Operational Monitoring

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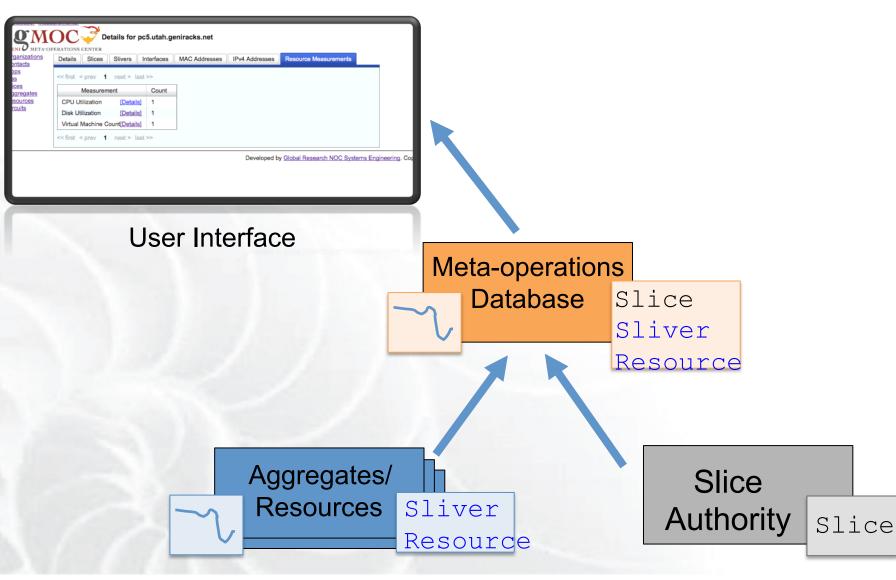
- ## Meta-Operations Framework
  - Core set of operational data needed to jointly run the network
  - Monitoring of aggregates and resources that make up GENI

- ## Goals for the User Interface
  - Provide Experimenters with operational monitoring data about their Slice
  - Provide Operators with monitoring data about the GENI infrastructure

User Interface

Meta-operations Database

Slice
Sliver
Resource

Aggregates/ Resources

Sliver
Resource

Slice Authority

Slice

- ## Monitoring covers:
  - Slice Authority
  - ExoGENI and InstaGENI racks
  - Each type of GENI meso-scale aggregate/resource
  - Health Checks

Slice Authority
pgeni.gpolab.bbn.com

Health Checks
BBN

ProtoGENI on InstaGENI Racks
PG on InstaGENI rack - Utah

Orca on ExoGENI Racks
ORCA on ExoGENI - BBN
ORCA on ExoGENI - RENCI

Open Flow (FOAM)
BBN
ExoGENI - BBN
ExoGENI - RENCI
InstaGENI - Utah
Georgia Tech
Kansas State
MOXI-CIC
MOXI-Indiana
SoX

MyPLC
BBN
Georgia Tech

All Reporters include:
- Name & Type
- Physical Location
- Operating Org

Slices and **Slivers** also include:
- Creator
- Creation/Expiration times

Slice Authority
Relational data:
- Version
- Slices (incl. URN & UUID)

Aggregate
Relational data:
- Version & POCs
- Sliver (incl.; State; containing Slice; contained Resources)

Health Checks
Time series data:
- AM is responding

Resources
Relational data:
- Resources (incl. Interfaces)

Time series data:
- CPU & Disk Utilization
- Number of active VMs
- Interface traffic counters
- OpenFlow datapath & Sliver control traffic stats

- For Experimenters:
  - Answer: "What's happening on my slice?"

- For Operations:
  - Answer: "What's happening at my location?"

Procedure:

1) Look up "my slice" or "my location".
2) Find statistics about (and relationships among) *aggregates*, *resources*, and *slices* of interest.

