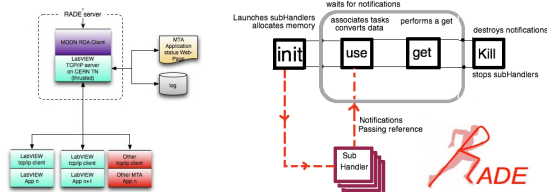


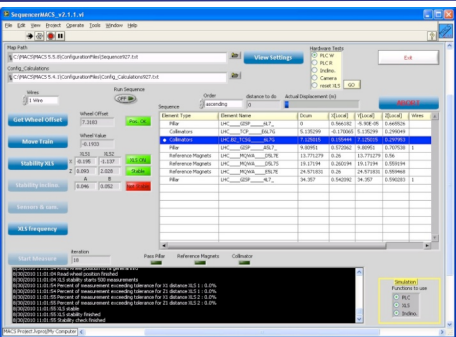
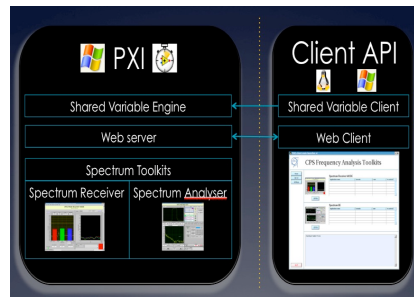
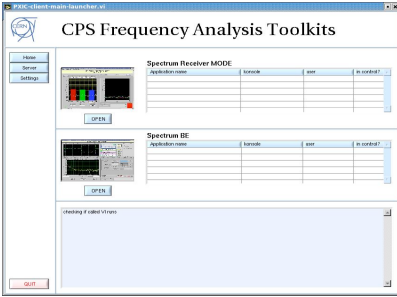
ABSTRACT

In the accelerator domain there is a need of integrating industrial devices and creating control and monitoring applications in an easy and yet structured way. The LabVIEW-RADE framework provides the method and tools to implement these requirements and also provides the essential integration of these applications into the CERN controls infrastructure. We present three examples of applications of different nature to show that the framework provides solutions at all three tiers of the control system, data access, process and supervision. We also describe the technique used for a full integration into the PS consoles.



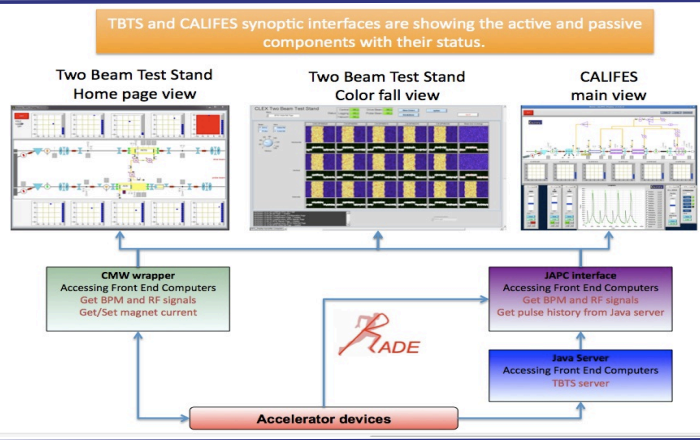
The RADE Framework
 With the RADE framework developers and engineers don't have to cope with all the different interfaces and hardware and can focus on the job at hand, creating turnkey control and monitoring applications in a quick, stable and flexible way. All the necessary protocols for communication and integration has been assembled in one single bundle, easy to use, and fast to implement.

Renovation of the PS beam spectrum analyzer
 The PS Beam analyzer is a PXI based system used to diagnose the RF signals of the PS. The application, running on Windows, was not properly integrated into the CERN Control Room (CCR) consoles running Linux, so a project was started to properly integrate the system with a split server client architecture. The server controls its real time applications through a state machine based master. This implementation concept proved quite powerful since any analysis application could later be added to the server and called from the client running in the CCR. With the use of LabVIEW and RADE the conversion of the old software and the installation of the new systems went smooth.



The LHC Collimator survey train – Multiple alignment control system (MACS)
 The beam cleaning insertions in point 3 and 7 will become one of the most radioactive zones in the LHC. Standard alignment measurements will not be possible due to the high radiation level of up to 4mSv/h A 500 m long straight section of the LHC tunnel with 37 collimators and 26 reference magnets will be measured. Manual measurements would take 4 days for a team of 3 people which where deemed to long so instead a fully automated system which could be remotely controlled was designed, using LabVIEW and RADE for the control interface.

RADE in the Two Beam Test Stand
 The Two-Beam Test Stand (TBTS) in the CLIC experimental hall is aimed to test the two-beam acceleration scheme for CLIC, an lepton collider project. Beam stability, beam loss issues and RF structures are studied in this set-up. By using the RADE Framework we have managed to create a fully integrated control interface, capable of managing every aspect of the accelerator.



CONCLUSION

The described examples above all use different technologies and techniques for communication and controls between software and equipment. The RADE framework and LabVIEW made it possible in a convenient and flexible way to realize the projects in a uniform environment within a reasonable time.