GRACC Project Overview & Status

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GRACC

grok (/ˈgɹɑk/) - to understand something intuitively

- A flexible accounting and monitoring system based on open-source technology.
- “Microservice”-based architecture: modular components loosely coupled with a message broker.
- Compatible with existing Gratia infrastructure:
  - NO changes to probes required
  - Historical data easily migratable

User Interface:
https://gracc.opensciencegrid.org

Documentation:
https://opensciencegrid.github.io/gracc

Source Code:
https://github.com/opensciencegrid

Issue Tracker:
https://jira.opensciencegrid.org/browse/GRACC

Key Components

gracc-collector

- HTTP endpoint compatible with Gratia collector
- Interface for legacy Gratia probes and collectors (utilizing Gratia replication)
- Will be phased out as probes are updated

RabbitMQ

- Mature message broker in use at GOC
- Adaptable message routing and queueing
- Standard, widely-supported wire format

Elasticsearch

- Distributed document database based on Apache Lucene
- Schemaless document model with JSON interchange format

Agents

gracc-raw

- Collects “raw” probe records from message queue
- Processes and enriches records
- Saves records in database

gracc-summary

- Consolidates raw records into summary records, with usage totals for unique Site/VO/User/Status/Etc. combinations
- Similar to Master Summary Data in Gratia
- Live summarizing or for specified period

gracc-request

- Handles requests for replay of data through message broker
- raw or summary records

