

IRIS-HEP Summer Fellow Project Proposal

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Project: Enabling Advanced Network and Infrastructure Alarms

Duration: July 2024 to September 2024 (12 weeks)

Project Description:

The project aims to enhance network measurement and monitoring for research and education networks used by the HEP, WLCG, and OSG communities. It involves expanding existing simple alarms with new, more powerful alarms based on extensive network-specific data collected through tools like Elasticsearch, Kibana, and Jupyter Notebooks. The goal is to proactively identify and address network problems before they impact scientific work or the network measurement infrastructure. The student will work with the IRIS-HEP/OSG-LHC team, participating in weekly group meetings and using their data science and analytics skills to improve the diagnostic range and capability of the alarm system.

Project Goals:

During the course of the project, we aim to expand and augment the existing alarms with new ones based on the data acquired by our infrastructure. While some of these alarms may have a higher priority, we will also address specific problems as we explore the types of data obtained using tools like Elasticsearch, Kibana, and Jupyter Notebooks. Our goal is to improve and maximize the diagnostic range and capability of the alarms to effectively identify various problems before they impact scientists using these networks or affect our network measurement infrastructure's ability to gather data. Ultimately, we aim to create an improved alerting and alarming system for the research and education networks used by the HEP, WLCG, and OSG communities.

Proposed Timeline:

Week 1-3:

- Study the existing infrastructure and the underlying working of the existing alarming and alerting system

- Explore the various types of data that we are dealing with using monitoring tools like ElasticSearch, Kibana, etc.
- Create an outline of some of the issues we are faced with while dealing with the data in the current infrastructure.

Week 4-6:

- Add the script for the new alarms that we seek to add to the existing infrastructure.
- Test the API using Postman API after the addition of these scripts locally.
- Specify the intervals at which we intend these alarms to be functional.

Week 7:

- Buffer for resolving any bugs that we might have encountered in the previous weeks.
- Work on the deployment of the alarms that we have added to the existing infrastructure.

Week 8-9:

- Work on the creation of additional more complex alarms to address the problems we face.
- Modify the code accordingly after the addition of the necessary scripts.
- Ensure existence of inter-communication between the alarms.

Week 10-11:

- Work on the deployment of these alarms to the infrastructure.
- Resolve any bug that might have occurred during the process.

Week 11-12:

- Evaluate the performance of our alarms on a real-time basis and make any changes to the system as and when necessary.
- Discuss the possibility of further extension of any of our alarms that we have generated during the course of the project or modifications to their functionality and make the changes wherever feasible.
- Document and summarize the project results.