

# Round Table Discussions: Pervasive Grids

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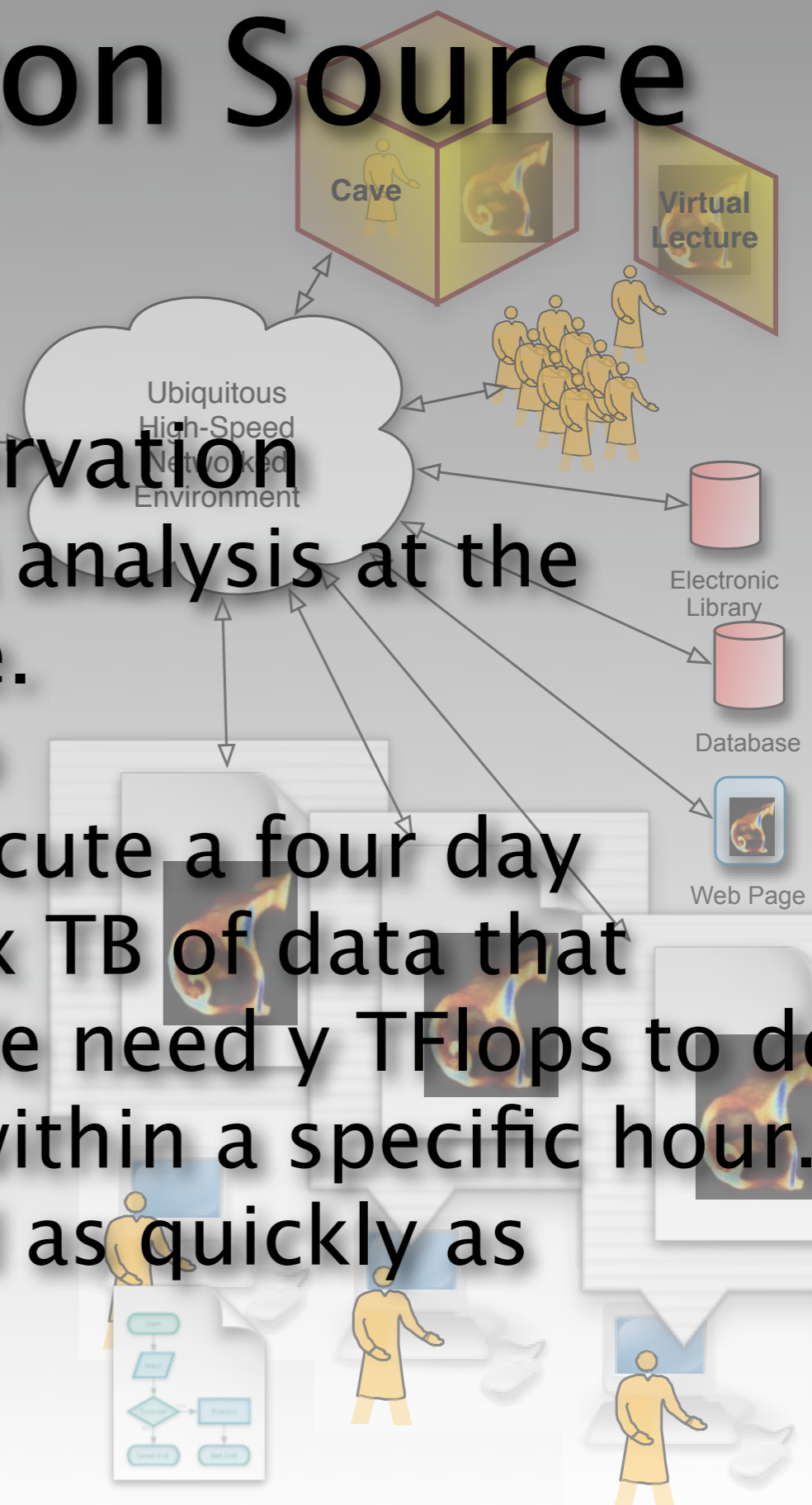
Starting August 1st: rit.edu  
Home page, Google: "Gregor Grid"  
Looking for: 3 PhD students 1 PostDoc

- I do not start with the definition ...