User Interface

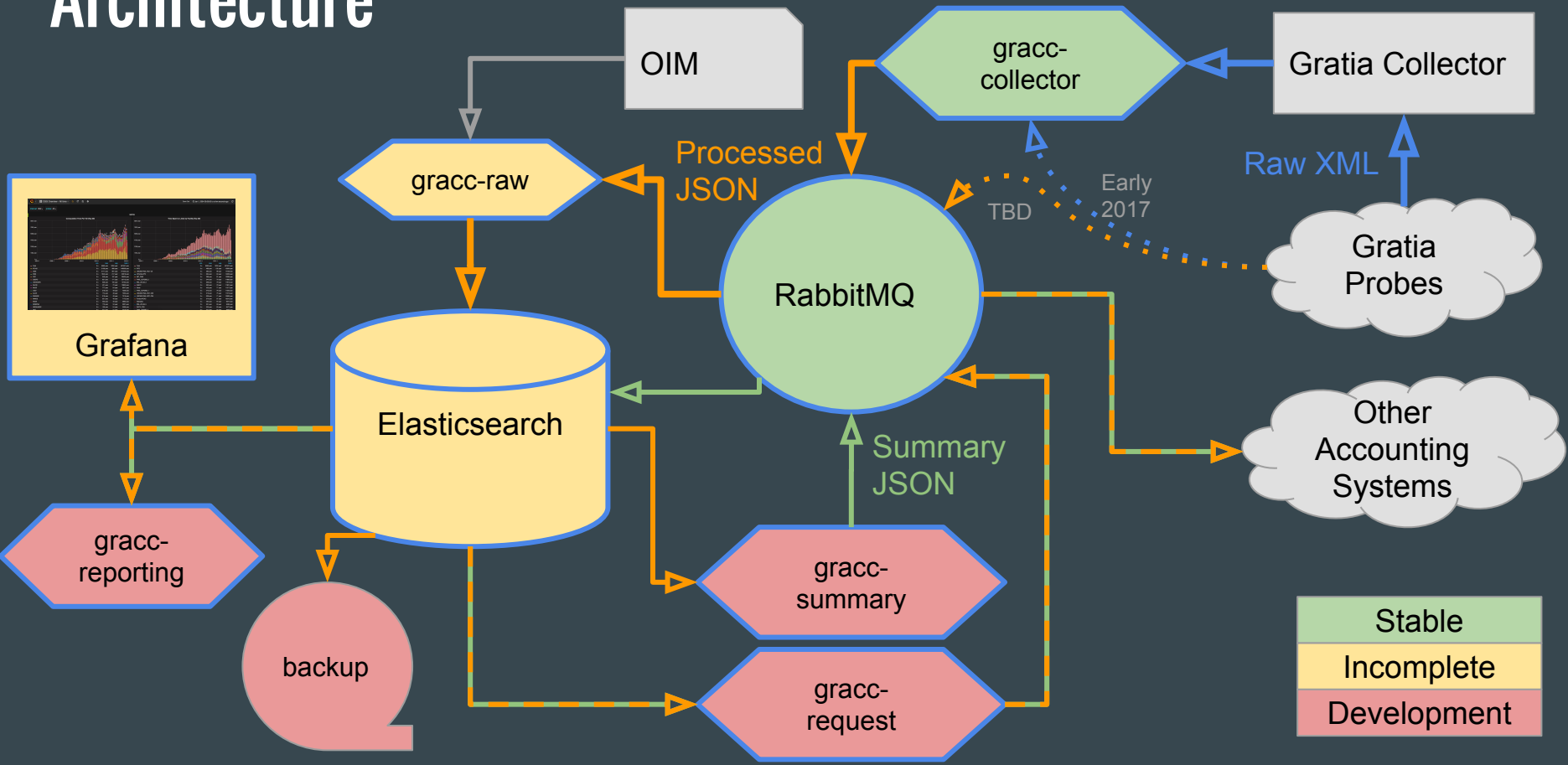
grafana

- Interactive web dashboard platform
- Time-series focused, but growing support for general data visualization

gracc-reporting

- Generate summary email reports from raw or summary records

Architecture



Status

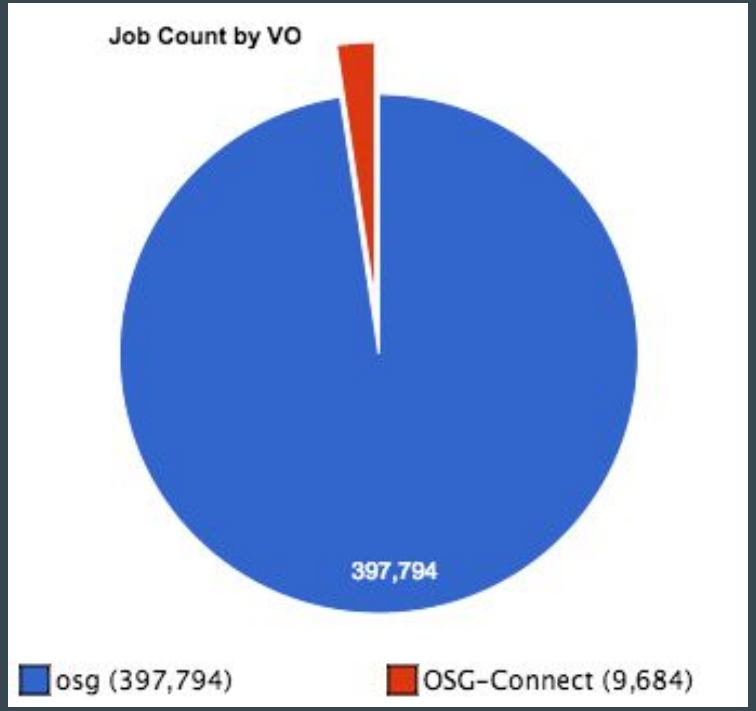
- Primary record processing pipeline is functional
  - OSG Gratia records live replicated to GRACC
  - Back-populated records from early 2015
  - Missing features:
    - Record enrichment with OIM information, e.g. site & resource name, field of science.
    - VO, Site, and Project name correction
- Grafana user interface
  - Basic dashboards implemented
  - Comprehensive system monitoring
  - Missing full spectrum of Gratiaweb dashboards
- Summary and Request Agents
  - Initial development near completion

