The GENI Meta-Operations Center

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The Global Research NOC

- Formed in 1998 to provide operations for the Abilene Network

- Groups

  - Service Desk: 24x7x365 Call Center & Monitoring Center

  - Network Engineering: 16 engineers providing Tier2 and Tier3 troubleshooting & planning

  - Systems Engineering & Tool Development: 10 engineers developing & supporting GRNOC toolset and systems, and operating research platforms like Internet2 Observatory and NLRview

The Global Research NOC

GENI Meta-Operations Center

- What is GMOC (other than a logo)?

- Goal: To start to help develop the datasets, tools, formats, & protocols needed to share operational data among GENI constituents

- Why "Meta?"

  - There will be lots of groups operating their own parts

  - This is not intended to change that

  - We're interested in what kinds of data exchange and functions are useful to share among these groups, at a GENI-wide level

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- Spiral 1 Deliverables

  1. **Define an Operational Dataset** - What kinds of data do we need to collect?

  2. **Choose a Dataset Format & Protocol** - How should the data be shared?

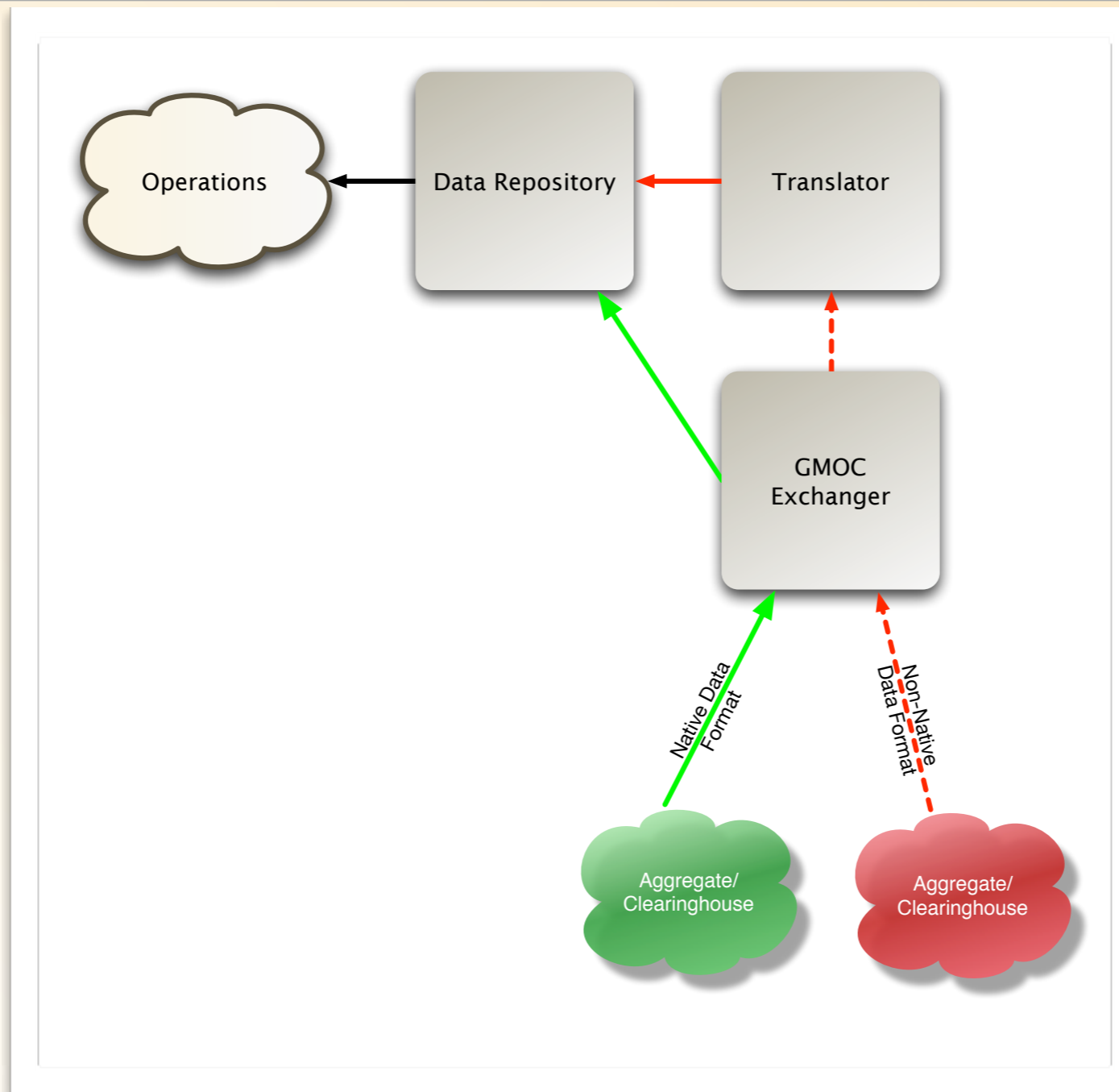 3. **Build Functions** - Basic early functions of Emergency Shutdown & GENI Operational View (more later)

