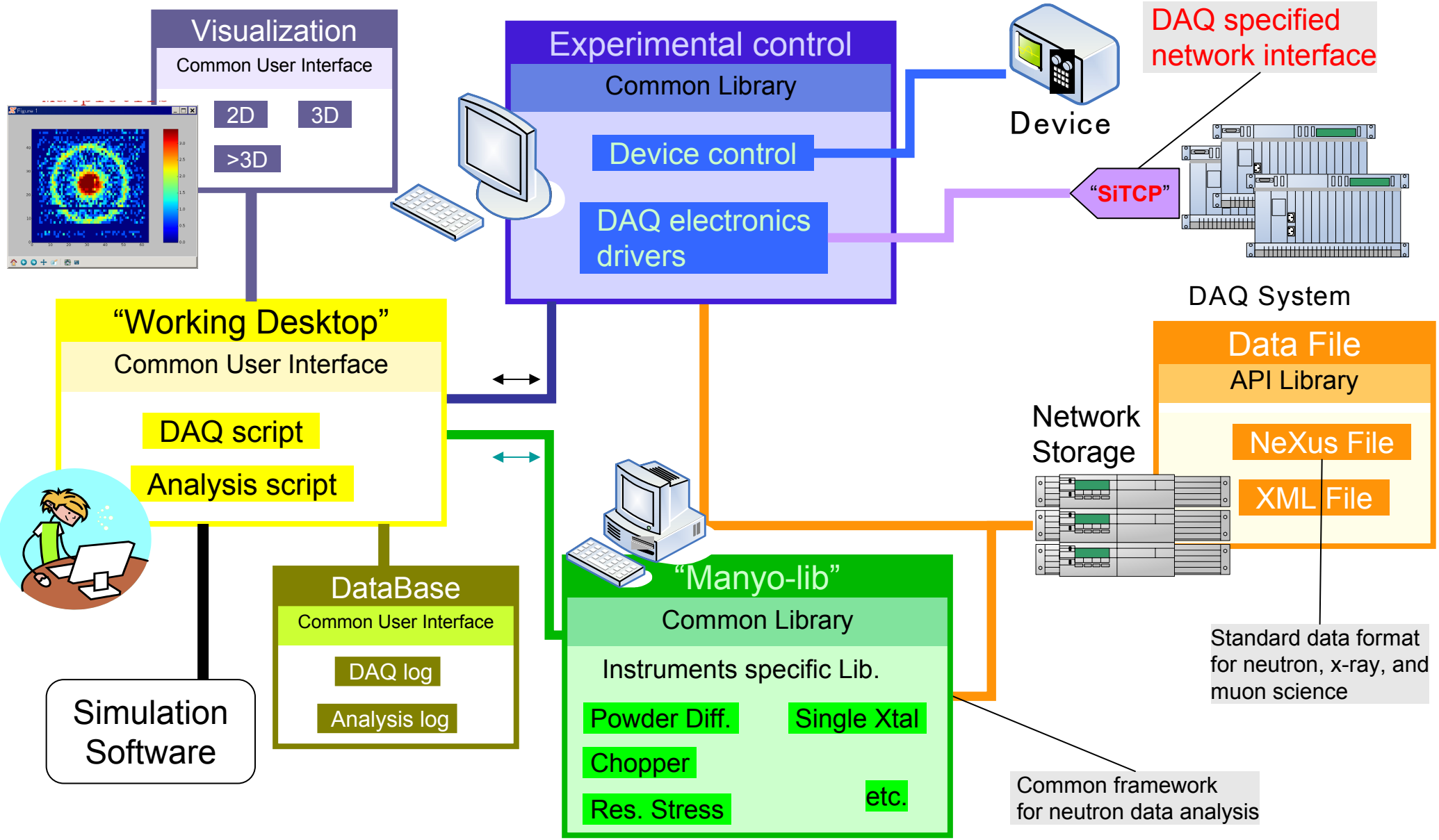
Abstract

A lot of neutron and muon experimental instruments covering the field from the fundamental science to the applied science in Material and Life science Facility (MLF) / Japan-Proton Accelerator Research Complex (J-PARC) are going to be constructed. As each and every instrument is expected to generate massive data (several tens of giga-bytes per hour), we have considered new technology to deal with these data. Satisfied this demand, we decided to adopt the new hardware and software technologies developed in KEK for the data acquisition system of these instruments. The new hardware technology is “SiTCP” which is the data acquisition-specific Ethernet interface, and the new software technology is “DAQ middleware” which is based on the Robot Technology (RT) middleware. Using these technologies, we will construct the network distributed data acquisition system. Because this data acquisition system is flexible and scalable, we can easily extend the capacity of the system to keep in step with the increase in the proton intensity of J-PARC.

