GRACC Project Overview & Status

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OSG Area Coordinators Meeting, July 27, 2016

GRACC

- 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
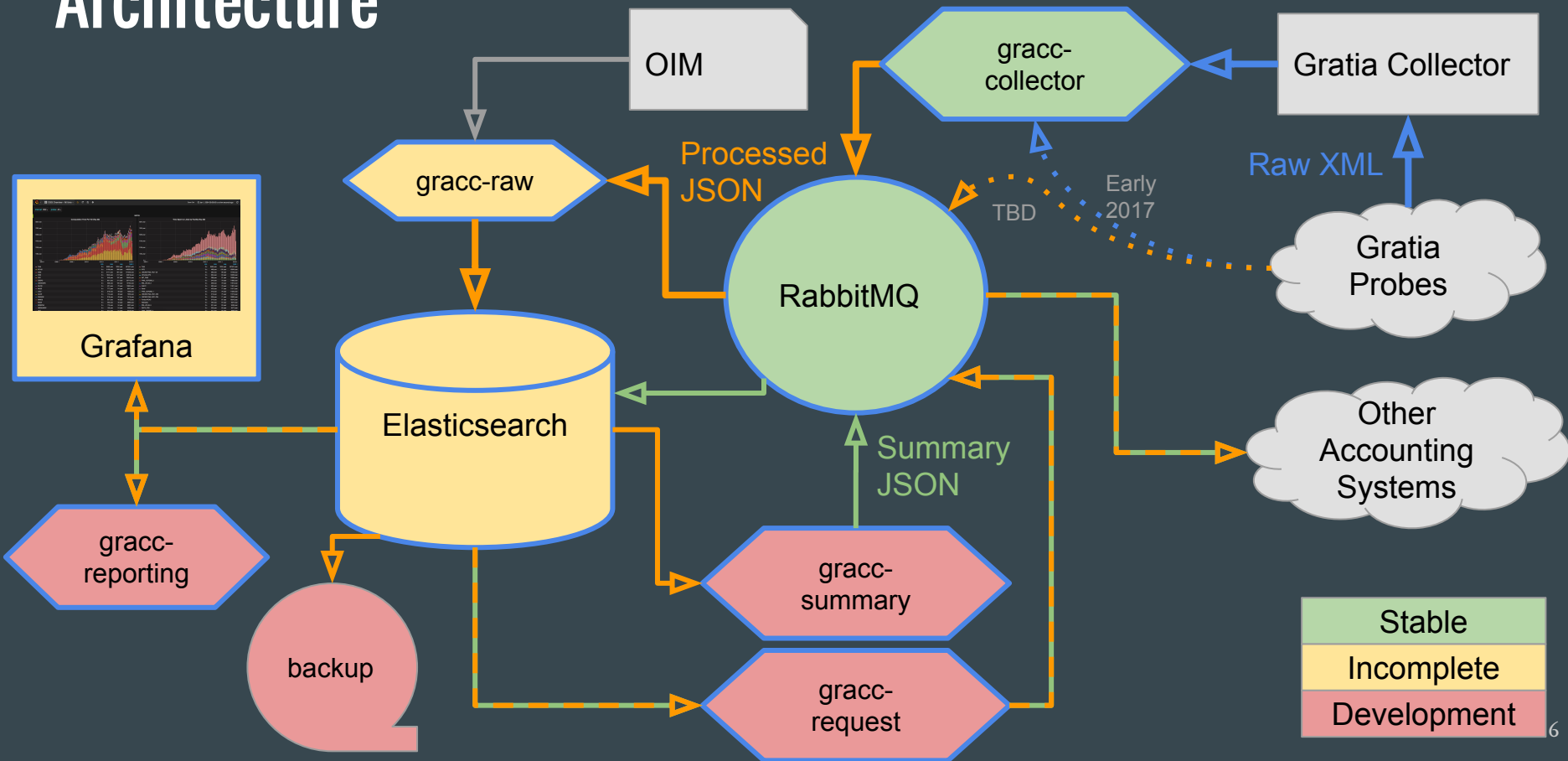- raw or summary records

