

NLC - The Next Linear Collider Project



NLC Pulsed R&D Project

Project Summary

More Details

Project Goals

Description

Schedule

Resources

Status

Author Name

Date

Project Summary

- Examine integration of 120 pulsed functions into EPICS IOC software. The goal of this project is to have EPICS running alongside an 120 Hz NLC IOC application
- The output of this project will be IOCs with operational pulsed functions, a specification on how to add more applications, and a specification on how to operate with either the OPEN or TRIO Control System architecture.

More Details

- There should be written procedures on how to interface with the EPICS database in near real-time
- Their needs to be documentation on how the VxWorks TCP/IP communications stack is structured and also its timing requirements.
- There will also be a number of applications written and tested in this R&D project which will directly influence how the real applications are written during the design and implementation phase of the NLC.
- Determine what the latency problems or requirements are in doing longline I/O to see if the task is being held or if their issues of priority inversion

Project Goals

- Demonstrate that NLC type 120 Hz applications can run alongside and EPICS IOC using a common database and common VxWorks objects
 - Whether the record is local to this CPU or whether the data is down a long line I/O pipe and architecture such as the trio architecture
 - Whether this processing is done in separate CPUs or linked CPUs together locally any single crates or backplane.
- **Byproducts:**
 - Provide test bed for sub-system interoperation testing
 - Narrow down technology choices
 - Determine software interface specifications
 - Provide more detailed input to cost model

Description

- **Phase 1:**
 - Identify all NLC activity, which would occur in IOC at 120Hz
 - Identify all EPICS database devices that are used at 120 Hz
 - Identify other labs who have used EPICS in this same function same method
- **Phase2:**
 - Write the VxWorks applications as a test bed
 - Write some code and test it
- **Phase 3:**
 - polish and integrate the code

Detailed Description

- Phase 1
 - refine project goals and acquire an IOC (or two)
 - Examine other institutions methods of doing the same functions
 - Gather specifics from other groups including feedback, machine protection system, etc.
 - Write the requirements document and detailed test plans
 - Detail the differences required for the OPEN architecture versus the TRIO architecture
 - Document the data flow for both architectures
 - Generate progress report (milestone)



Detailed Description (cont)

- Phase 2
 - FY01 - full-time -
 - acquire more IOCs and/or custom networks/protocols
 - Write the code to simulate the required functions
 - Setup a test bench to run the simulations on
 - Perform testing to measure actual results
 - Integrate the test setup with the network R&D project where possible
 - Review findings then prepare the CDR text
 - Write and review the interface specification for EPICS IOC applications -- milestone



Detailed Description (cont)

- Phase 3
 - FY02 - 3 F. T. E.'s
 - Write actual code to handle the applications identified
 - Integrate and test on the NLC test network
 - Examine any OPI type interfaces that may be required

Schedule

- **FY99**
 - develop detailed project goals requirements and network/software/hardware needs
- **FY00**
 - refine project goals and acquire an IOC (or two)
 - Document the data flow for this architecture
 - Generate progress report (milestone)
- **FY01**
 - full-time - acquire more IOCs and/or custom networks/protocols
 - Review findings then prepare the CDR text
 - Write and review the interface specification for EPICS IOC applications
- **FY02**
 - 3 F. T. E.'s
 - Write actual code to handle the applications identified
 - Integrate and test on the NLC test network
 - Examine any OPI type interfaces that may be required

Team/Resources

- This will require input from other EPICS collaboration members
- May require hardware and or network configuration help
- Will require software at both the driver level and interrupt a level and possibly application level to verify proper operations and
- some networking equipment may be borrowed
- test system will be installed in Bld ???



Status

- Investigated other Labs designs and capabilities (RT99)
- Learned details of Real-Time Linux for possible usage
- Still gathering and classifying bandwidth requirements
- Working on prototype specifications