# What are the Applications and their Requirements?

# Advanced Photon Source

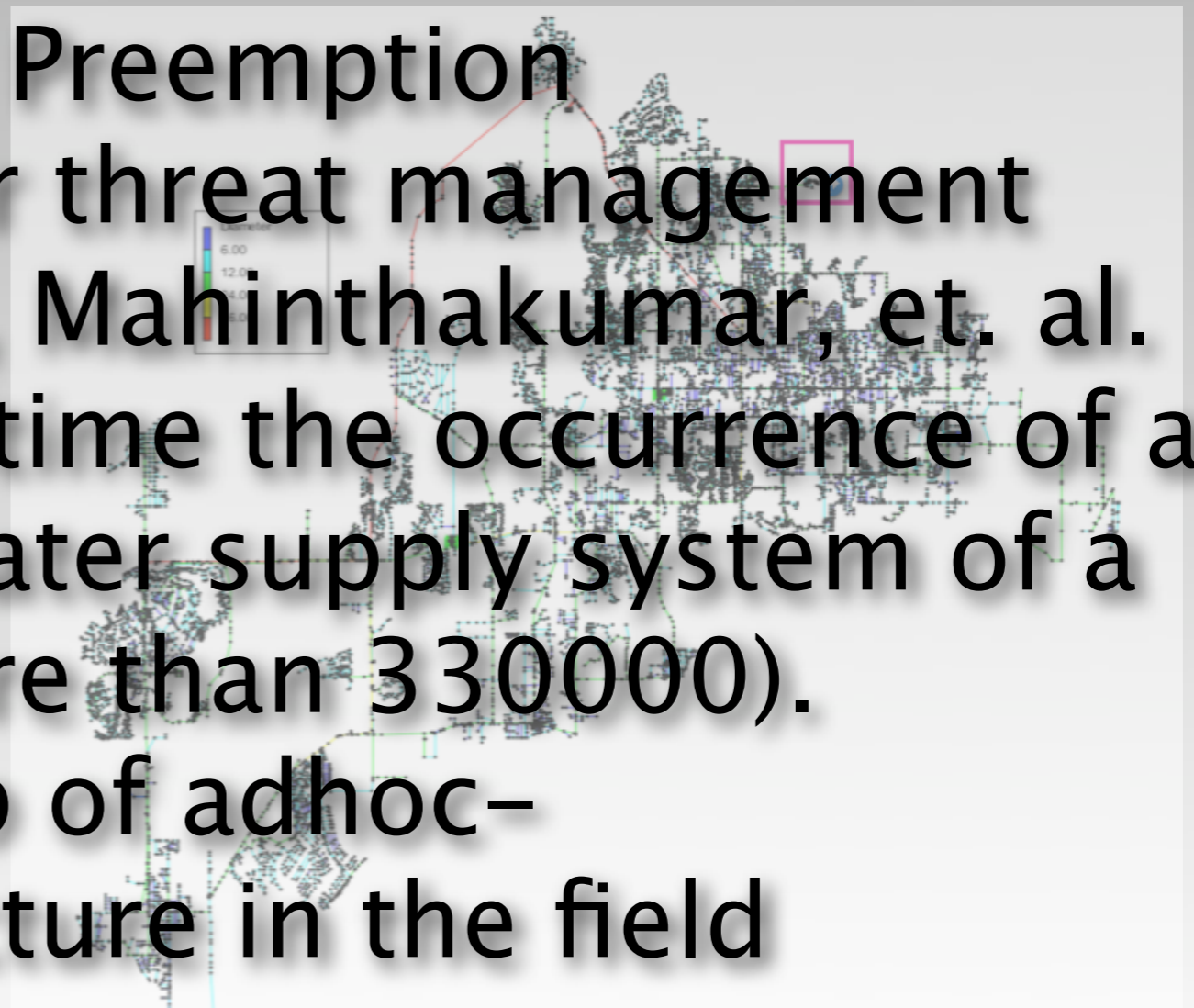
- Resource as a “service”
- Need for Resource Reservation
  - Example: Real time data analysis at the advanced photon source.
  - von Laszewski, De Carlo
  - On mm/dd/yyyy we execute a four day experiment and gather x TB of data that needs to be analyzed. We need y TFlops to do an analysis in realtime within a specific hour. Data needs to be moved as quickly as possible between



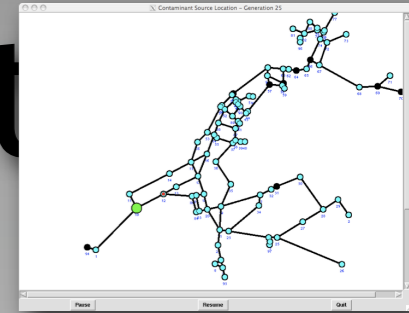


# Typical Requirements

- Ad-Hoc requirement in case of an emergency
- Need for Service Preemption
  - Example: Water threat management
  - von Laszewski, Mahinthakumar, et. al.
  - Analyze in realtime the occurrence of a threat in the water supply system of a whole city (more than 330000).
  - (Future:) Set up of adhoc-cyberinfrastructure in the field