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

OIM

gracc-collector

Gratia Collector

gracc-raw

Processed JSON

Raw XML

Grafana

RabbitMQ

TBD

Early 2017

Gratia Probes

Elasticsearch

gracc-reporting

Summary JSON

Other Accounting Systems

backup

gracc-summary

gracc-request

Stable

Incomplete

Development

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
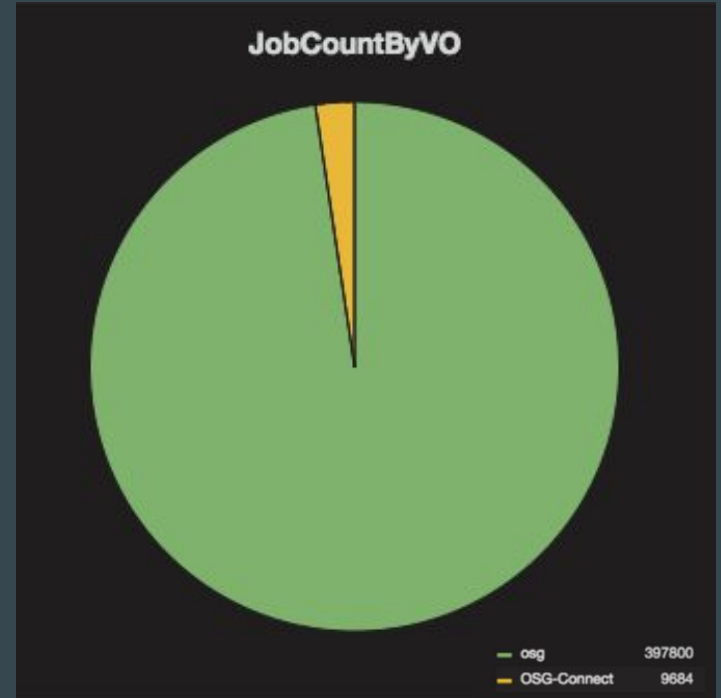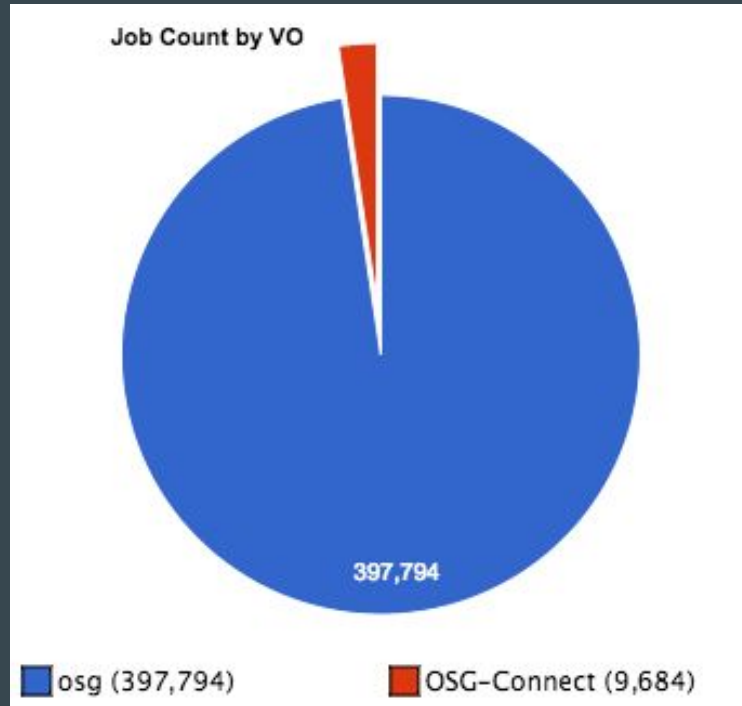 - Missing full spectrum of Gratiaweb dashboards
- Summary and Request Agents
  - Initial development near completion