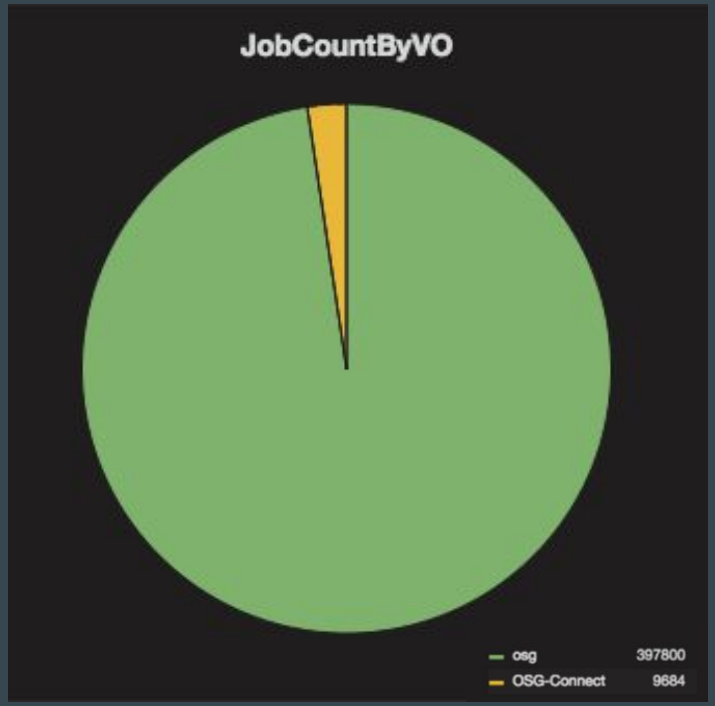
Elasticsearch

- Five-node VM cluster on UNL “Anvil” cloud
  - Each VM: 8 Cores, 64 GB RAM, 4-5 TB Ceph-backed network storage
  - Four data/master nodes, one “client” node also running collector and agents
- Stability issues
  - Several unexplained node crashes in past month, logs indicate filesystem problems
  - Intermittent filesystem “hangs” for 5-20 minutes
    - Typically only affects one node
    - Writes are queued
    - Reads appear to function (since data is replicated)
- Performance issues
  - Producing general visualizations from raw records is fast for short time periods (days-weeks)
  - Longer time span or more involved queries (e.g. “wall hours for every user for every VO”) can take significant time (several minutes) and significantly impact cluster performance
  - Queries against daily summary records are anticipated to be significantly more performant.

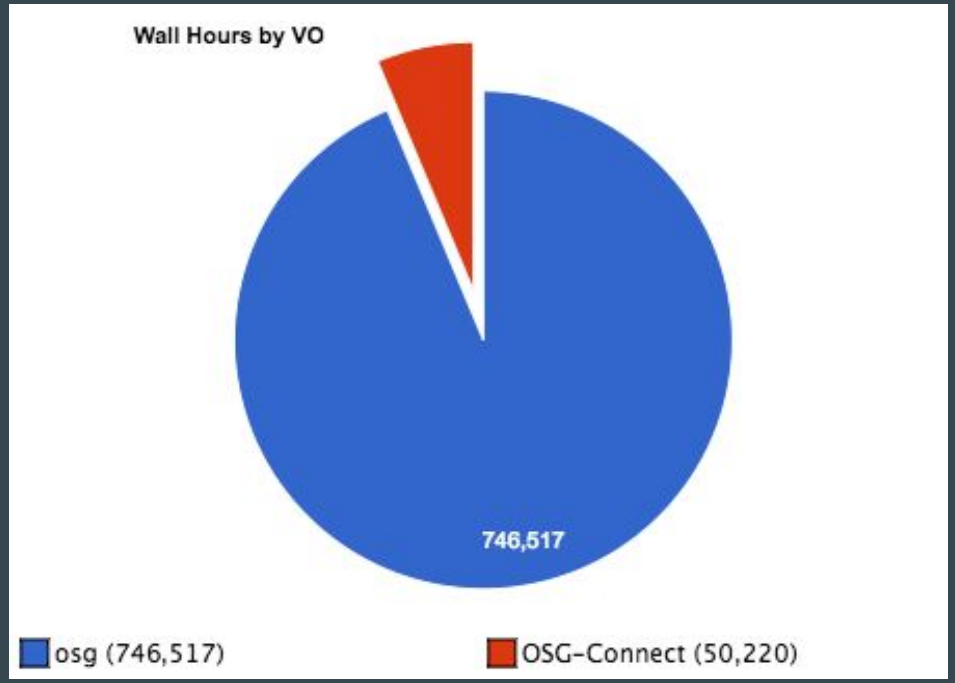
Comparisons GRACC vs Gratia(web)