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- Today's talk

  - First, talk about the functions

  - Then, some ideas about the dataset
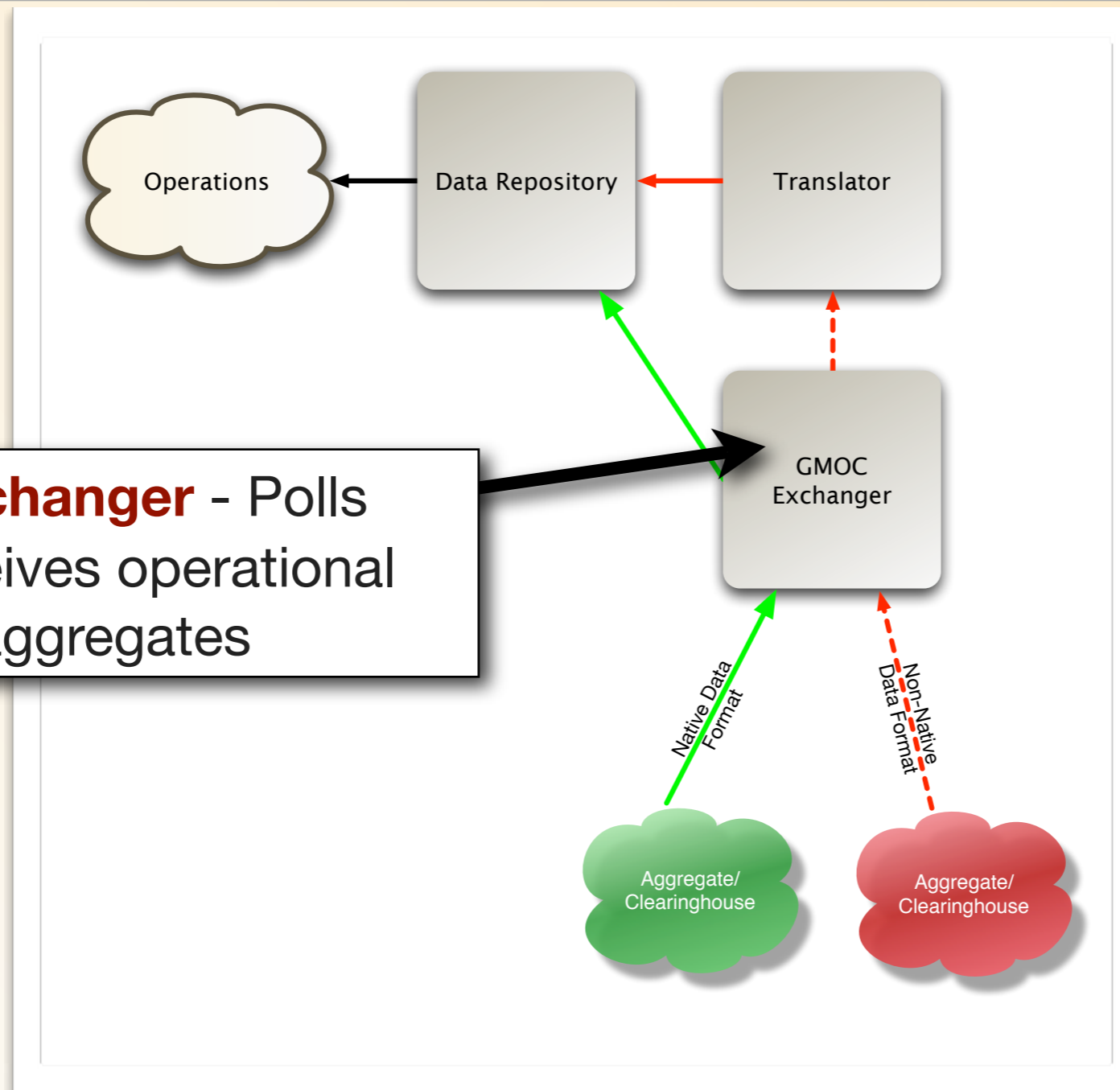
  - No time to discuss formats in this talk