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
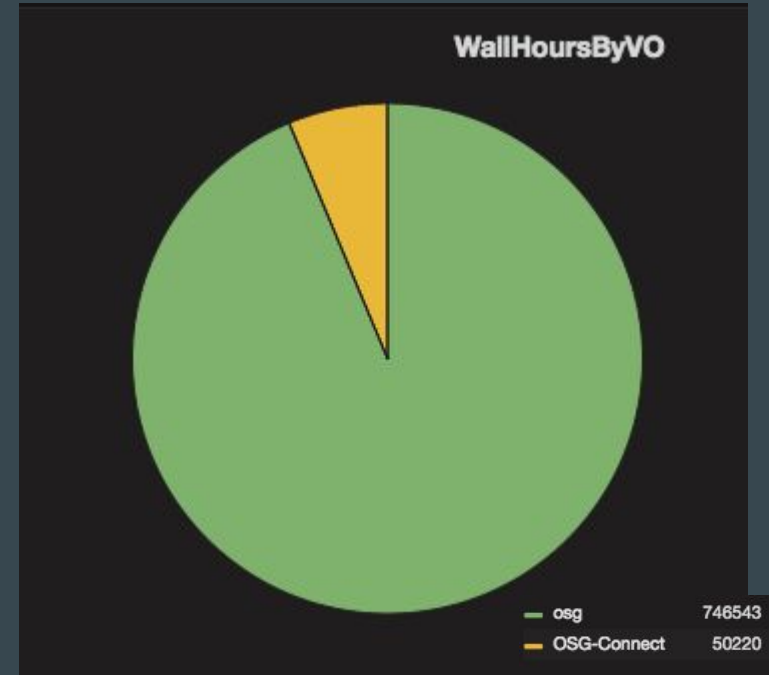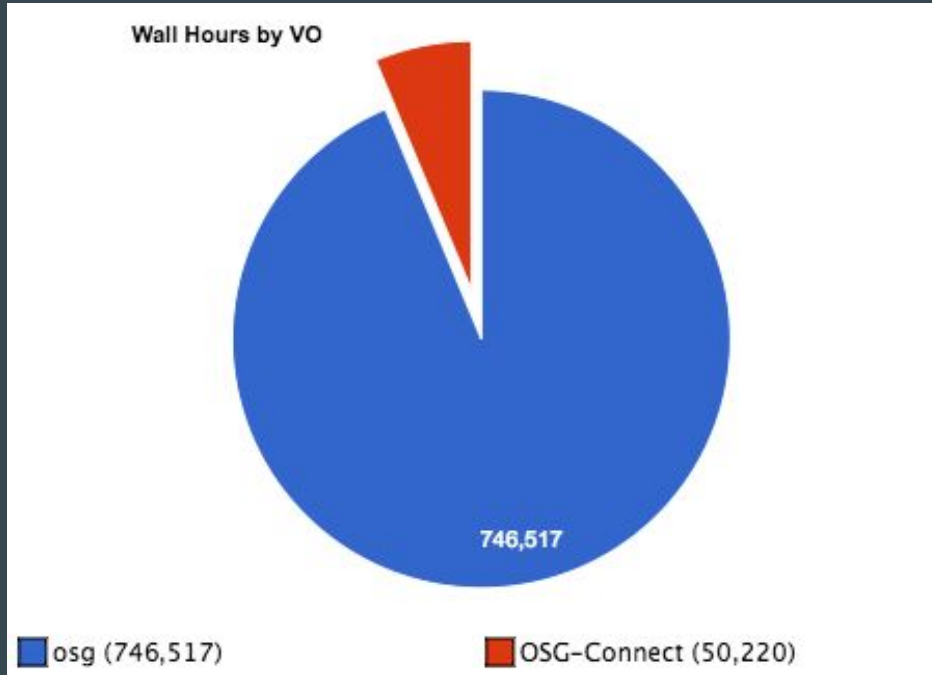 - Queries