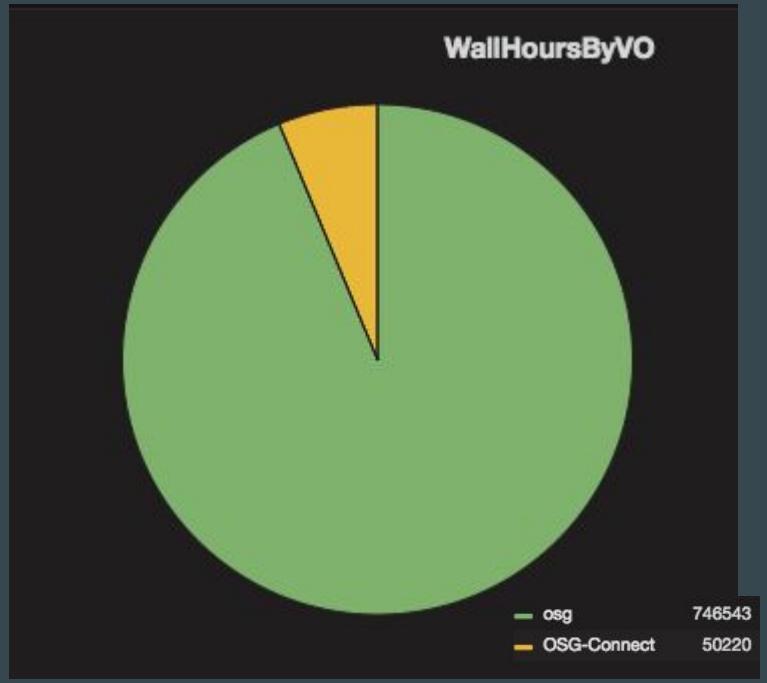
Payload # of Jobs (one day)



