

# LONI Institute All Hands Meeting

Edward Seidel

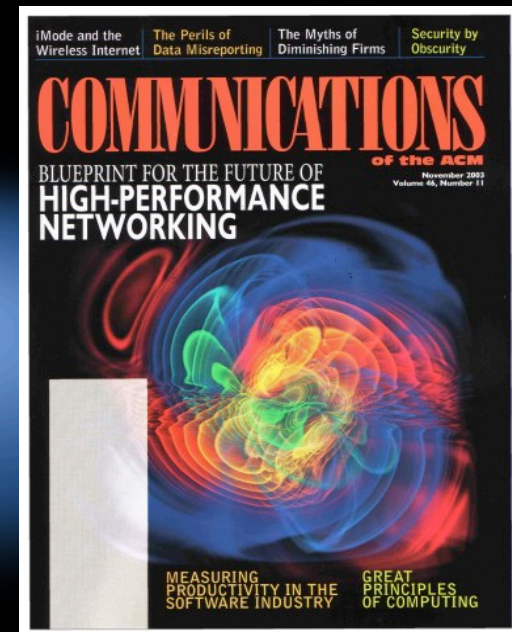
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Center for Computation & Technology

Louisiana State University

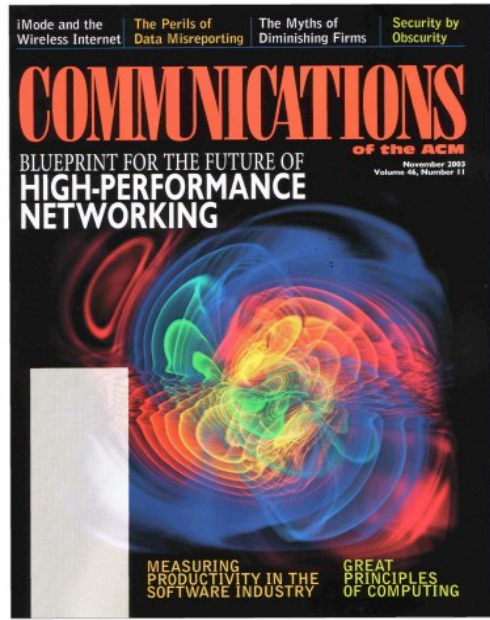
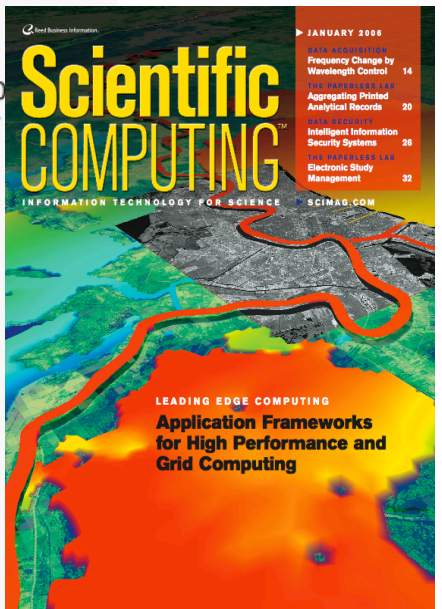
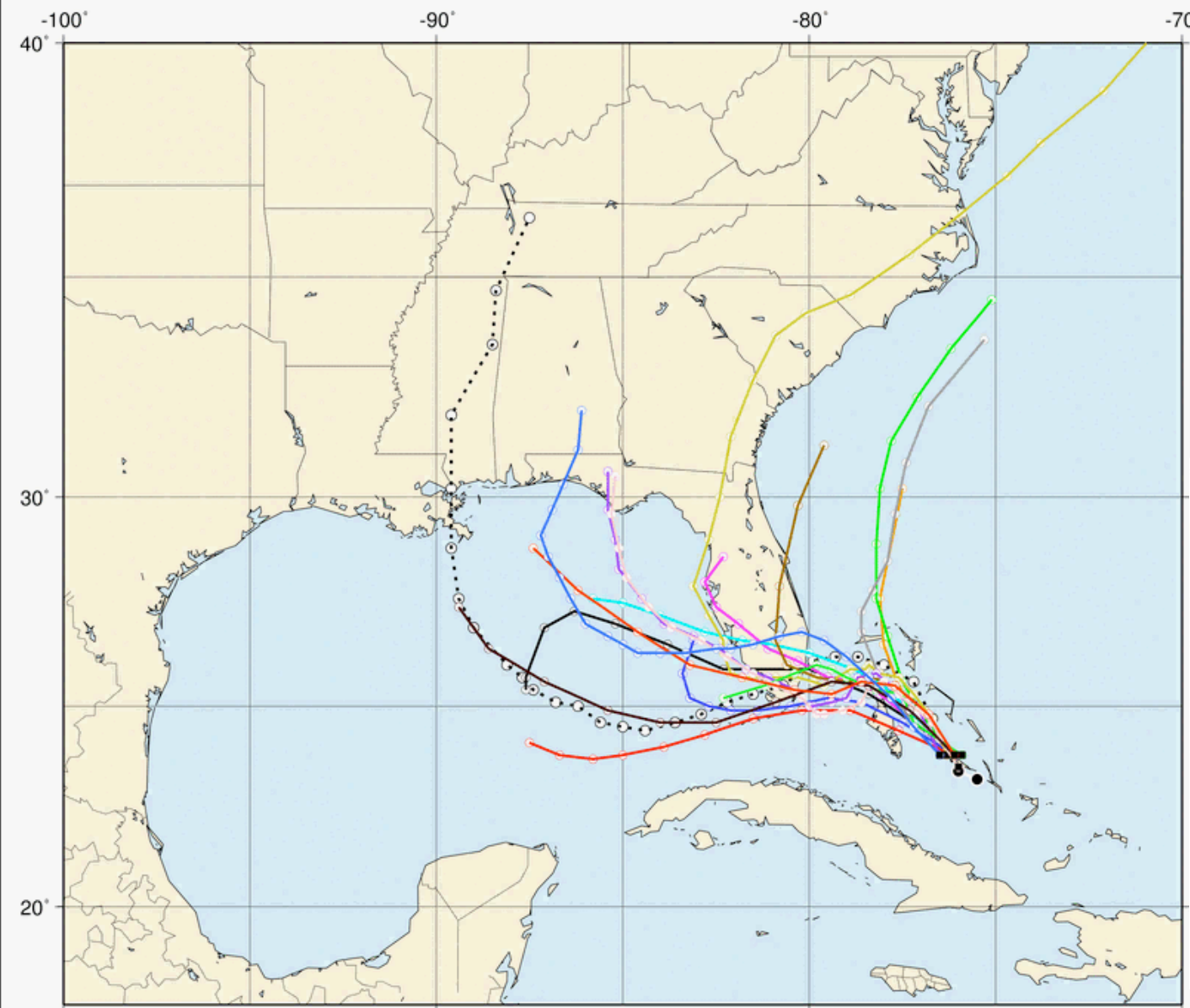