against daily summary records are anticipated to be significantly more performant.
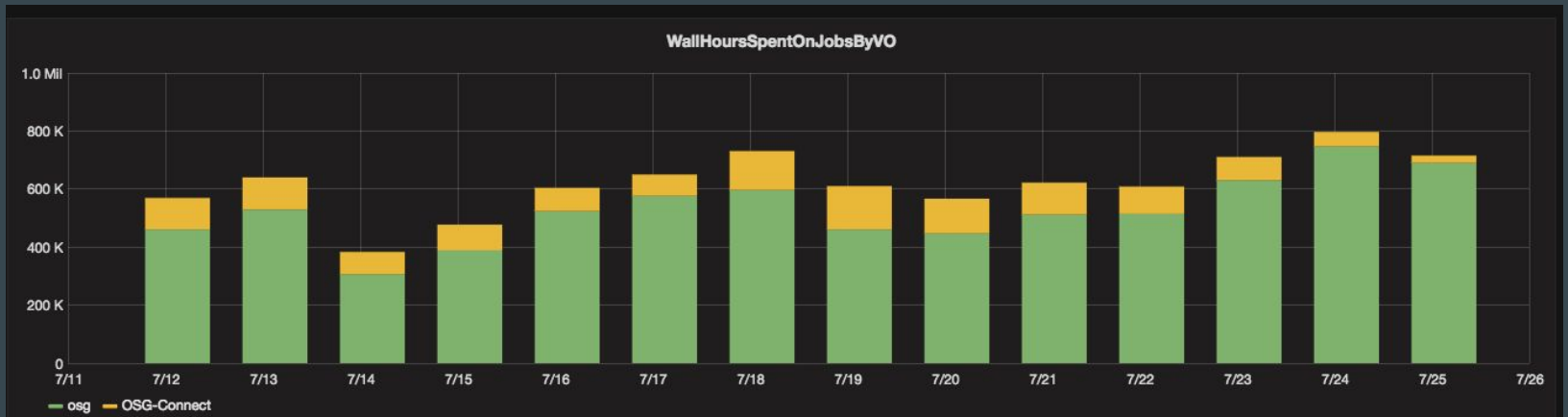