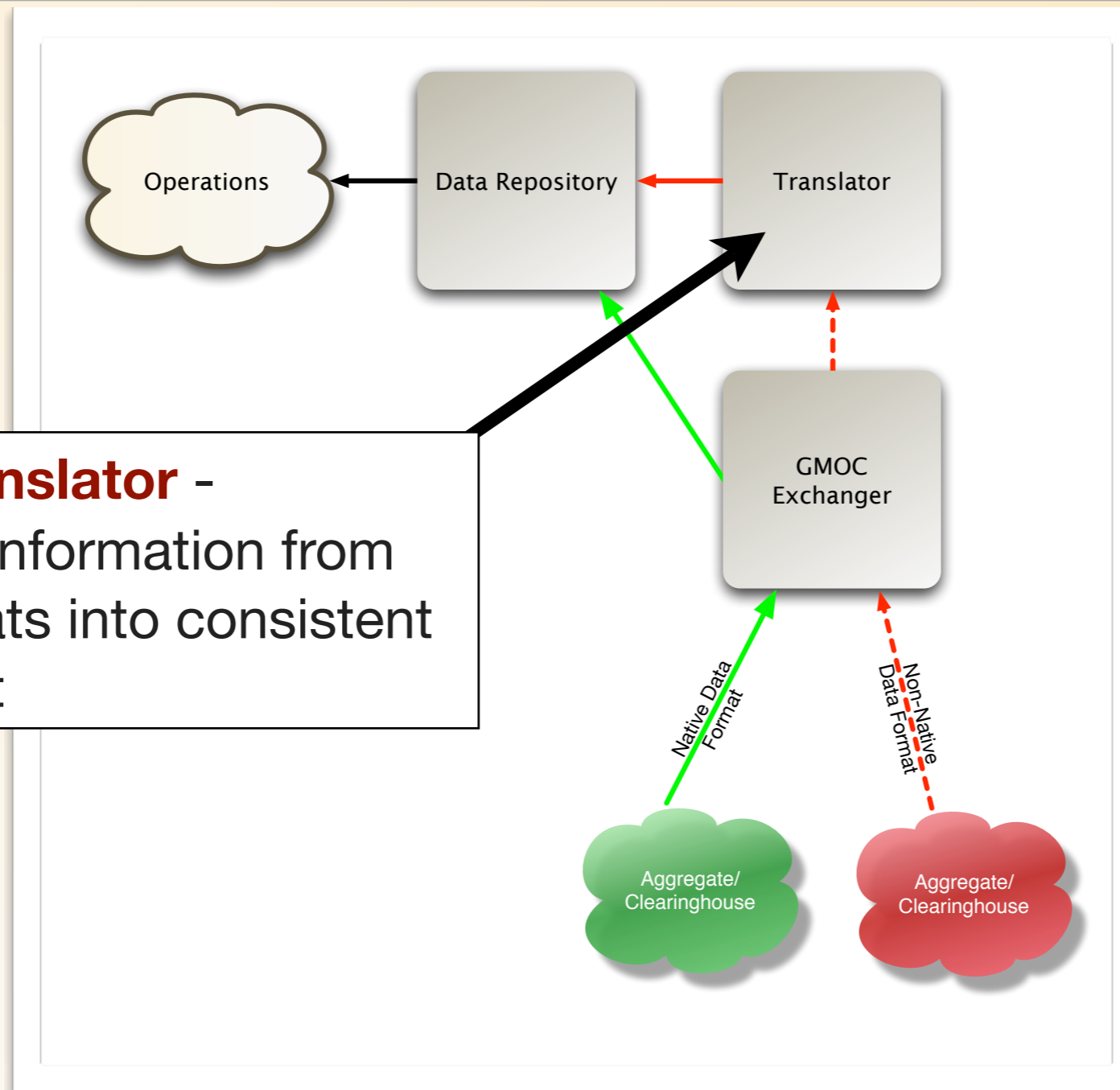# GMOC Architecture

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