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# Sharing Solutions for Complex Problems



# Science, Engineering, Society are being Transformed

- Complex problems require totally new methodologies
  - Scale computing beyond current experience...
  - Large scale data, beyond...
  - Large scale collaborations, beyond...
- Good news!
  - Cyberinfrastructure!
- Not so good news!
  - We are not moving fast enough, spotty CI coverage!

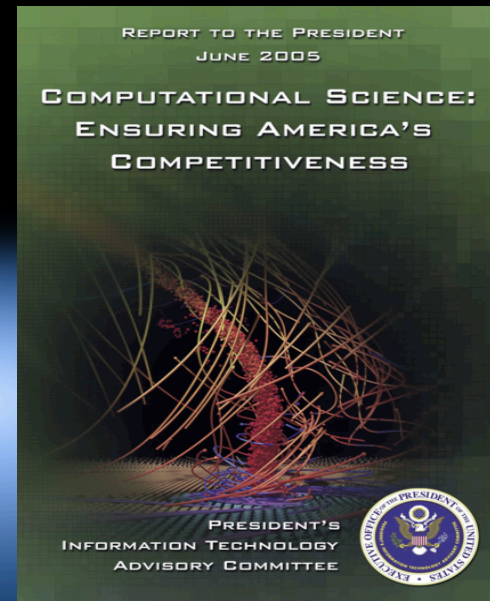




# Collaborations for Complex Problems PITAC Report Summary



*“Universities must significantly change organizational structures: multidisciplinary & collaborative research are needed [for US] to remain competitive in global science”*