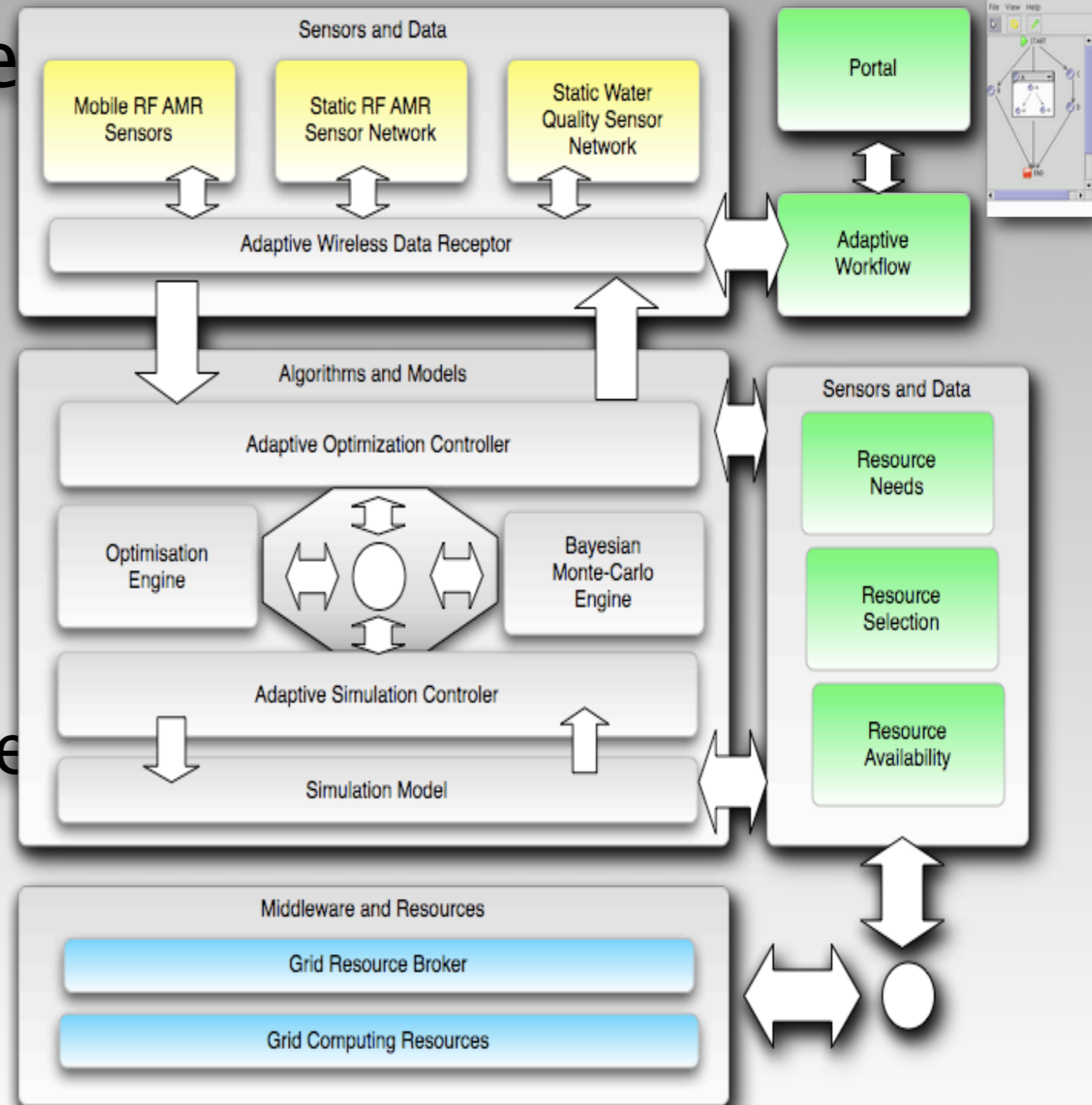


# Water Threat Management



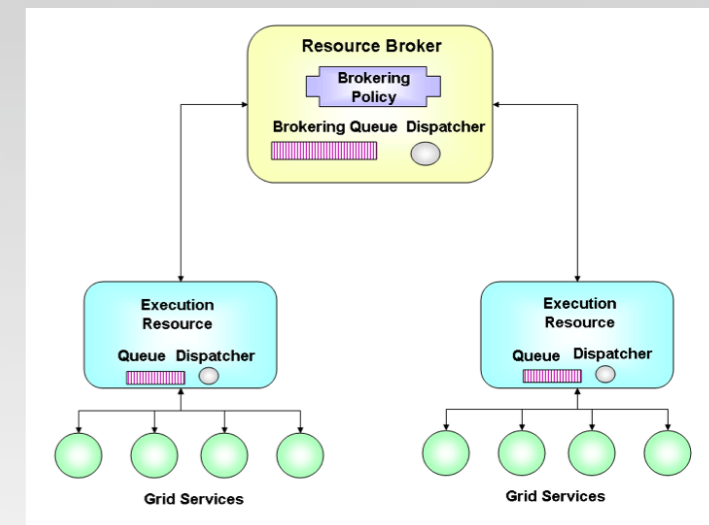
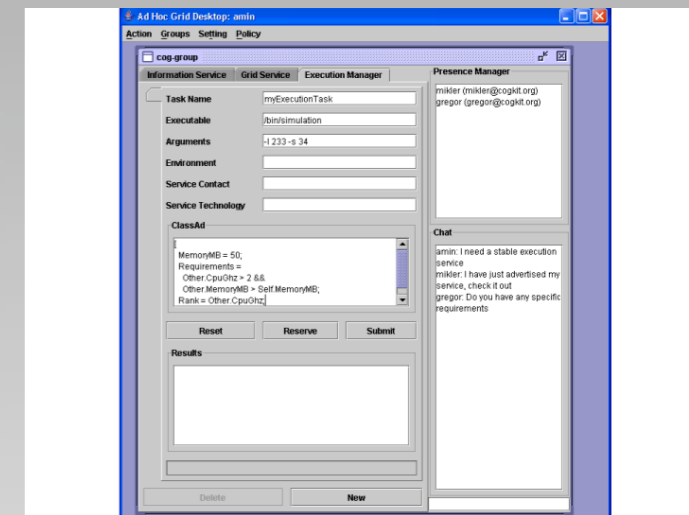
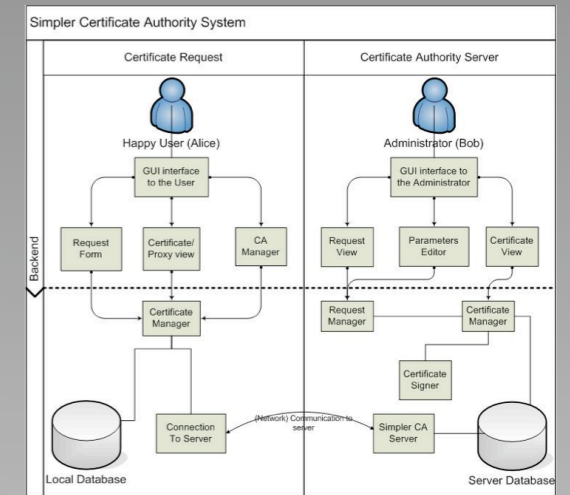
- **Dynamic Data-Driven Application System**

- **Application**
  - Water System
- **Dynamic**
  - Data
  - Optimization
  - Simulation
  - Workflow
  - Computer Resources
- **Data Driven and Vice Versa**
  - Water Demand Data
  - Water Quality Data



