



UPGRADING AND ADAPTING TO CS-STUDIO PHOEBUS AT FACILITY FOR RARE ISOTOPE BEAMS

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Upgrading to CS-Studio Phoebus

- CS-Studio Phoebus is a significant upgrade to CS-Studio.
- Alarm System
 - FRIB deploys over 20 instances of alarm server along the beamline.
 - New Phoebus alarm server uses Apache Kafka vs. the old based on ActiveMQ and relational database.
 - Faster performance with the importing time of the alarm tree configuration.
 - Logs the history of alarm states and alarm configuration updates.
 - Includes a mode to disable email notifications for alarms temporarily.
 - Authorization mechanism extended for per-alarm-server instance basis.

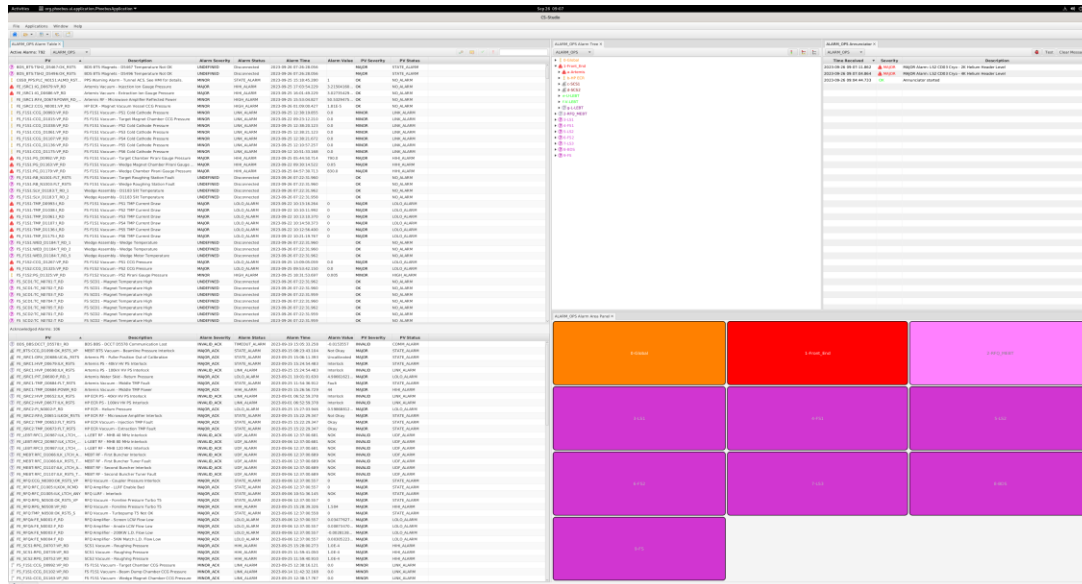


Figure 1: Alarm System View in Phoebus showing alarm table (left), alarm tree (top center), annunciator (top right) and area panel (bottom right).

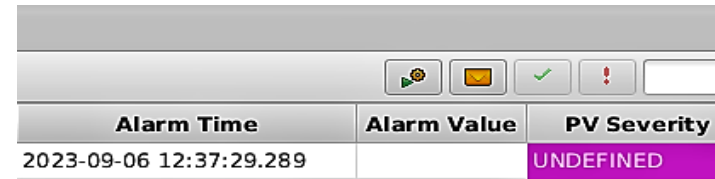


Figure 2: Mode to disable/re-enable email notifications.

Upgrading to CS-Studio Phoebus

Operator Interface Displays

- Utilized the auto-conversion tool provided with Phoebus to convert displays.
- Auto-conversion tool's advantages :
 - » Converted most widgets without needing any modifications
 - » Reported through warnings about missing widget, property, or script API.
 - » Corrected widget types when used in a wrong context in the old BOY display.
- FRIB users utilized script for bulk-fixing the common issues in converted files.
- User effort required in re-creating the old CS-Studio's perspectives with Phoebus equivalent "Layouts".
- Manual effort is restricted to fixing scripts with new APIs and plot widget type.