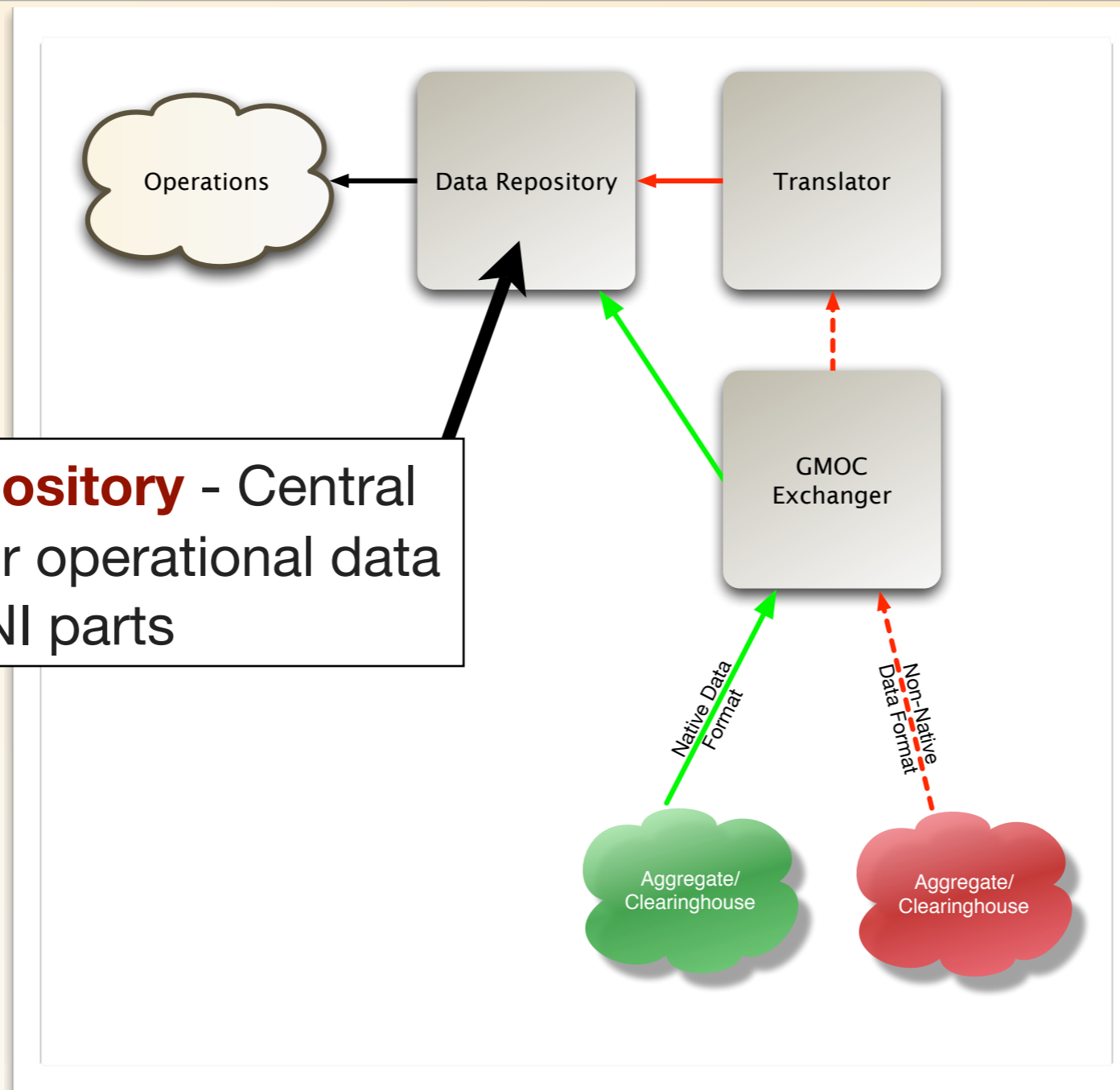GMOC Exchanger - Polls and/or receives operational data from aggregates