# Ad-Hoc Grids

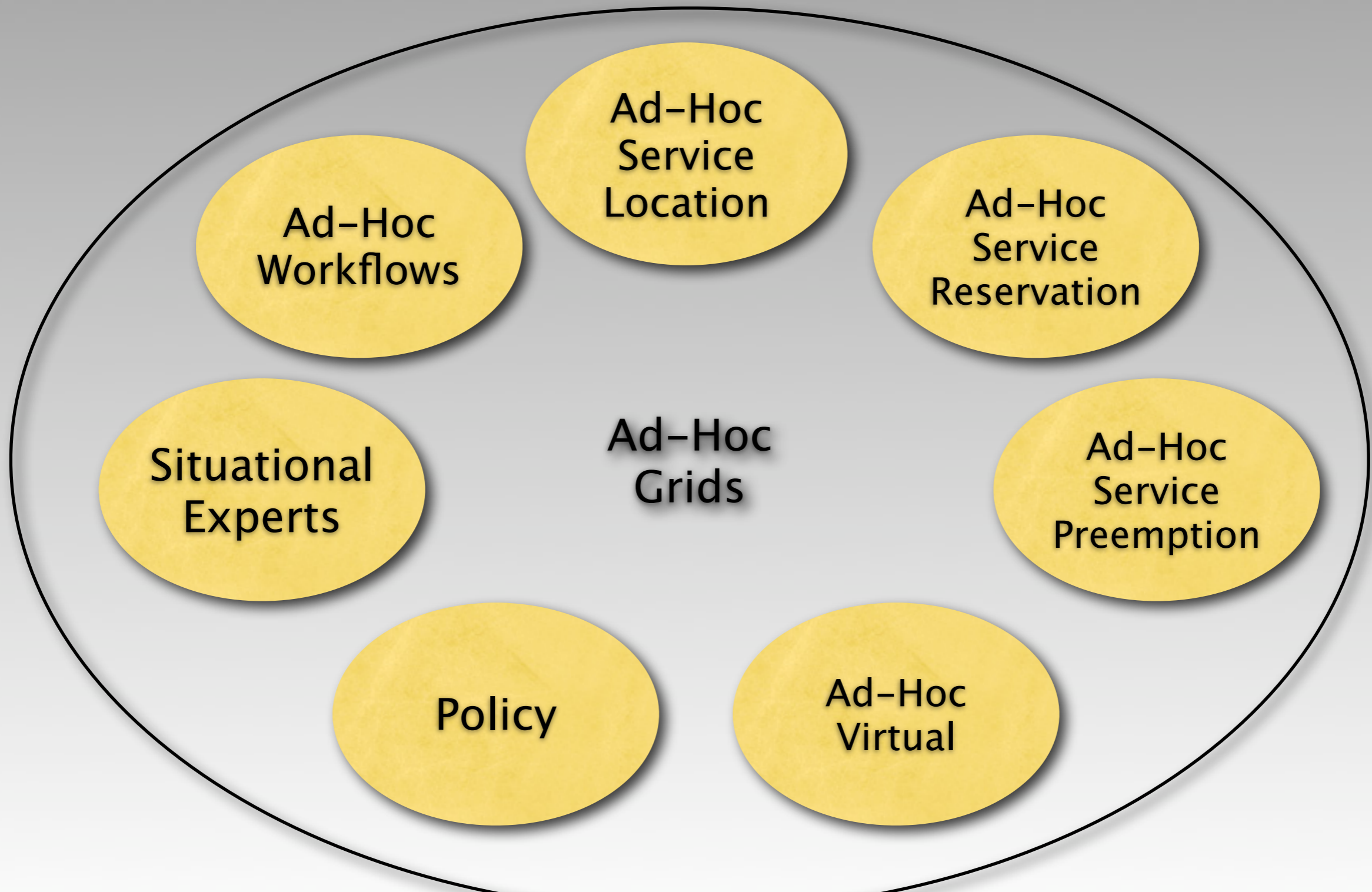
- Objective:
  - create a VO in a spur of a moment
  - share resources that are contributed
- Approach:
  - create a Certificate authority
    - best thesis award at Polytechnic New York
    - Sosonkin, von Laszewski
  - integrate the communities resources
    - ad-hoc community registry
    - ad-hoc service match making
    - ad-hoc reservation service
    - PhD thesis on Ad-Hoc Grids, K. Amin, G. von Laszewski



# Ad-Hoc Workflows

- Objective:
  - Scientific workflows may change during runtime
- Approach:
  - [www.cogkit.org](http://www.cogkit.org) contains a sophisticated workflow engine called Karajan.
  - Specification of workflows in XML and functional programming language.
  - Ad-hoc rendering of workflows and inputs
  - Workflow service
- For more info: [gregor@mcs.anl.gov](mailto:gregor@mcs.anl.gov)

# Ad Hoc Grids



# What are the Challenges?

- Focus here: Focus on infrastructure:
  - others have pointed out other challenges
- Create middleware
- Create “upperware”
- Community consensus
- Standard consensus
- Scalability vs functionality
  - (consider 1 billion DNA sequences in health care)
- Security vs free access
- System needs QoS (incl. sporadic

# What is a Pervasive Grid?

- Pervasive Grid =
  - Is the term needed?
    - Are Grids anyways pervasive?
      - Example power Grid is pervasive
    - Is it similar to an Ad Hoc Grid?
  - PG = Cyberinfrastructure?
    - There is more than Grid CI adds these things.
  - We should not know that the Grid is

# Will the Pervasive Grid be Realized?

- Despite of the new term,
- Yes, we are working on things ...
- Should we use breadcrumbs such as
  - Ubiquitous Cyberinfrastructure
  - Pervasive Cyberinfrastructure
- to rescue Hänsel und Gretel?
- Someone has to pay the ticket for Hänsel and Gretel to go through the forest ....  
Maybe we can feed them this way pastry instead of bread crumbs ;-)

- Evaluate the term with care
- Ecosystem =
  - sum of all energies in an ecosystem is constant
  - What is the energy equivalent = knowledge
  - I do not like the term Ecosystem
- If this were to work the hope is
  - the sum of all new inventions from a PG is hopefully exponential