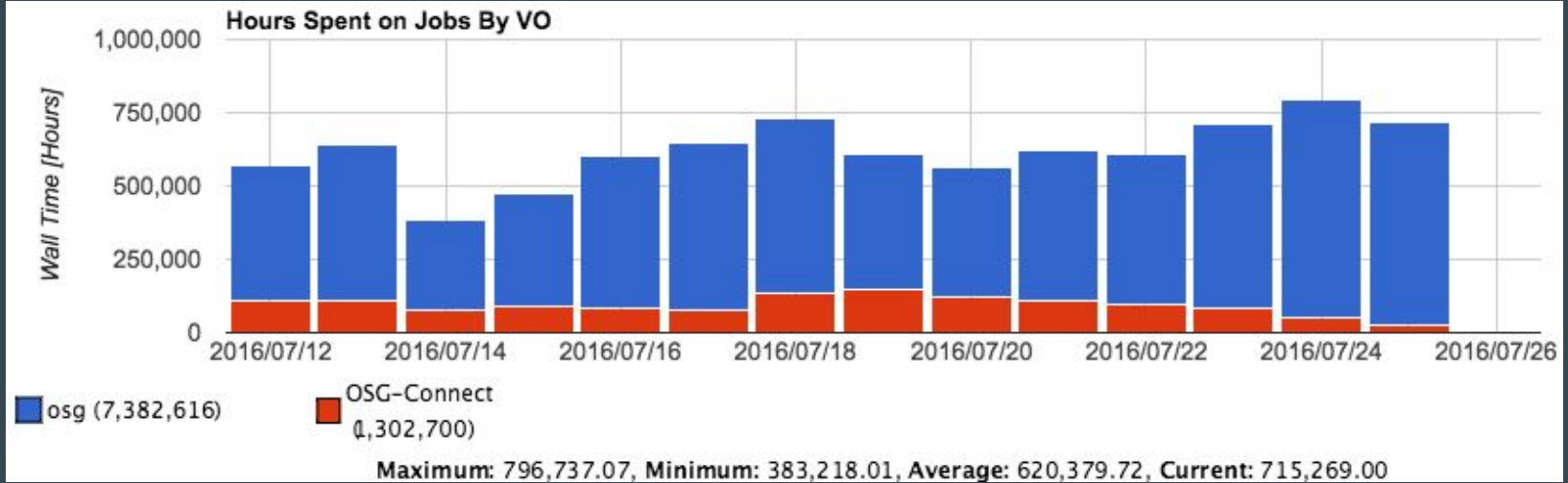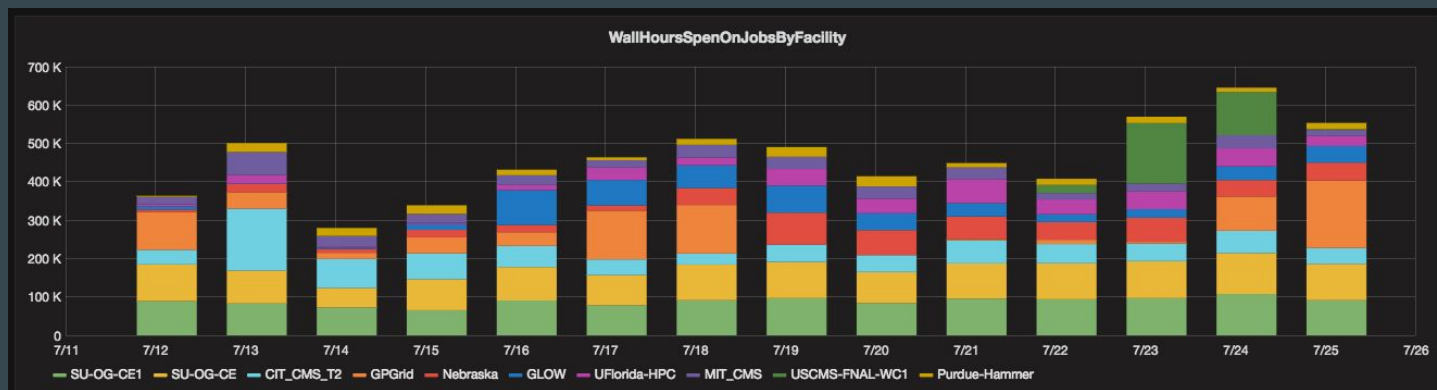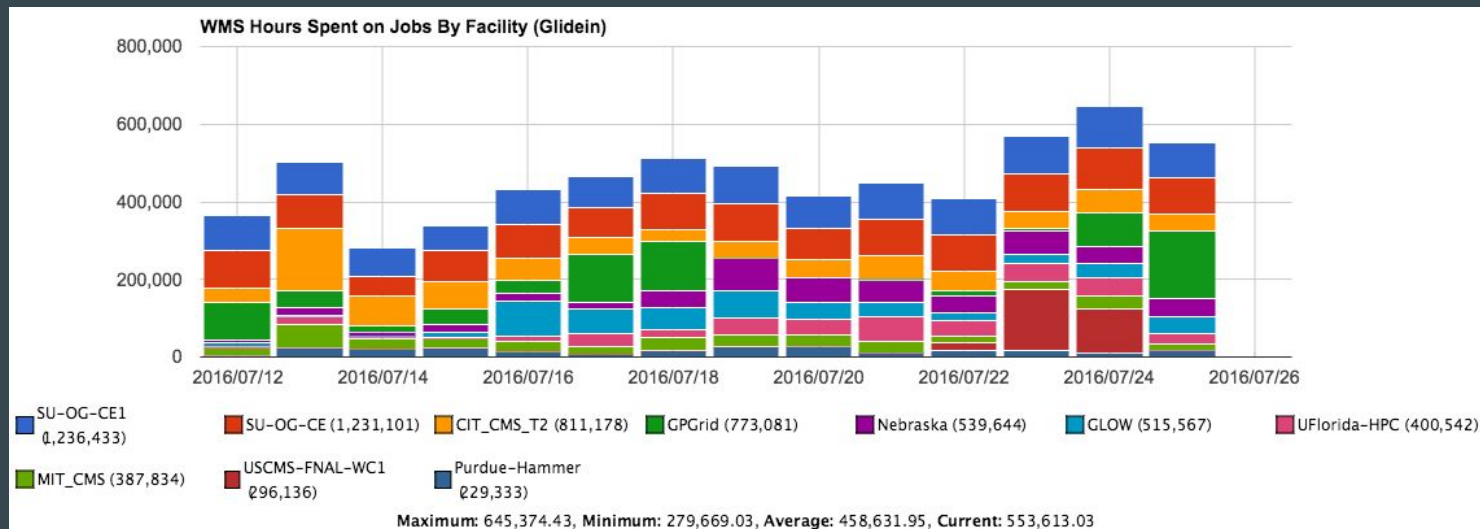
Comparisons GRACC vs Gratia(web)

