Intelligent Data Movement Service
Shakedown Experiments

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Goals

- Create a distributed, dynamic data storage and movement service as a long-running GENI experiment
  - Aim high, then deal with reality!

- Distributed across many GENI aggregates, dynamism through responsiveness to network measurements

- Use existing, proven services as core components

- Allow for opt-in users to use IDMS as a functional system
  - Collect "real-world" data and adjust/optimize as necessary

- Explore the limits of GENI resource allocation capabilities

Components

- **Storage depot**
  - IBP implementation from our colleagues at LoCI and ACCRE
  - Manages physical storage, allows for distributed "allocations"
  - Build upon existing client tools

- **Network Controller**
  - XSPd, session protocol interface for dynamic network control
  - Communicates with ION and OpenFlow

- **WAN Acceleration**
  - Phoebus software router, uses XSP for signaling
  - Deploy near backbone paths

- **Experiment I&M**
  - UNIS for service registration and discovery, plus tracking experiment resources
  - Active and passive measurements over experiment lifetime

- **Data Manager Service (new)**
  - Dynamic resource allocation and ervice placement
  - Algorithms for effective data distribution

Resource allocation and instantiation
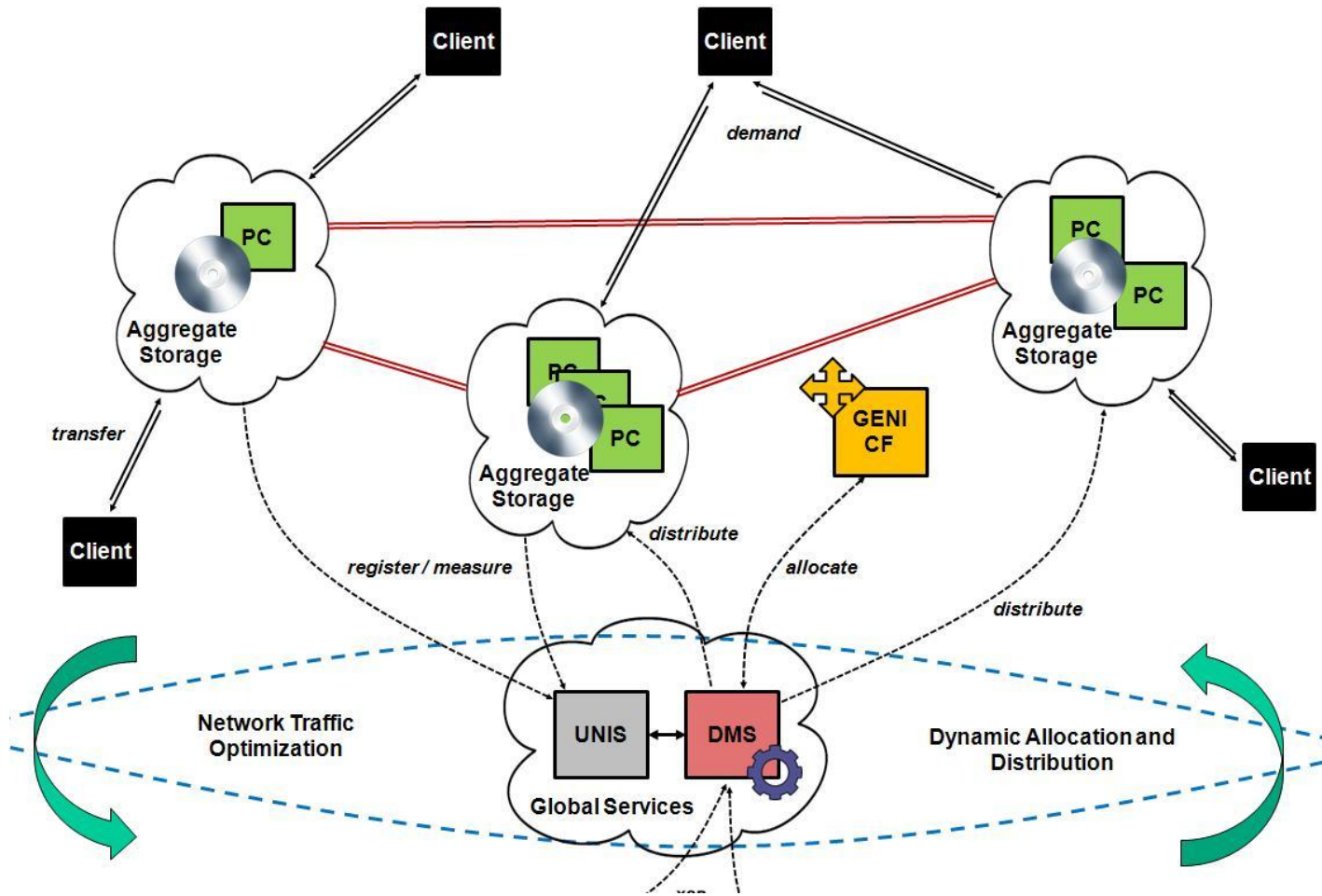
Network optimization
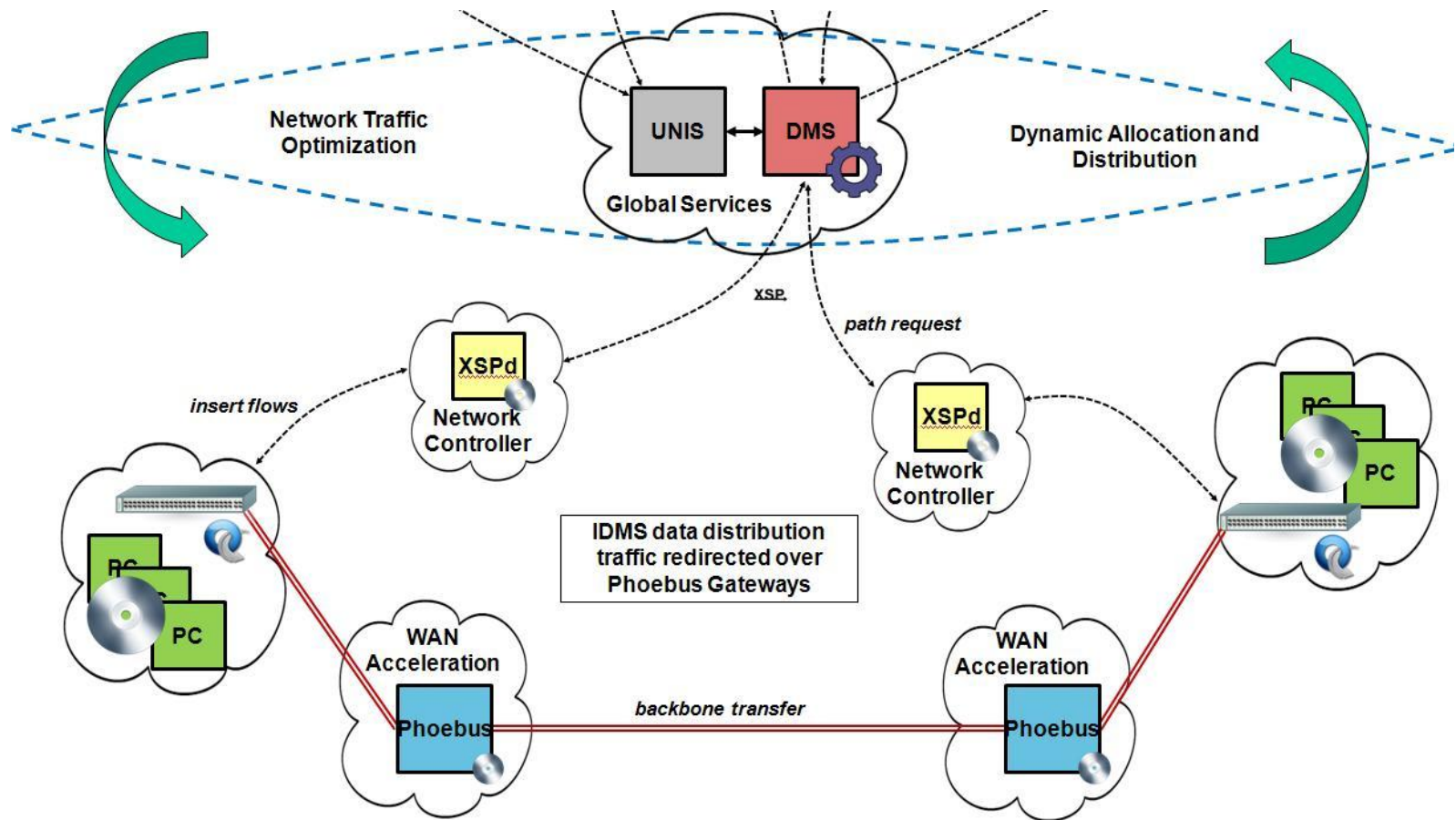
GENI Resources

- Racks for storage and control appliances
  - Leverage both InstaGENI and ExoGENI deployments

- "sliverable" storage
  - Recent addition to ExoGENI

- Backbone PCs
  - ProtoGENI and elsewhere, suitable for WAN acceleration

- FOAM aggregates for traffic flow optimization and redirection

- GENI I&M

- Existing GENI CF interfaces
  - Omni and stitching tools

Challenges

- Availability of resources
  - Experiment design requires resiliency in the face of failures

- Aggregate storage capacity
  - Limits on user data may need to be enforced

- Understanding and reacting to network conditions
  - Building a non-trivial data management service
  - Do intra-slice measurements give us the right level of visibility?

- Compatible AuthN/AuthZ for users
  - Existing services already use GENI-compatible PKI mechanisms
  - Clients, scripts, and potentially a webGUI

Reporting and availability

- Appliance images
  - IDMS services plus skeleton images

- Code repositories

- Experiment log
  - Experiences and specific GENI troubleshooting advice

- GENI Wiki

  - Progress reports
  - Links and references to everything abve

Thank you!

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