Operations

Data Repository

Translator

GMOC Exchanger

Native Data Format

Non-Native Data Format

Aggregate/ Clearinghouse

Aggregate/ Clearinghouse

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GMOC Translator -
Translates information from other formats into consistent data format

Operations

Data Repository

Translator

GMOC Exchanger

Native Data Format

Non-Native Data Format

Aggregate/ Clearinghouse

Aggregate/ Clearinghouse

GENI Meta-Operations Center

GMOC Repository - Central datastore for operational data from all GENI parts

Operations

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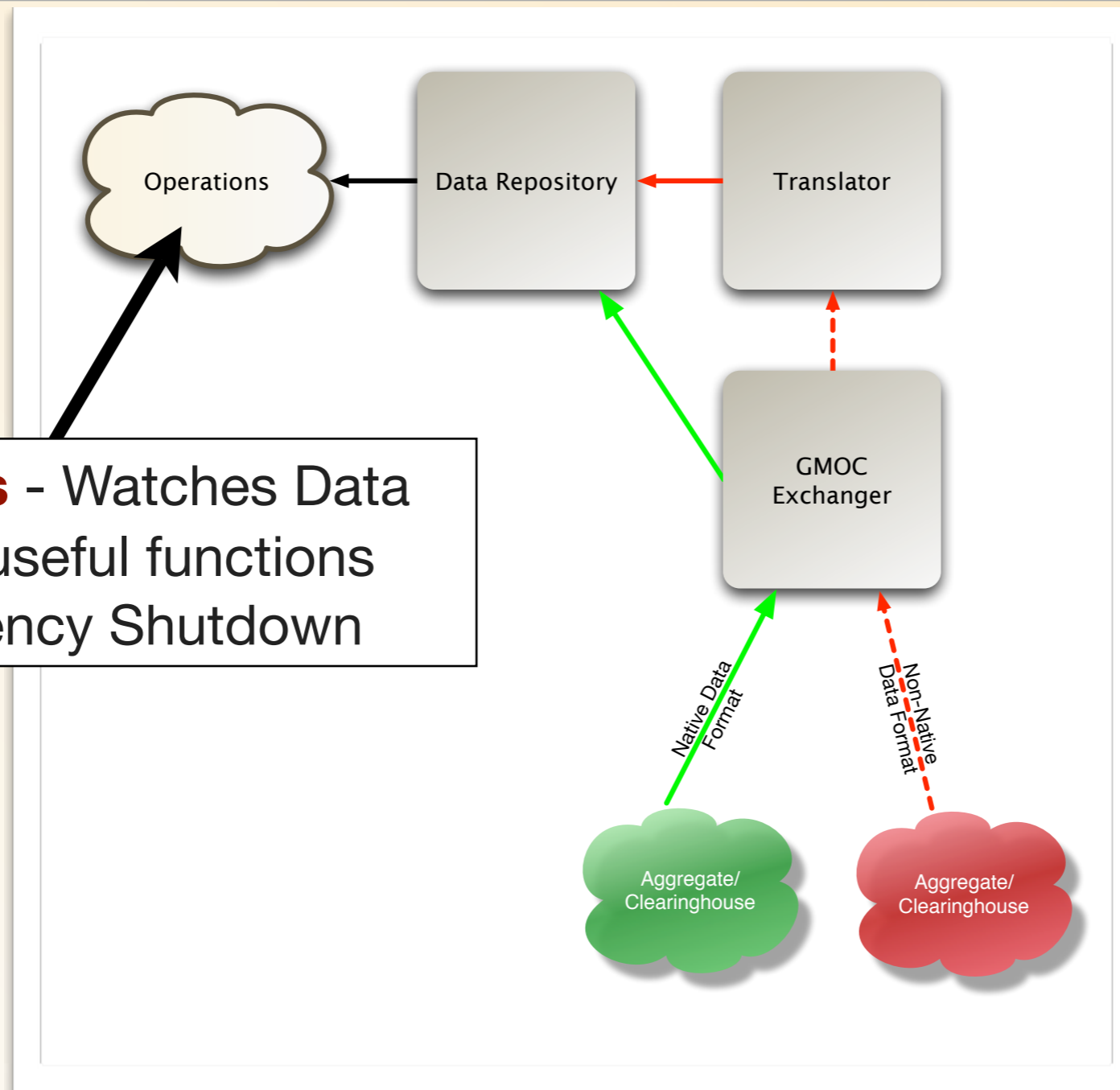
Operations - Watches Data to provide useful functions like Emergency Shutdown

Operations

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Translator

GMOC Exchanger

Native Data Format

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Aggregate/ Clearinghouse
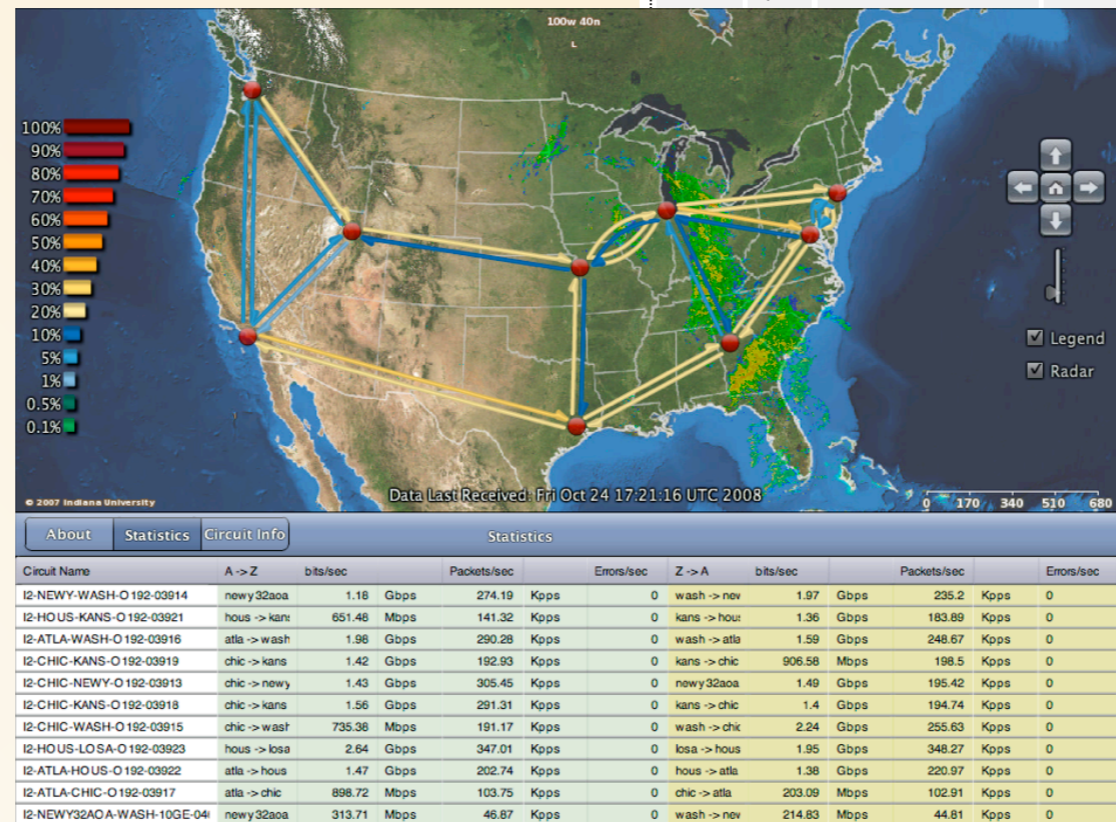
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Early GMOC Functions