Payload # of Jobs (one day)

Payload WallDuration (one day)

Wall Hours by VO

osg (746,517)   OSG-Connect (50,220)

746,517

WallHoursByVO

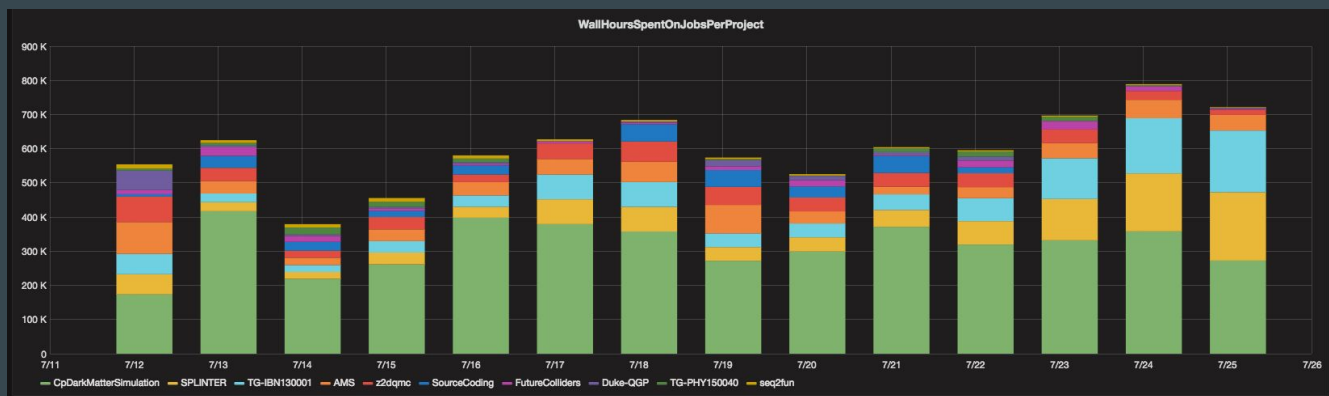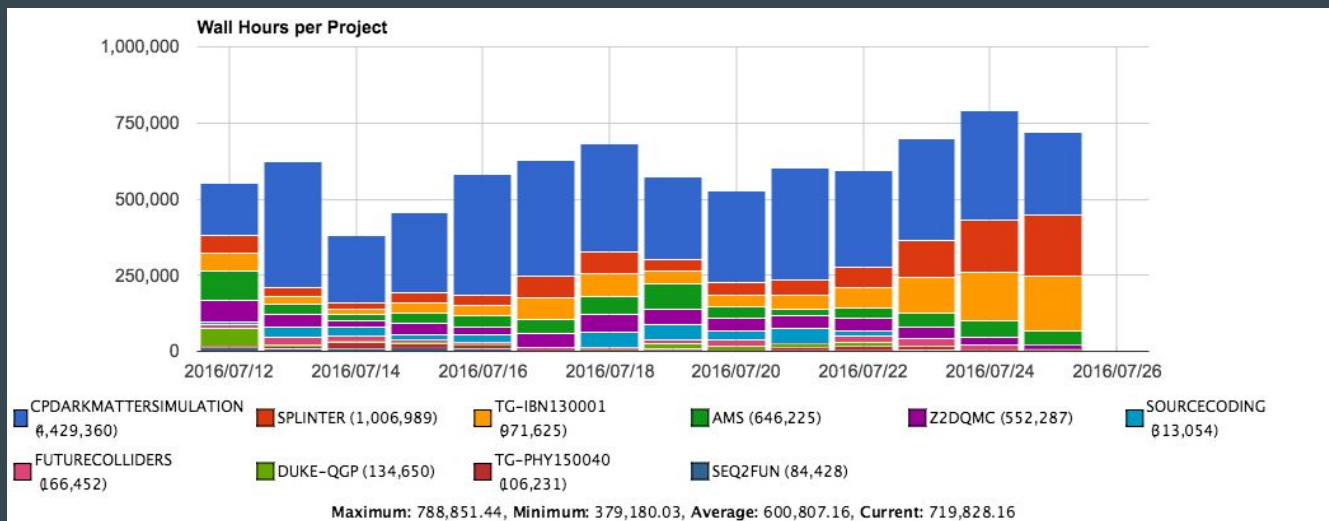osg   746543
OSG-Connect   50220