# Louisiana as CI Testbed

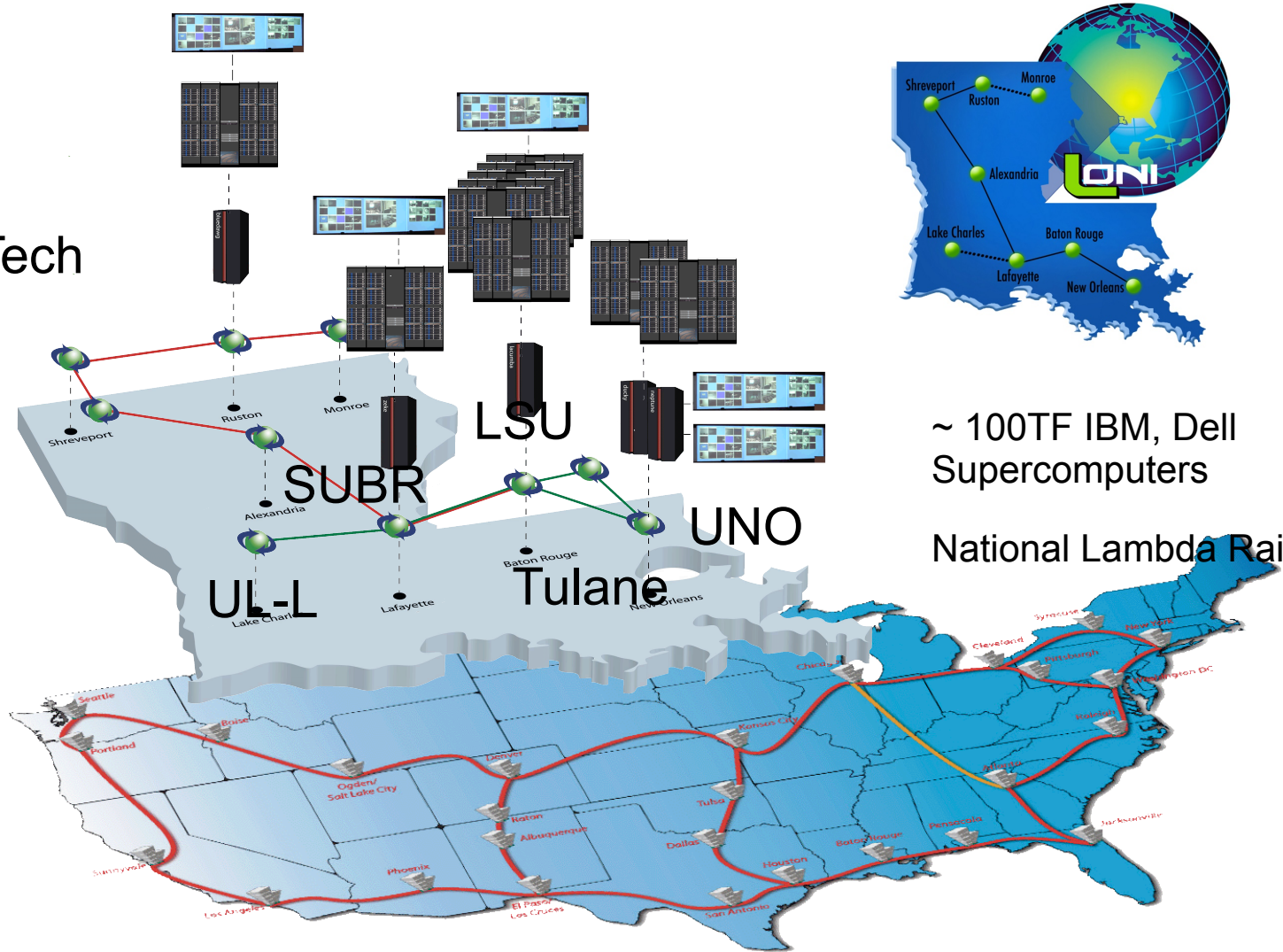
## *A Case Study of Shared CI*

- 4 Layers: Each reinforces the next
  - 2001-3: Vision 2020
    - Gov. Foster: \$25M annual across 5 campuses
    - “IT = Economic development”
    - 2003: CCT, \$9M annual at LSU, LITE Center, ULL
  - 2004: LONI and its impact
    - Gov. Blanco: \$40M + \$10M infrastructure
  - 2007: CyberTools
    - \$12M Statewide NSF/EPSCOR CI project
    - Many other multisite projects
  - 2007: LONI Institute and beyond
    - \$15M Statewide project to recruit people



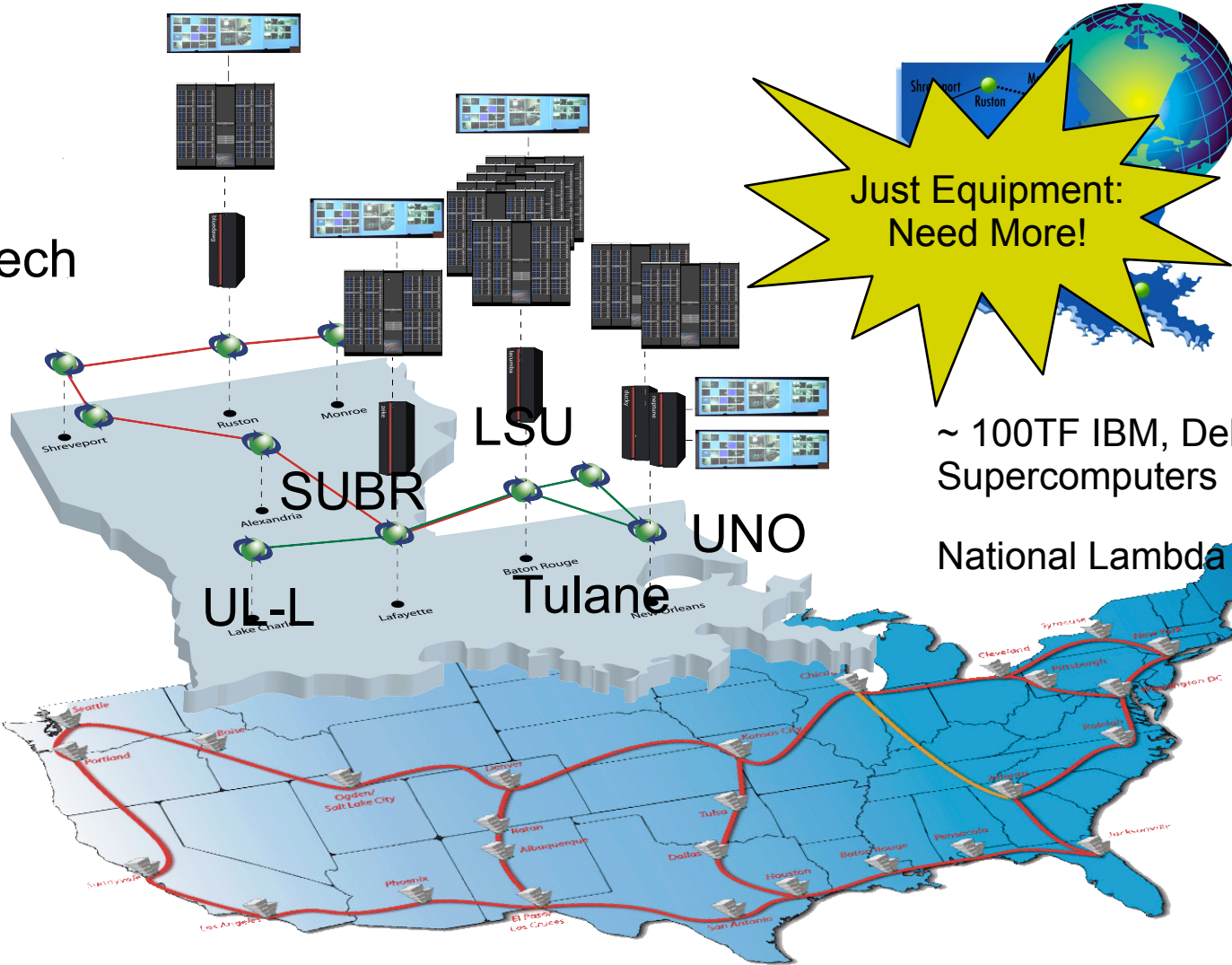
# Layer 2: LONI

LA Tech



# Layer 2: LONI

LA Tech



Just Equipment:  
Need More!