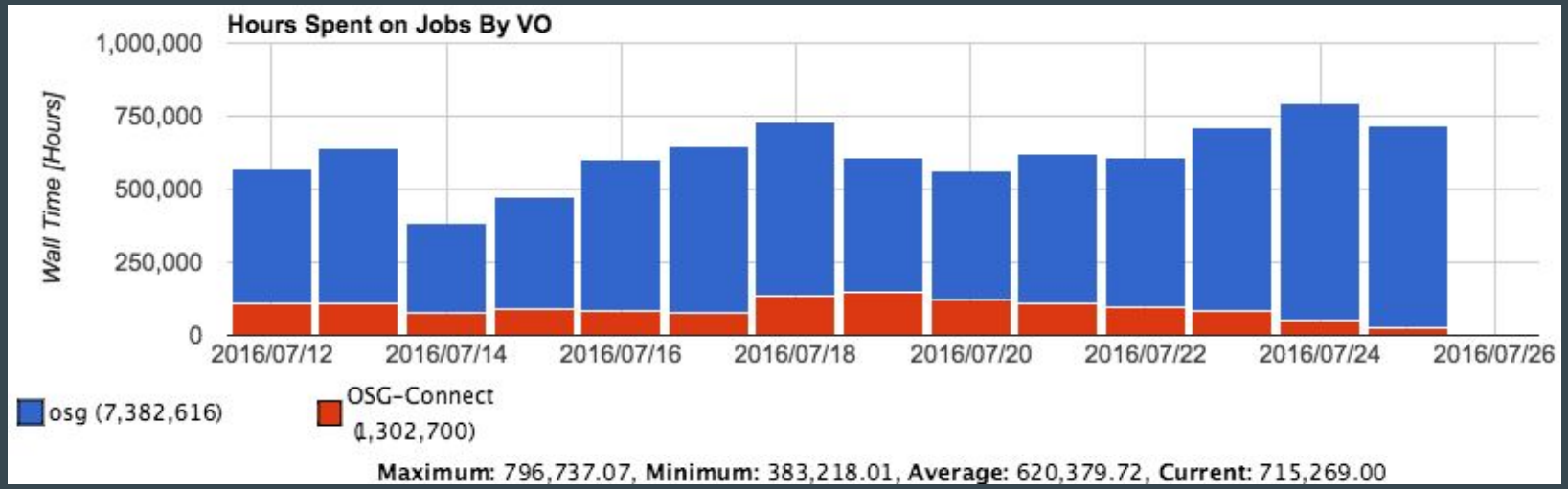


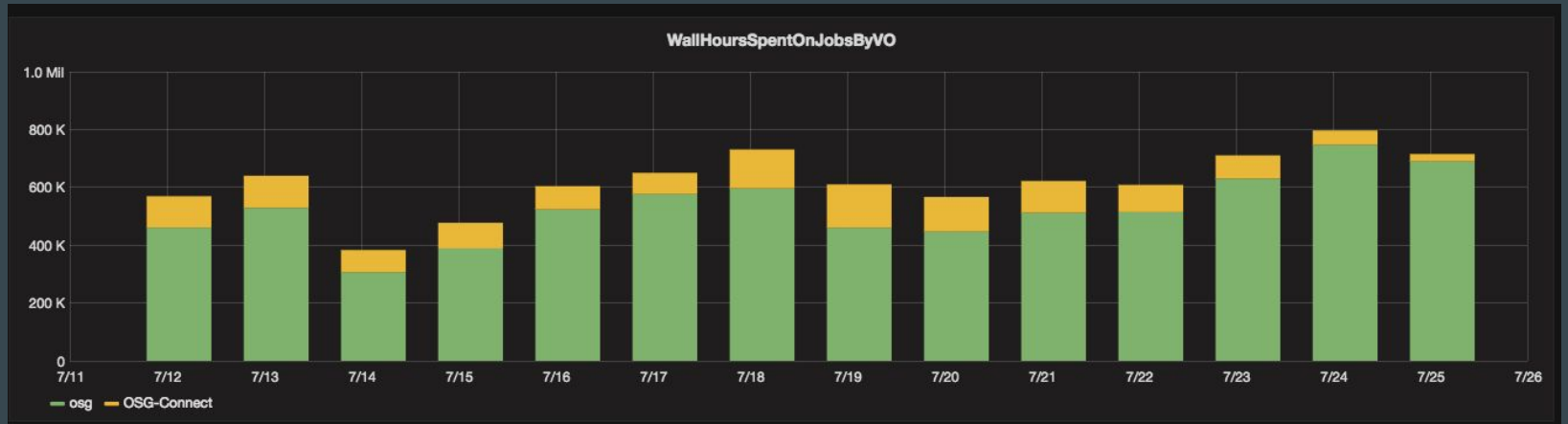
Payload WallDuration (one day)