GENI Operational Data Views

- Give GENI-wide view of operational status

- Provide Interface for researchers needing operational data about past or present GENI

  - Programmatic

  - User-centric

Emergency Stop

- Find out-of-control slices
  - reports of abuse
  - slices impacting others unexpectedly
- Probably a combination of direct shutdown/isolation & indirect deprovisioning

Defining the Common Operational Dataset

The Approach

- It will need to be a collaborative effort

    - We will be contacting anchors and related projects for input

    - Each project may share different kinds/amounts of operational data

- Initially, we'll be concentrating on operational data about components/aggregates and their interconnections,

- Additionally, we may want to access information about the mapping of that data to slice data

    - use case: slice A needs emergency shutdown. which aggregate(s) need to act?

    - use case: what slices were affected by the outage on component B?

    - use case: what was the state of GENI during the life of my experiment on slice C?

Potential Types of Operationally Significant Data

1. System-wide View

2. Operational Status

3. Utilization Data

4. Specialized Data

Types of Operational Data - Topology

- What exists at a given time on GENI, from an operational viewpoint

- System Component/Aggregate perspective: What's the current state of interconnected components/aggregates?

- Slice perspective: What interconnected components support a given slice?

- Requires data about topology of aggregates/components, and the mapping of slice to component.

- This data might come from experiment tools, clearinghouses, or aggregate managers

Types of Operational Data-
Operational Status

- The operational state of a given component, sliver, aggregate, or slice

- Potential States
  - Up
  - Down
  - Impaired

- May also include additional specific info (i.e. how is it impaired, or why is it down)

- Basic guidelines would be useful to encourage common definitions for these

Types of Operational Data - Utilization Data

- Utilization Data - Data about the data flowing on GENI components, slices, backbones, etc

- Some things might be fairly common

  - Link utilization

  - CPU utilization

  - Memory utilization

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Types of Operational Data - Specialized Data

- Some things will be specific to the type of component

  - latency/jitter

  - signal strength

  - error counts (network links)

- There should be a way for aggregates/components to create their own types of this

Deliverables Timeline

- **by GEC4:** Demonstrable active data sharing with some other projects

- **6 Months:** First version of Common Operational Dataset defined

- **6 Months:** Initial Data Format and Protocol defined

- **6-12 Months:** Emergency Shutdown & GENI Operational Data View

Months 1-6   Months 7-12

Define Common Operational Dataset   Define Data Format & Protocol   GMOC Functions