~ 100TF IBM, Dell  
Supercomputers

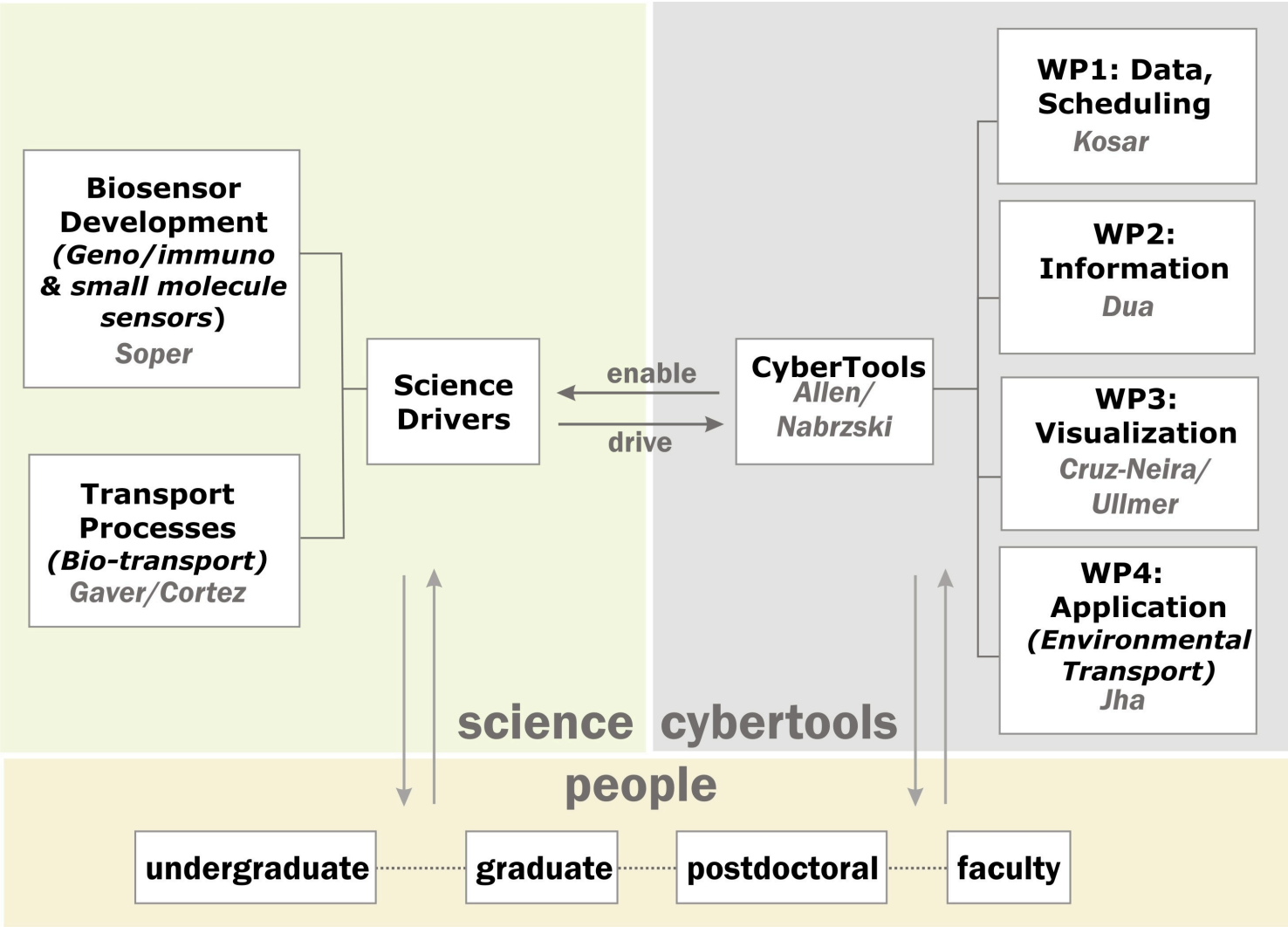
National Lambda Rail





# Project Organization (Sept 1)

## *Tools Integrated with Science Drivers*

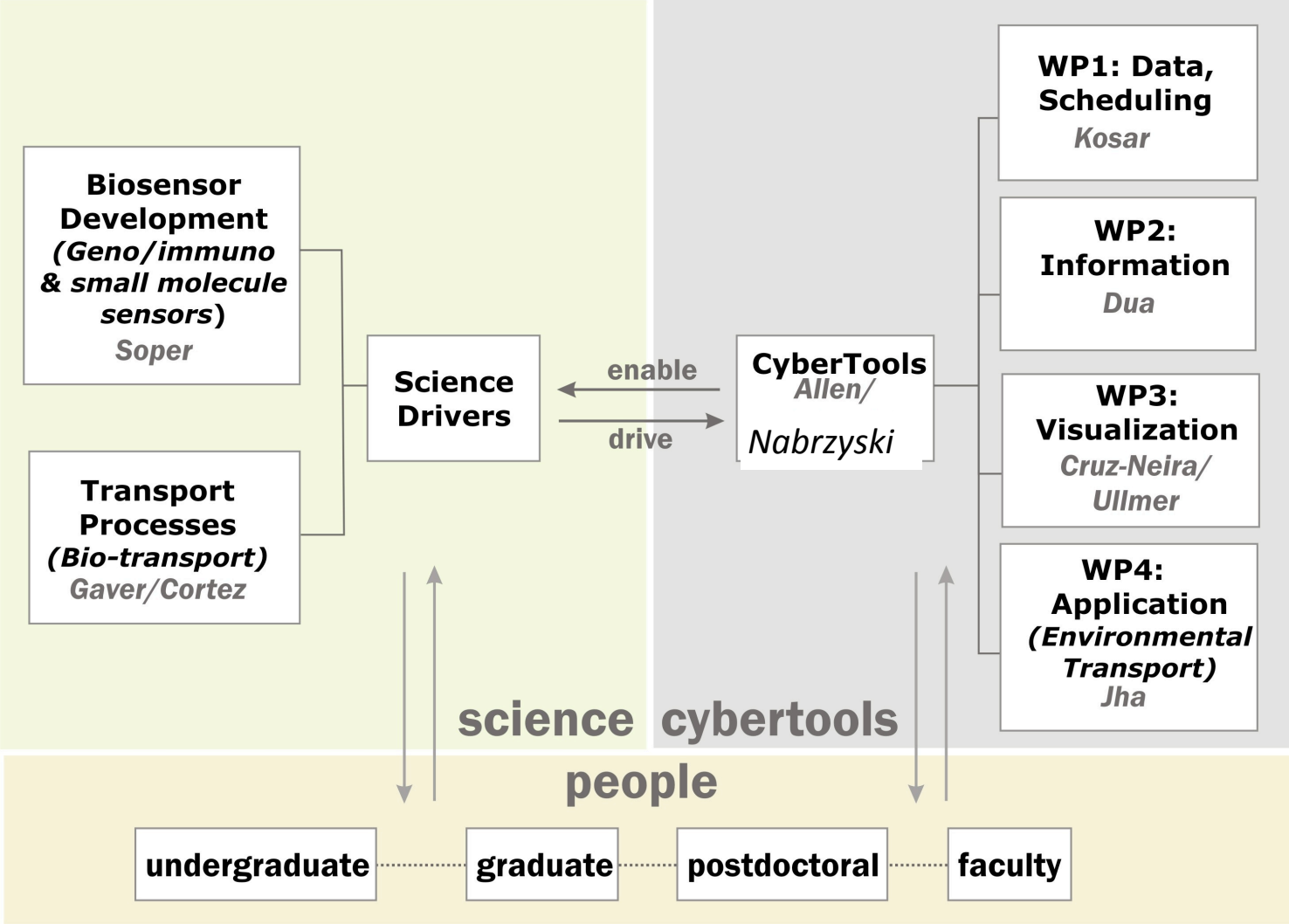


- WP teams include SD researchers