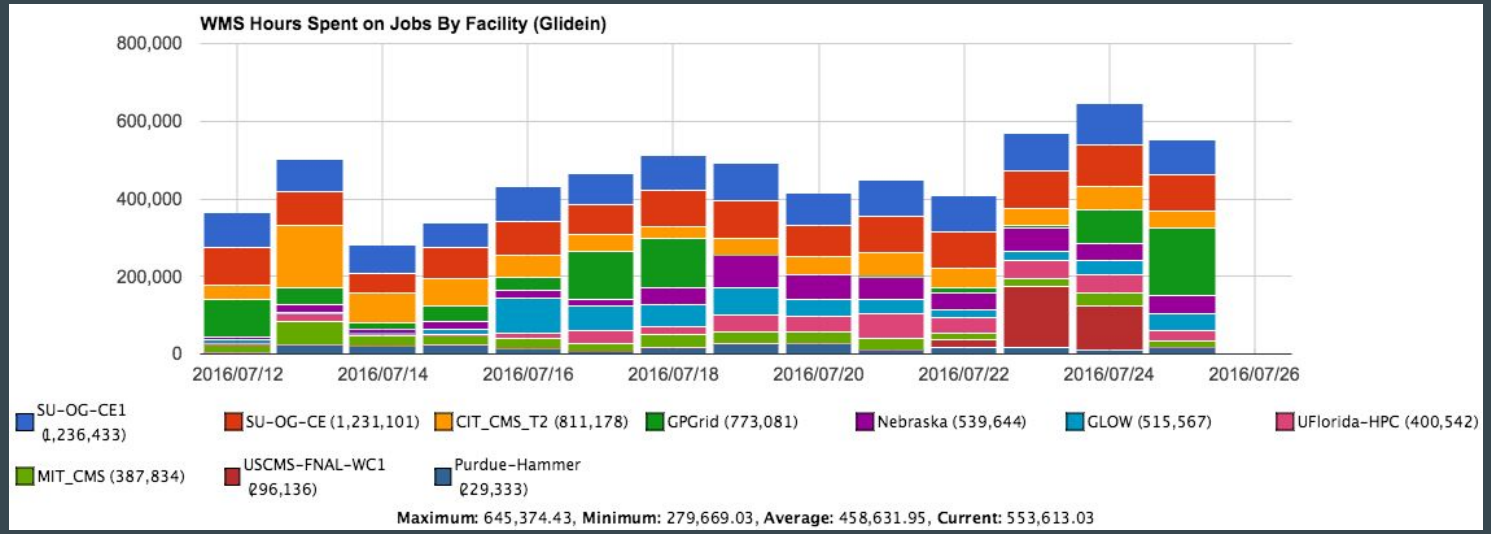


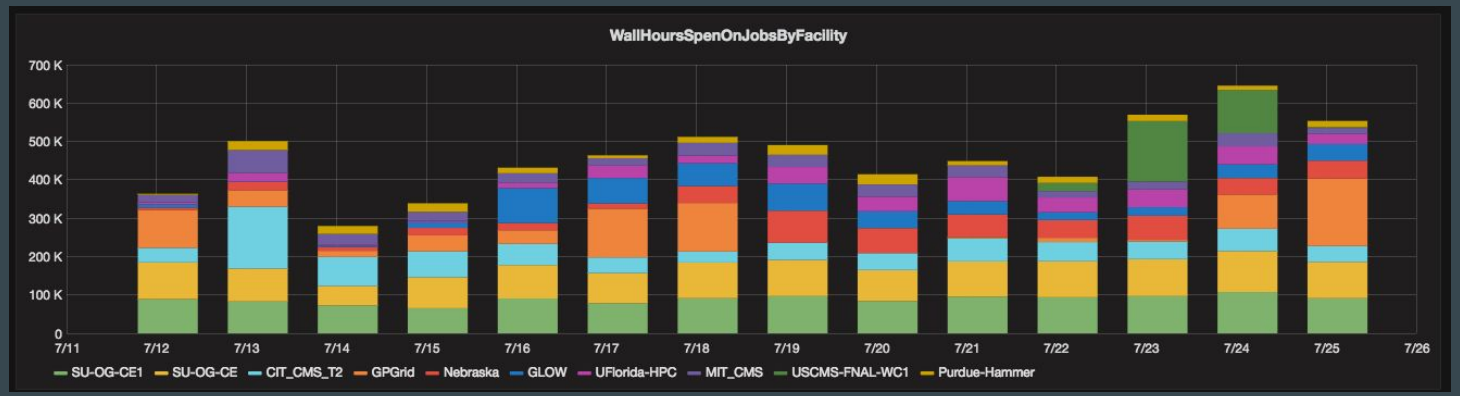
Payload Hours Spent on Jobs By VO (two weeks)