GMOC User Interface
(requires login)

- ## More intuitive user interface
  - ### Give each user a view that is tailored to their situation
    - Experimenters get a Slice-centric UI
    - Operators get an Aggregate-centric UI

- ## Common Data
  - ### Share data and code with other projects

- ## Stitching
  - ### Expand existing (but rudimentary) support
  - ### Visibility into the underlying backbone network

- ## Better client support
  - ### Make it super easy to talk to GMOC programmatically

References

- "Protected" User Interface
    - https://gmoc-db.grnoc.iu.edu/protected/

- Monitoring API
    - Relational Schema
      http://groups.geni.net/geni/attachment/wiki/GENIMetaOps/gmocv3.rng
    - Time series statistics
      http://groups.geni.net/geni/wiki/GENIMetaOps/DraftMonitoringMetrics

- Monitoring software releases
    - FOAM
      http://groups.geni.net/geni/wiki/PlasticSlices/MonitoringRecommendations/FoamConfiguration
    - MyPLC
      http://groups.geni.net/geni/wiki/PlasticSlices/MonitoringRecommendations/MyplcConfiguration
    - PlanetLab Node
      http://groups.geni.net/geni/wiki/PlasticSlices/MonitoringRecommendations/PlnodeConfiguration

Interested in testing the
GMOC Monitoring User Interface?

Contact:

GMOC Service Desk <gmoc@grnoc.iu.edu>

GENI Help Desk <help@geni.net>

Interested in Monitoring?

Join the monitoring@geni.net mailing list:

http://lists.geni.net/mailman/listinfo/monitoring

BACKUP

Reporting Aggregates & Data

Aggregates

Relational data:

- Version & POCs
- Slivers (incl. Creator; Creation/Expiration times; State; containing Slice; contained Resources)

Resources

Relational data:

- Resources (incl. Interfaces)

Time series data:

- CPU & Disk Utilization
- Number of active VMs
- Interface traffic counters
- OpenFlow datapath & Sliver stats

Aggregates & Resources also include:

- Name & Type
- Physical Location
- Operating Org

ProtoGENI on InstaGENI Racks

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MyPLC

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Georgia Tech

Reporting Entities & Data

Slice Authority

BBN
(pgeni.gpolab.bbn.com)

Slice Authority
Relational data:
- Name & Type
- Physical Location
- Operating Org
- Version
- Slices (incl. URN & UUID; Creator; Creation/Expiration times)

Health Checks

BBN

Healthchecks
Time series data:
- is pingable
- AM is responding

Slice Authority

pgeni.gpolab.bbn.com

Slice Authority
Relational data:
- Version
- Slices (incl. URN & UUID)

Aggregate
Relational data:
- Version & POCs
- Sliver (incl.; State; containing Slice; contained Resources)

Resources
Relational data:
- Resources (incl. Interfaces)

Time series data:
- CPU & Disk Utilization
- Number of active VMs
- Interface traffic counters
- OpenFlow datapath & Sliver stats

ProtoGENI on InstaGENI Racks

PG on InstaGENI rack - Utah

Orca on ExoGENI Racks

ORCA on ExoGENI - BBN

ORCA on ExoGENI - RENCI

SAs, Aggregates & Resources also include:
- Name & Type
- Physical Location
- Operating Org

Slices and **Slivers** also include:
- Creator
- Creation/Expiration times

Open Flow (FOAM)

BBN

ExoGENI - BBN

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Healthchecks
Time series data:
- is pingable
- AM is responding

- ## Relational data collected by GMOC
  - Physical location of aggregate resources
  - Points of Contact (POC) for each aggregate
  - Slice Authority Info
    - type, version, operating organization, etc.
  - Aggregate Info
    - name, version, type, etc.
  - Slivers for each aggregate
  - Sliver data
    - who created them, when they were created, what slices they're associated with, their current state, etc.
  - Data about resources within each aggregate
    - VM servers, routers, etc.
  - Mapping of resources to slivers
  - Data about interfaces on resources
    - MAC/IPv4/IPv6 addresses, VLAN tags, netmask, etc.

- Time-series data collected by GMOC
  - CPU utilization
  - Disk Utilization - per partition
  - Number of active VMs - for hypervisors
  - Interface traffic counters
    - TX/RX pps, TX/RX bps
  - OpenFlow datapath stats
    - ports, RO/RW rules, TX/RX messages, dropped messages, flow message modifications, flow message removals, message errors, TX/RX message packets, etc.
  - OpenFlow sliver stats
    - pretty much the same as datapath stats
  - Health checks
    - is pingable, aggregate version, aggregate resource list