# Project Organization (Sept 1)

## *Tools Integrated with Science Drivers*



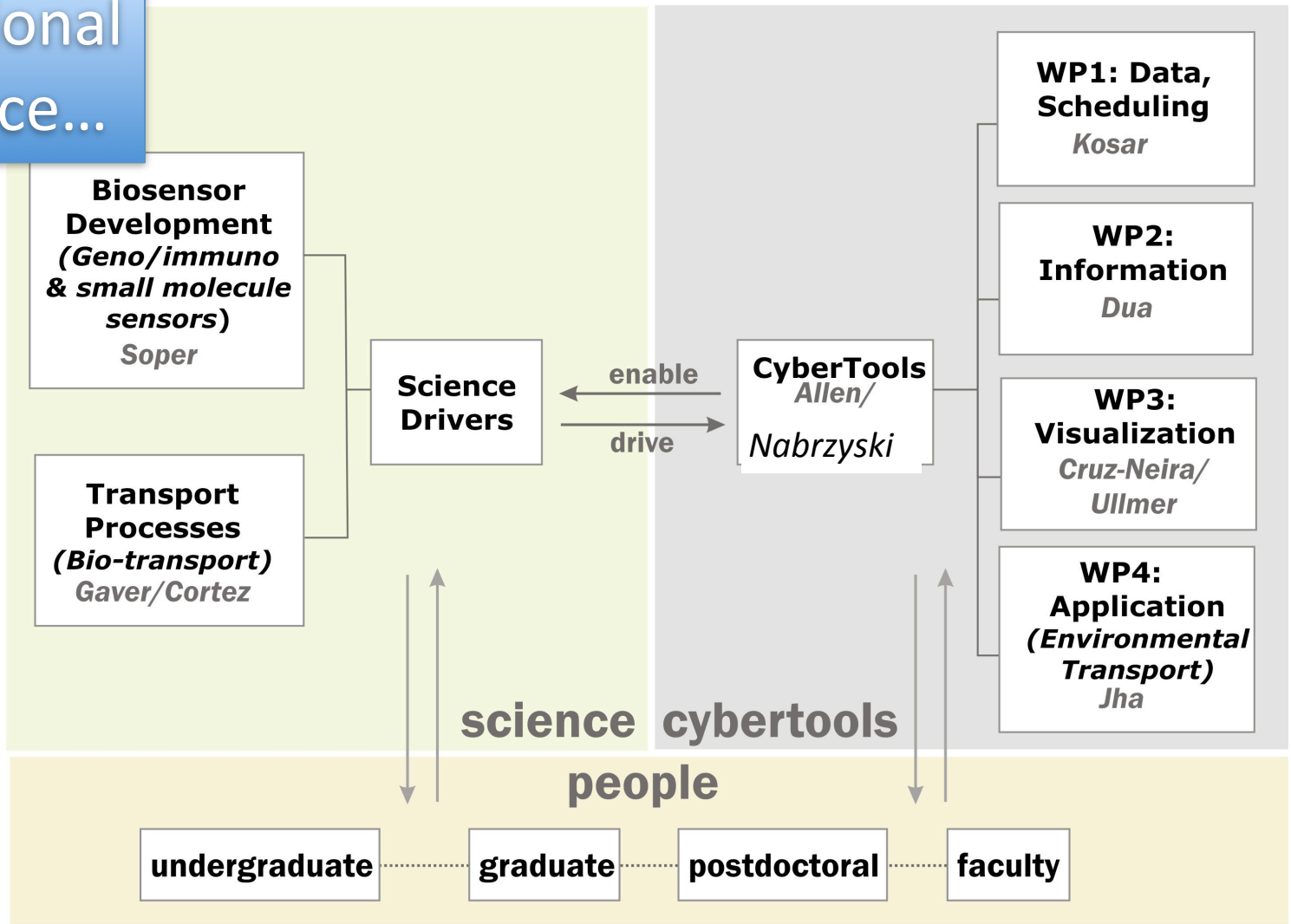
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# Project Organization (Sept 1)

## *Tools Integrated with Science Drivers*

Additional Science...



