Implementation of an email-based alert system for large-scale system resources

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Motivation

Within a research department:

Scientific community

- Tackle different problems
- Construct a codebase for a particular issue
- Develop a scenario for executing simulations
- Request access to computing resources (submit jobs)

System administration community

- Manage allocation of the computing resources for each job
- Monitor executing simulations
- Monitor idling resources
- Keep track of incoming jobs

Simulations

Scientific community

- *Unoptimized* simulations lead to:
  - Long execution time (will cause delays in the pipeline)
  - Low degree of parallelism (cannot take full advantage of multiple core/threads)
  - Excessive memory consumption (limited resource)

- Simulation testing + optimization is required

Resource management + monitoring

Sysadmin community

- Allocate jobs (e.g., simulations) to the computing cluster

- Manage computing nodes (updates, services)

- Observe *unexpected* behavior of the running simulations
- Check *idling* resources for potential issues