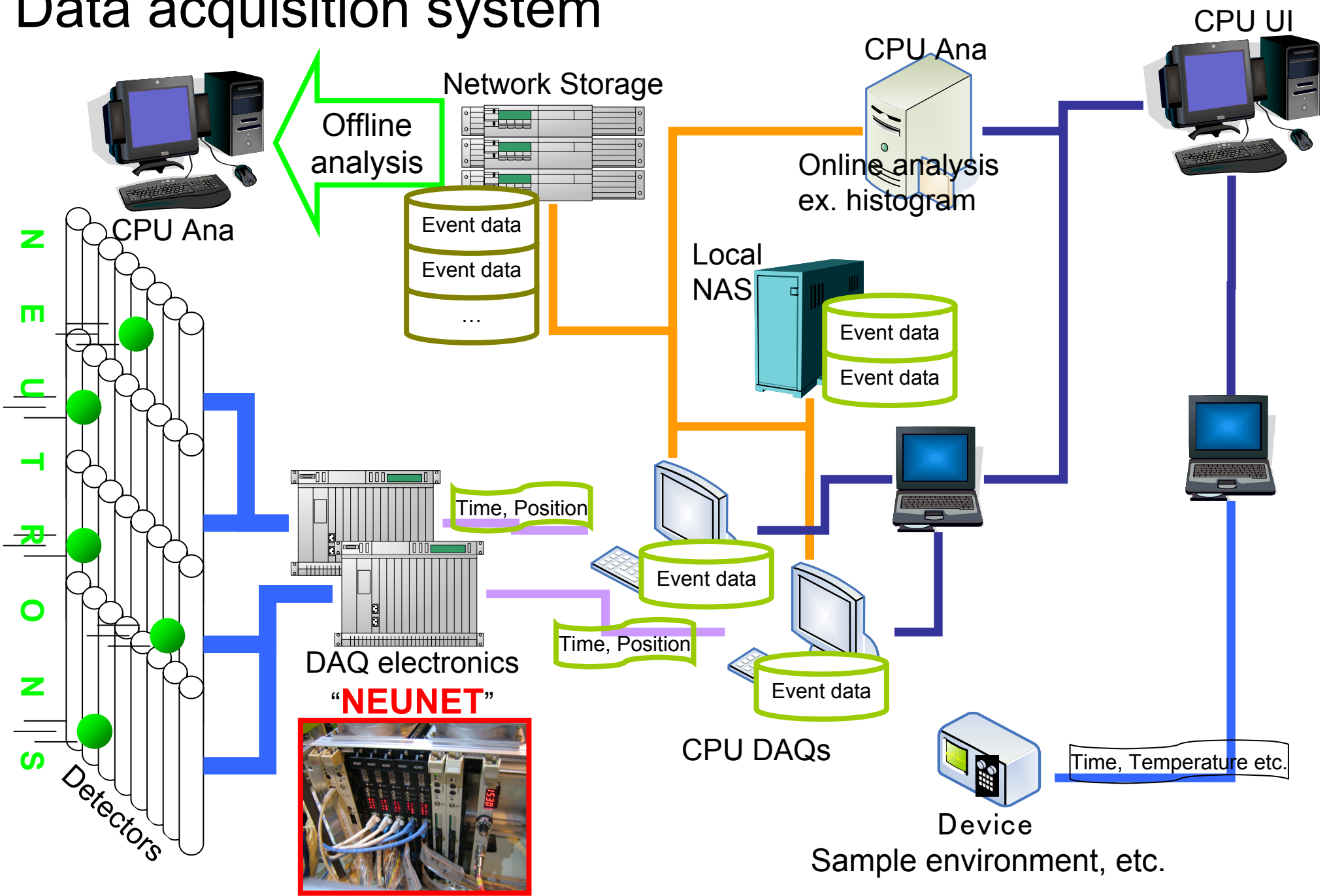
Neutron Instruments under construction and planned