- WP teams include SD researchers





# Project Organization (Sept 1)

## *Tools Integrated with Science Drivers*

Additional Science...

**Biosensor Development**  
(*Geno/immuno & small molecule sensors*)  
*Soper*

**Transport Processes**  
(*Bio-transport*)  
*Cover/Cortez*

**Science Drivers**

enable  
drive

**CyberTools**  
*Allen/  
Nabrzyski*

**WP1: Data, Scheduling**  
*Kosar*

**WP2: Information**  
*Dua*

**WP3: Visualization**  
*Cruz-Neira/  
Ullmer*

**WP4: Application**  
(*Environmental Transport*)  
*Jha*

Additional Science...



science cybertools  
people

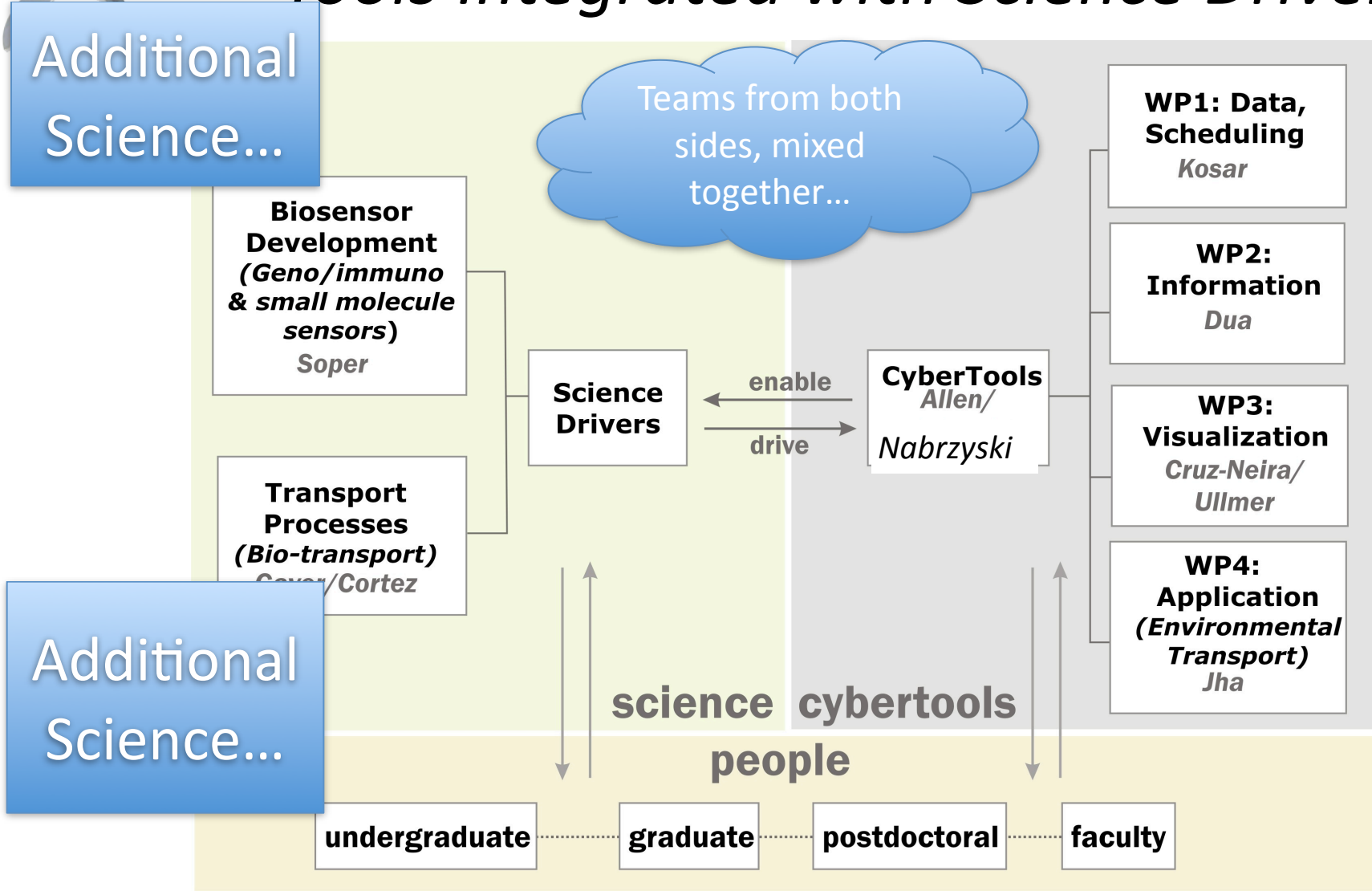


- WP teams include SD researchers

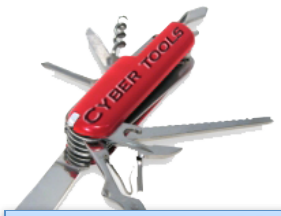


# Project Organization (Sept 1)

## *Tools Integrated with Science Drivers*



- WP teams include SD researchers



# Project Organization (Sept 1)

## *Tools Integrated with Science Drivers*

Additional Science...