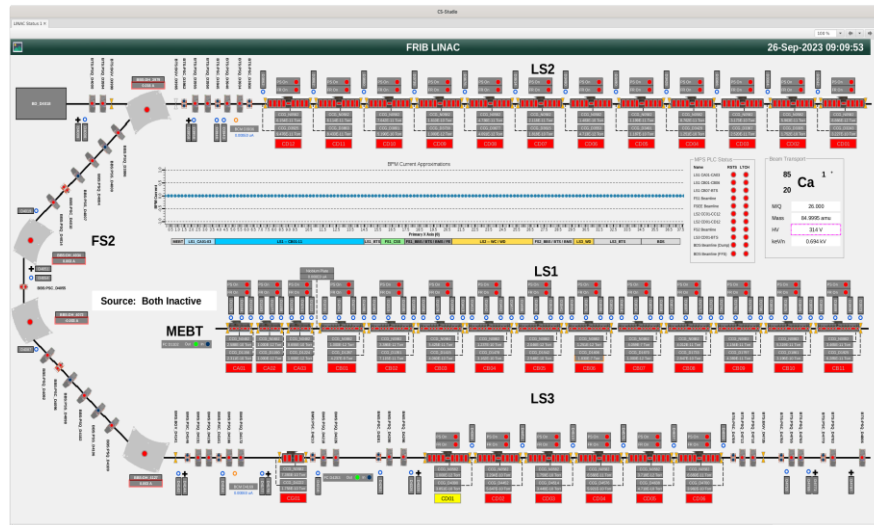


Figure 3: FRIB LINAC West in Phoebus Display Runtime

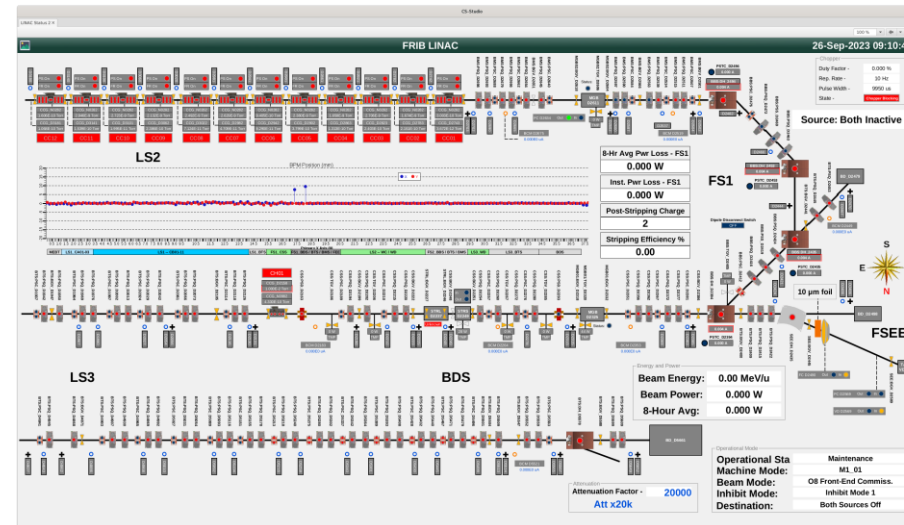


Figure 4: FRIB LINAC East in Phoebus Display Runtime

Upgrading to CS-Studio Phoebus

Save and Restore

- Tool to take snapshots of PVs at a specific time and write values of a snapshot back to PVs at a later time.
- Backend for Phoebus Save-and-Restore is designed with Elastic Search for the storage for savesets and snapshots.
- Git migration tool with the Phoebus Save-and-Restore service to migrate hundreds of savesets and snapshots.

Other Tools

- Improved for user experience and system maintainability.
- The Probe tool extended to display PV values in various formats.
- A new tool “3D Viewer” has been added to allow users to configure 3 dimensional structures using spheres, cylinders and boxes which can be rotated, zoomed and moved when rendered on screen.

Summary

- FRIB is in the process of transitioning to the upgraded CS-Studio Phoebus.
- Utilizing a combination of auto-conversion tool, user scripts and manual testing to migrate our large number of displays to Phoebus Display Builder.
- Deployed multiple instances of the Phoebus alarm server across the FRIB beamline that has been robustly providing the alarm monitoring to the FRIB Operations and various engineering groups.
- In coming months, plan to transition all our displays to Phoebus for all FRIB beamlines and decommission the old CS-Studio and its services entirely.

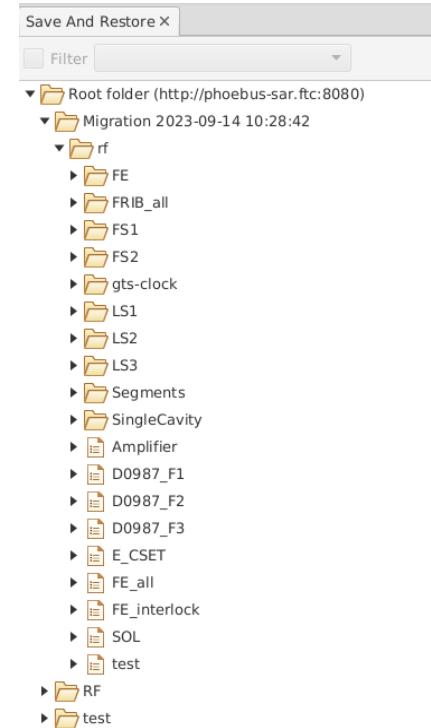


Figure 5: Migrated Save-and-Restore.