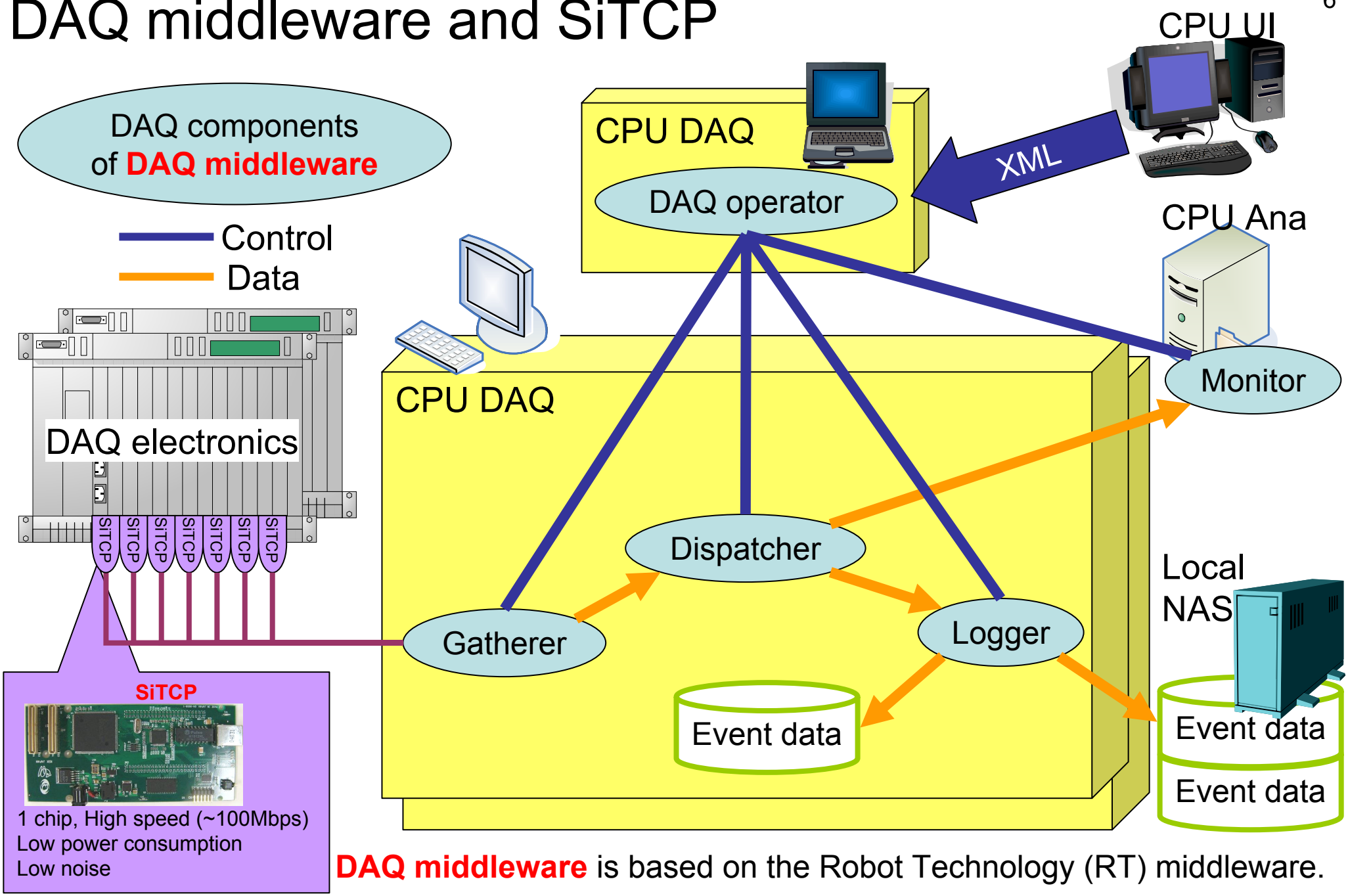
MLF Computing Environment



Data acquisition system



DAQ middleware and SiTCP



DAQ middleware is based on the Robot Technology (RT) middleware.

Summary

- We have developed the DAQ electronics "NEUNET" which is attached the DAQ specified Ethernet interface called "SiTCP".
- We have applied "DAQ middleware" which is based on RT (Robot Technology) middleware to the DAQ software.
- Because the DAQ components in DAQ middleware are distributed objects, the system is flexible and scalable. Therefore, we can easily extend the capacity of the system to keep in step with the increase in the proton intensity of J-PARC.