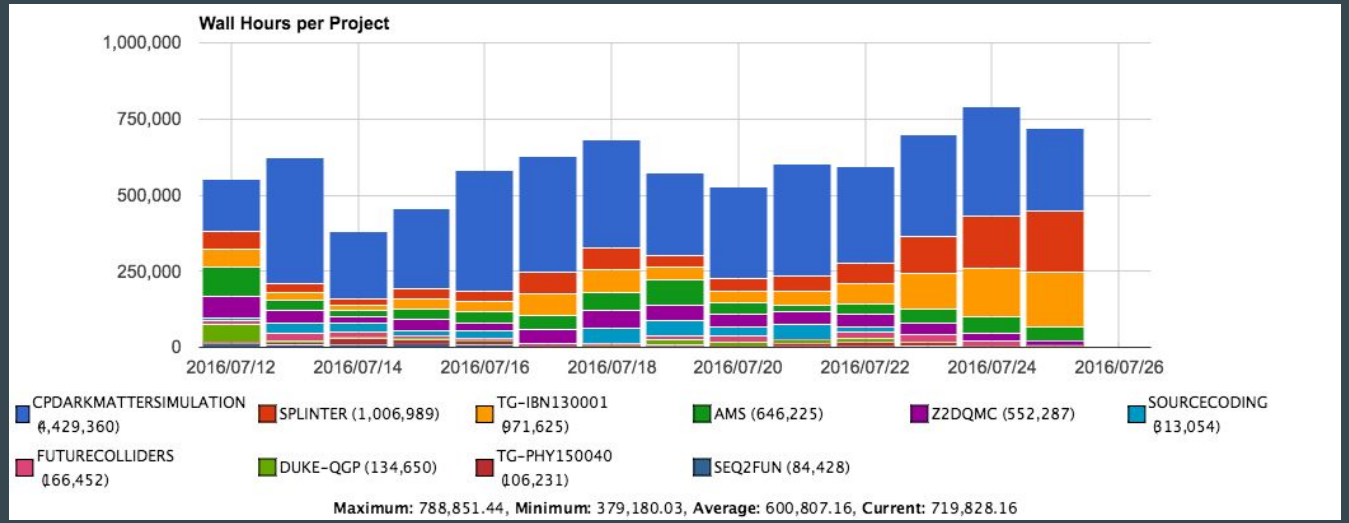


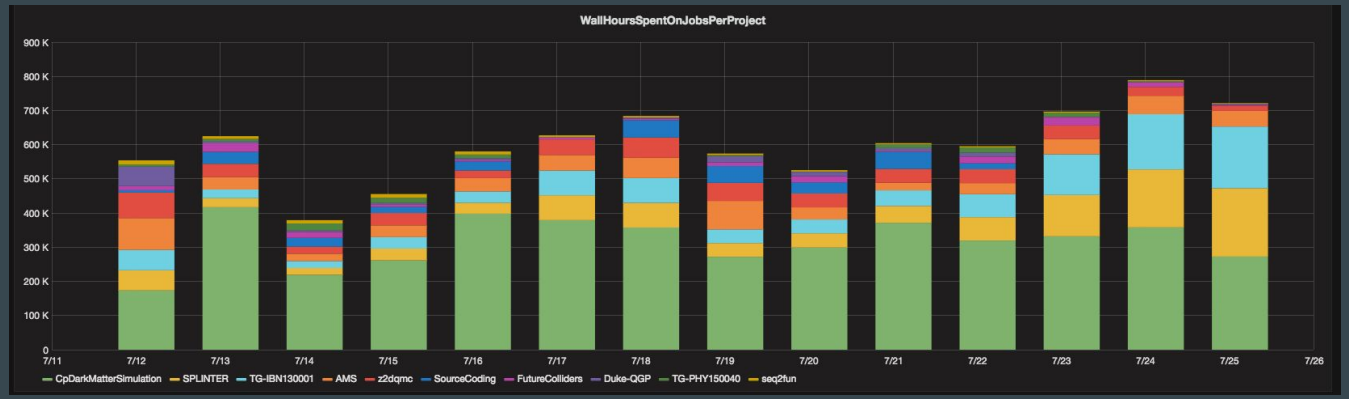
Payload Hours Spent on Jobs By Facility (two weeks)