Teams from both sides mixed

**WP1: Data, Scheduling**  
*Kosar*

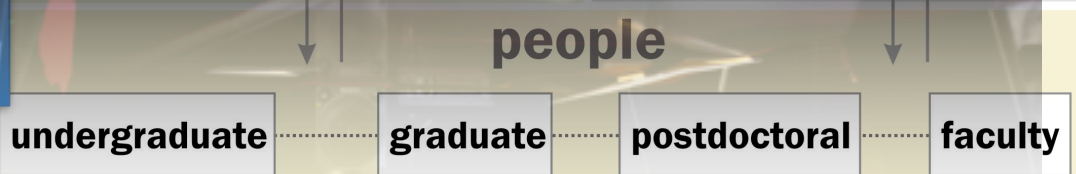
**WP2: Information**  
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**WP4: Application (Environmental Transport)**  
*Jha*



Additional Science...



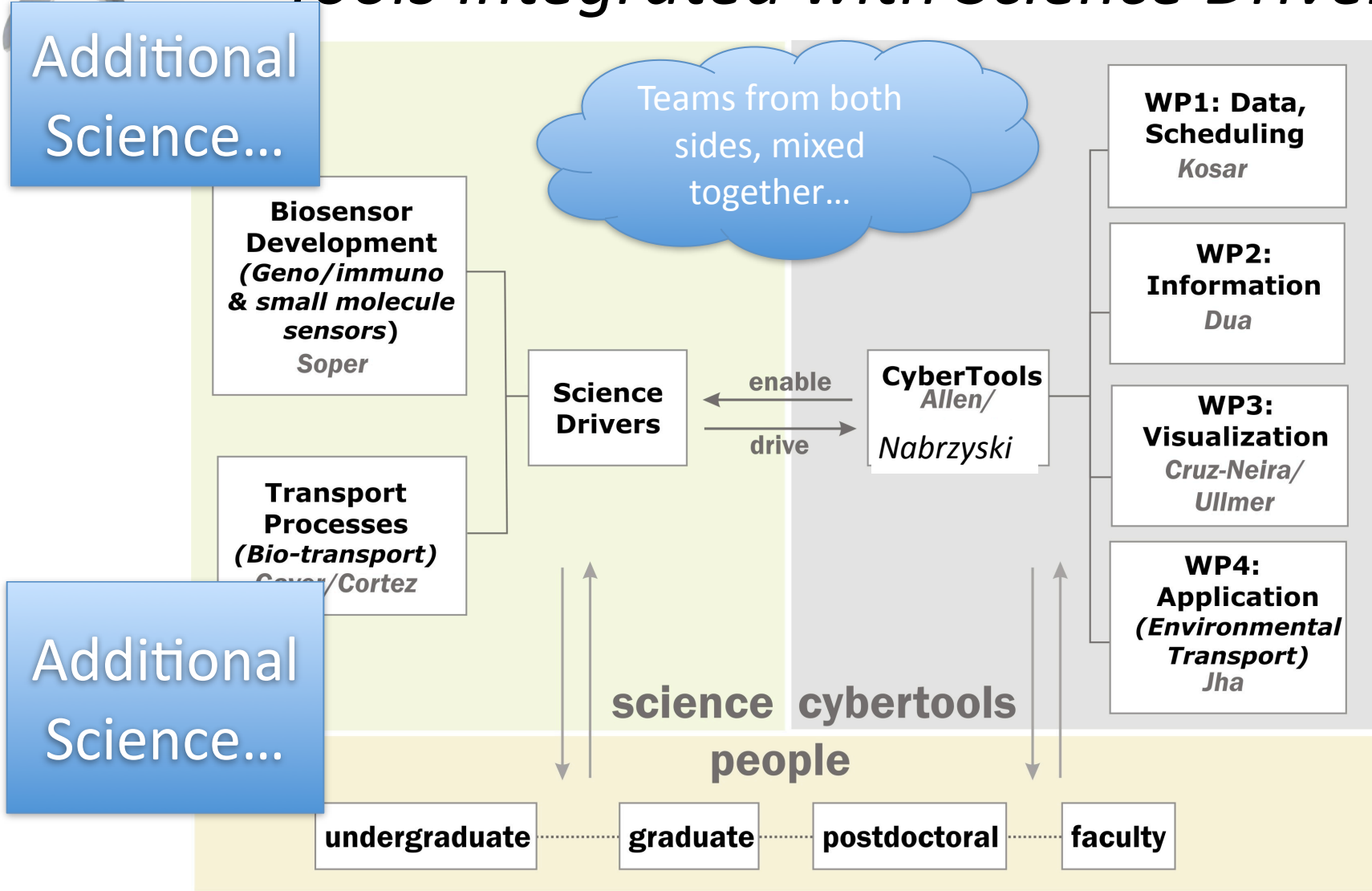
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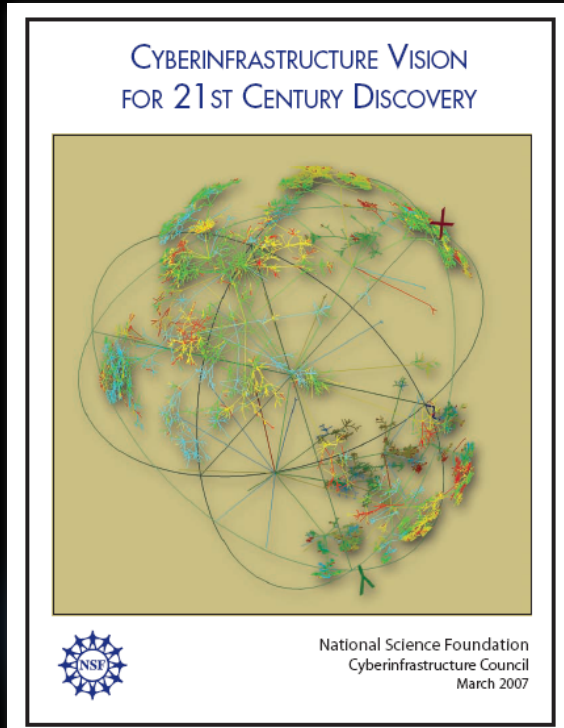
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# Layer 4: LONI Institute

- \$15M, 5-year project
  - 12 new faculty, 18 grads, 6 CI staff!
- Built on LONI infrastructure, create bold new inter-university superstructure
  - Faculty, staff, students focus on CS, Bio, Materials, but all disciplines impacted; digital art & media!
  - Promote collaborative research at interfaces for innovation
- Draws on, enhance strengths of all universities
  - Strong groups recently created; collectively world-class
  - Much stronger recruiting opportunities for all institutions
- Create University-Industry Research Centers
  - Economic development!



