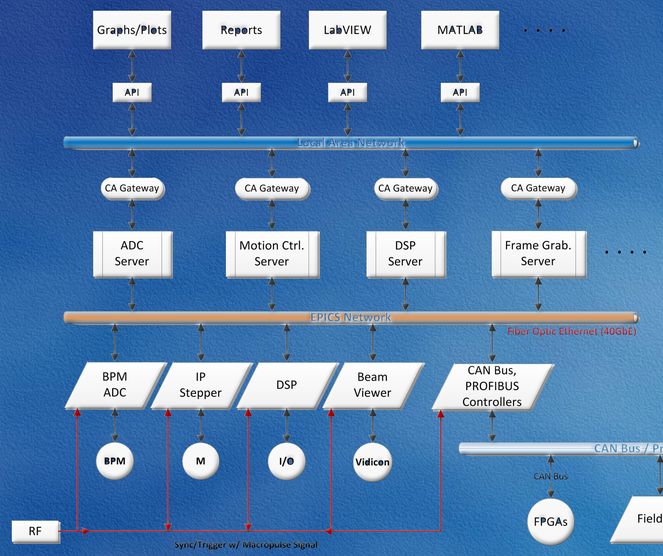
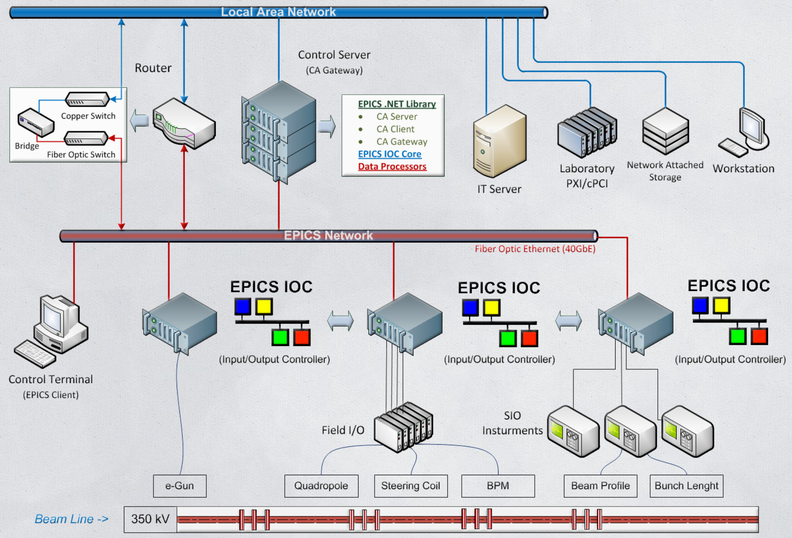


The control software communications are all based on CA (Channel Access) protocol, while other software can connect to the data acquisition systems using the provided API and CA Gateways. Gateway traffic is separated from the control to provide a scalable and reliable substructure.

Control Software Communications

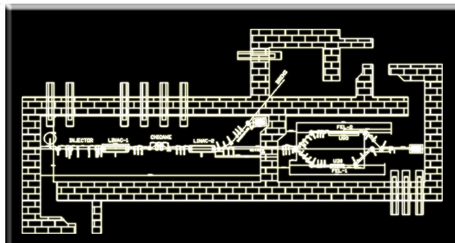


The overall design was made keeping challenges of distributed software programming. To make developers' life easier, whole system is made EPICS .NET library compatible, as mentioned below.

The control network is designed to deliver exceptional performance, scalability, and reliability with least possible maintenance. With a distinguished two-tier approach, the backbone of the control network infrastructure is fiber optic Ethernet while LANs feed workstations with DAQ data.

This two-tier approach completely isolates the stable control network from the other workgroup networks where possible software glitches, viruses, and other problems may clog the data links. As a backup to fiber optic 10GbE, a separate copper Ethernet is deployed with redundant switches for all the distributed control nodes (like IPCs, PACs, and PLCs). When completed, this project will mark a milestone for future nuclear research laboratories in terms of the industrial grade reliability and IT level of technology of its control network infrastructure.

Control Network Infrastructure



Current facility project aims to produce FEL (free electron laser) between 2-250 μm, 2.5 cm and 9 cm period length with resonators using 15-40 MeV electron beam (10 MeV electrons for Bremsstrahlung). In order to have wide research area we plan to use Superconducting accelerators with IOT power sources. Planned research areas are:

- Biomedical Science
- Semiconductors
- Non-linear Optics
- Nanotechnology
- Material Science
- Photo-Chemistry

TURKISH ACCELERATOR CENTER

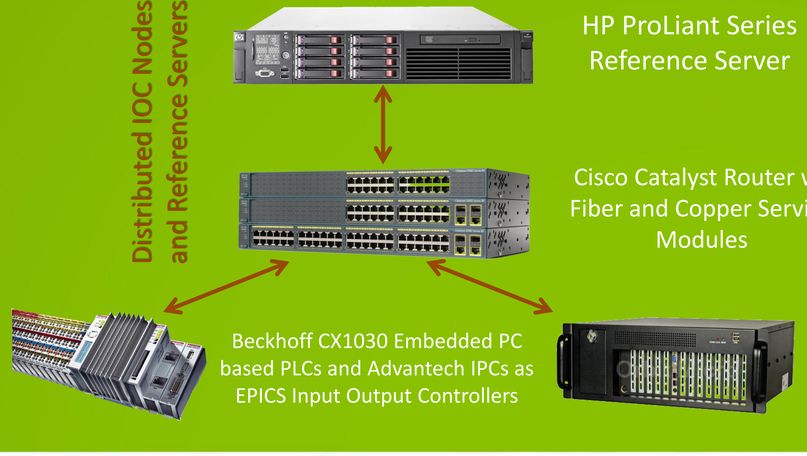
Distributed Control Systems Architecture

Turkish Accelerator Center is anticipated to have one of the most modern implementations of distributed control systems used in any nuclear research facility in Europe. The complete control architecture is implemented as a soft real-time distributed control system based on EPICS (Experimental Physics and Industrial Control System) software with various EPICS compliant hardware ranging from IPCs, PACs, to PLCs. While the network infrastructure depends on fiber optic 10 Gigabit Ethernet, gateways provide data access for LAN workgroups and web clients. Whenever necessary, custom control software is developed and deployed using native EPICS .NET Library. Thus software architecture is standardized on a typical client-server model on each node, backed up with publish/subscribe messaging paradigm throughout the control network. With the integration of all the subsystems, the project is expected to deliver exceptional performance, scalability, and reliability in less than twelve months' time.

Prepared by Teoman Soygul
Presented by Suat Ozkorucklu
NIWeek, US-TX 8/2/2010

Our valuable contribution to distributed control world, EPICS .NET library is mean to bridge the gap between innovative technology and vastly reliable control software. Based on Microsoft® .NET Framework 4.0 and written 100% with managed code with C# 4.0, this library meets the developers needs in every aspect. Bringing the power of Visual Studio 2010 to control world, this modular software unleashes unlimited potential which was once limited by legacy software.

System Architecture



Beam Position Monitors: Sample Control Subsystem Application