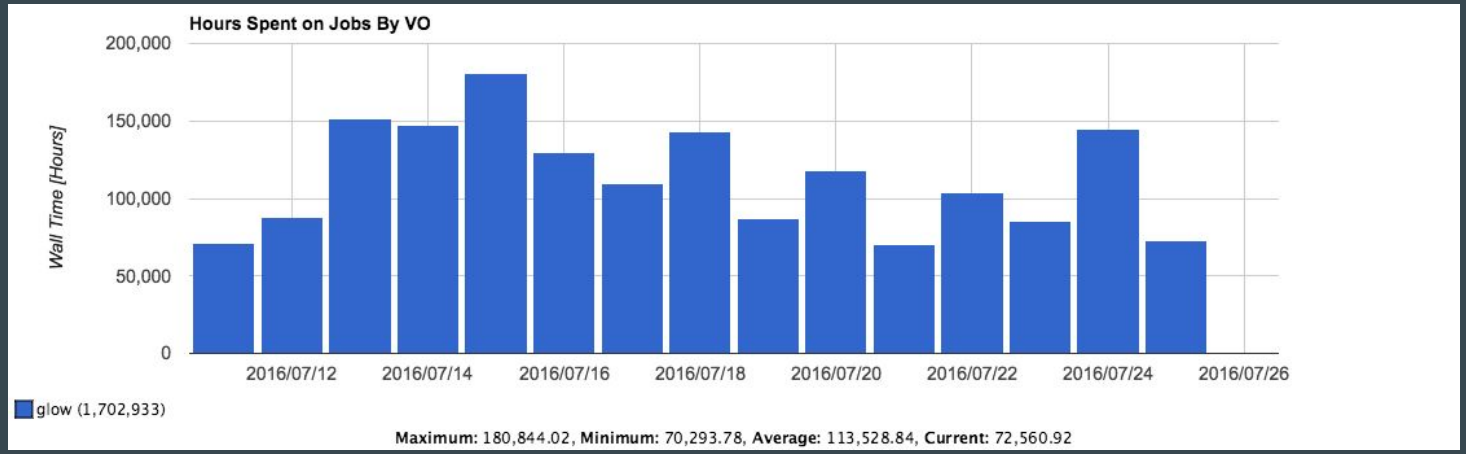


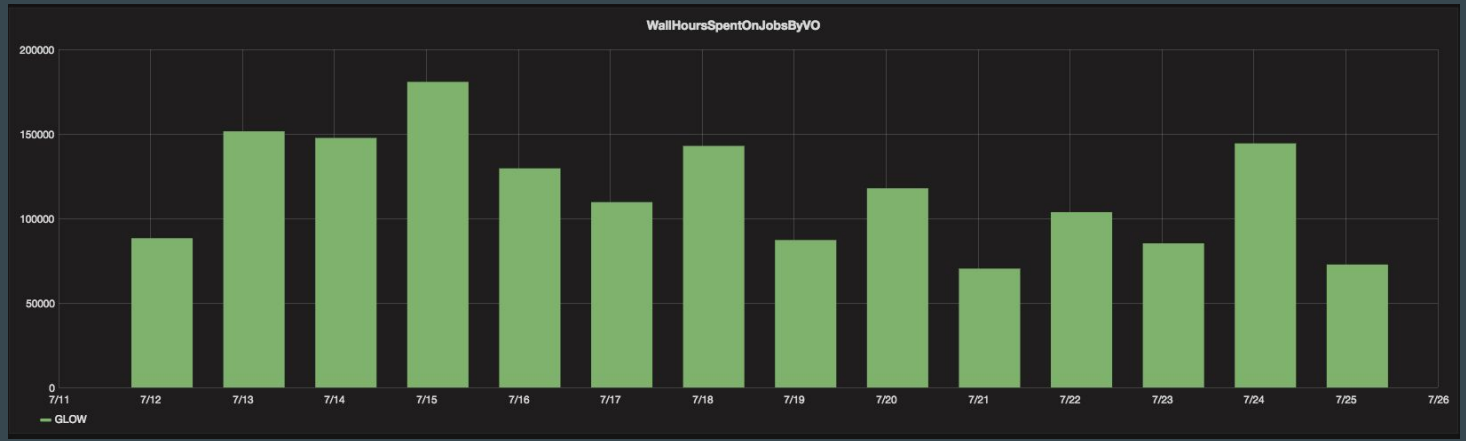
Payload Hours per Project (two weeks)





Batch WallDuration by VO (two weeks)





Summary

- GRACC system maintaining live replication of Gratia accounting data
- Data shows good agreement with Gratia
- Summarization and OIM integration necessary for completing Gratiaweb-like user interface
- Questions on Elasticsearch deployment
  - summarization may alleviate some of these concerns
  - recommendation for production deployment may involve dedicated hardware
- Schedule:
  - Summary and request agents starting testing, deployment in August
  - OIM integration and Name correction development starting, targeted deployment in September
  - user interface development to continue through end of year