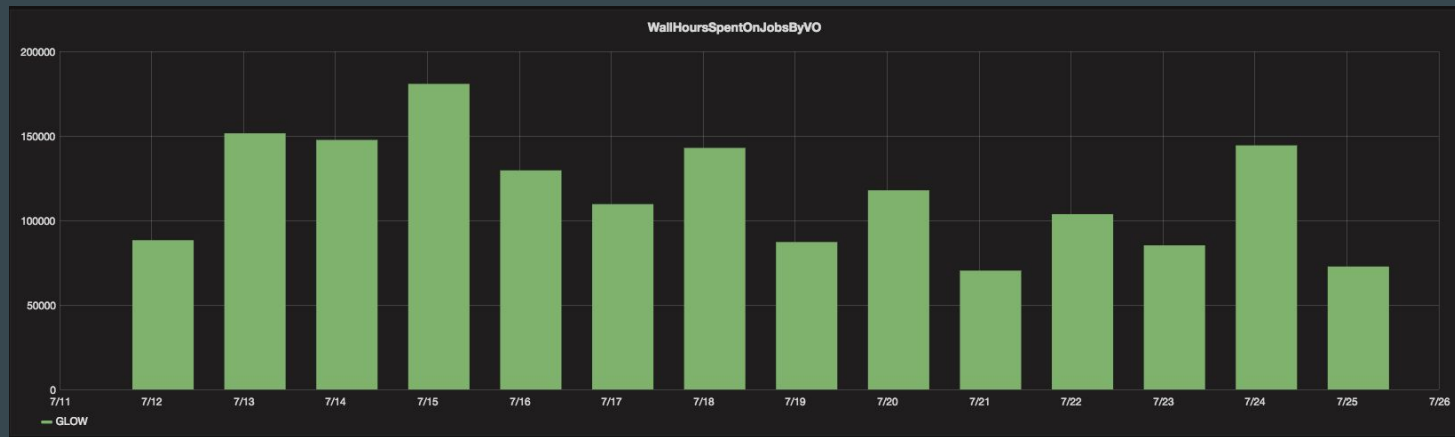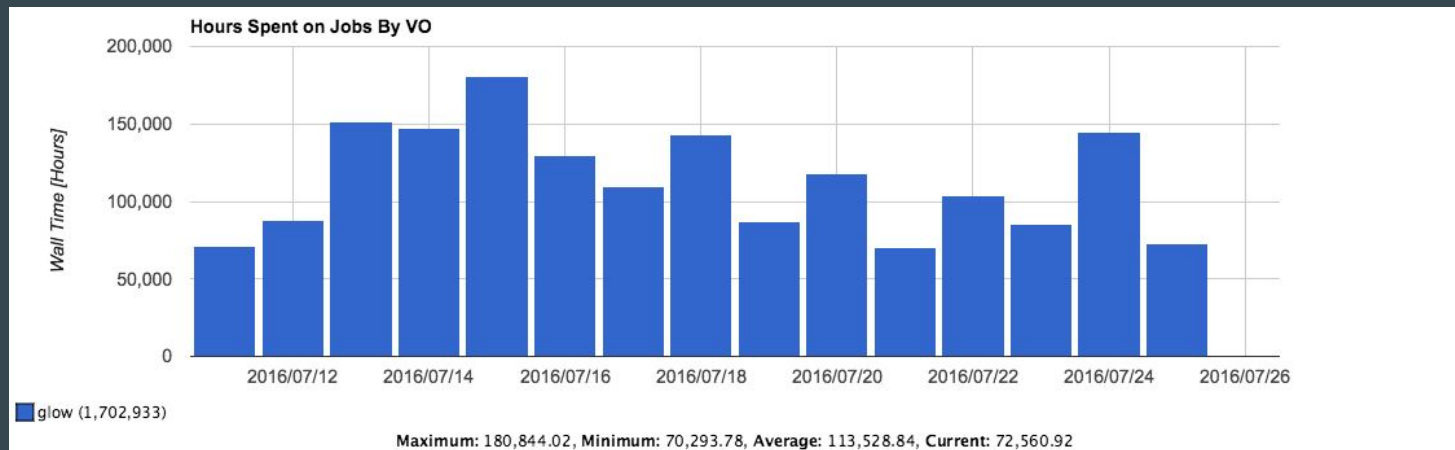# Payload Hours Spent on Jobs By VO (two weeks)

Payload Hours Spent on Jobs By Facility (two weeks)

Payload Hours per Project (two weeks)

Batch WallDuration by VO (two weeks)

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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