# NSF Vision



I. Virtual Organizations for Distributed Communities

2. High Performance Computing

3. Data & Visualization/Interaction

4. Learning & Work Force Needs & Opportunities



# National CI Blueprint

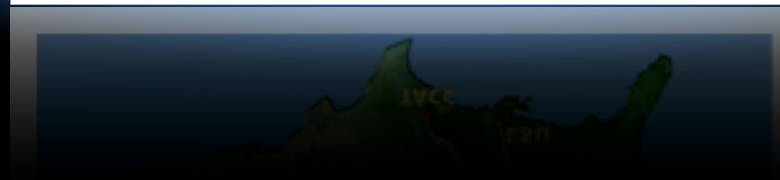


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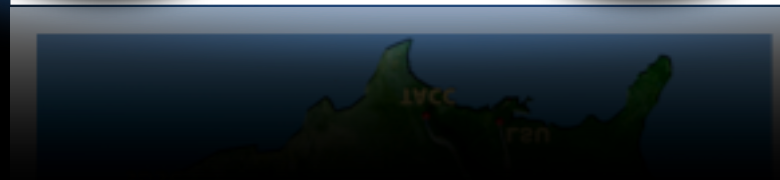
Track 2

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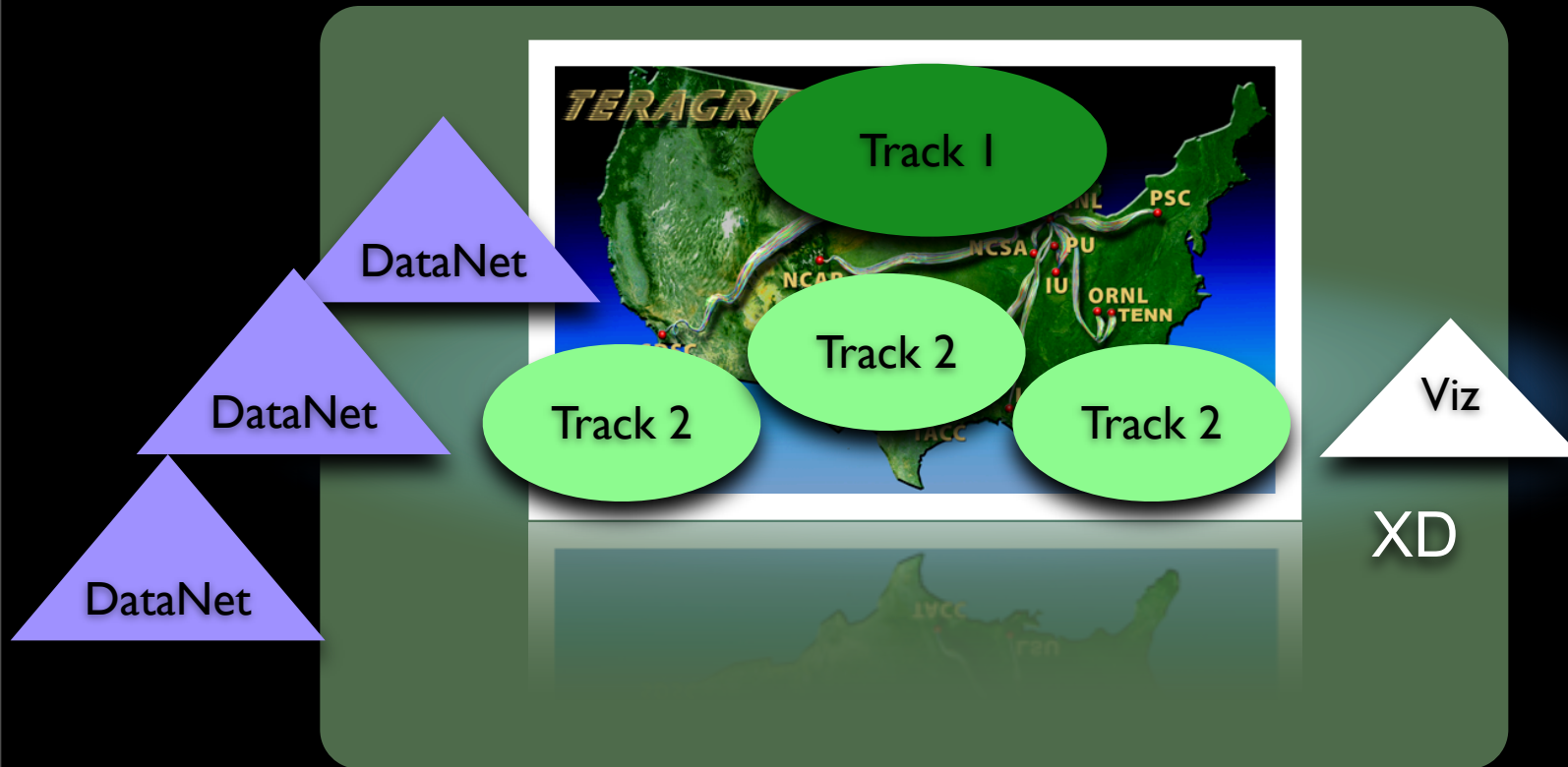




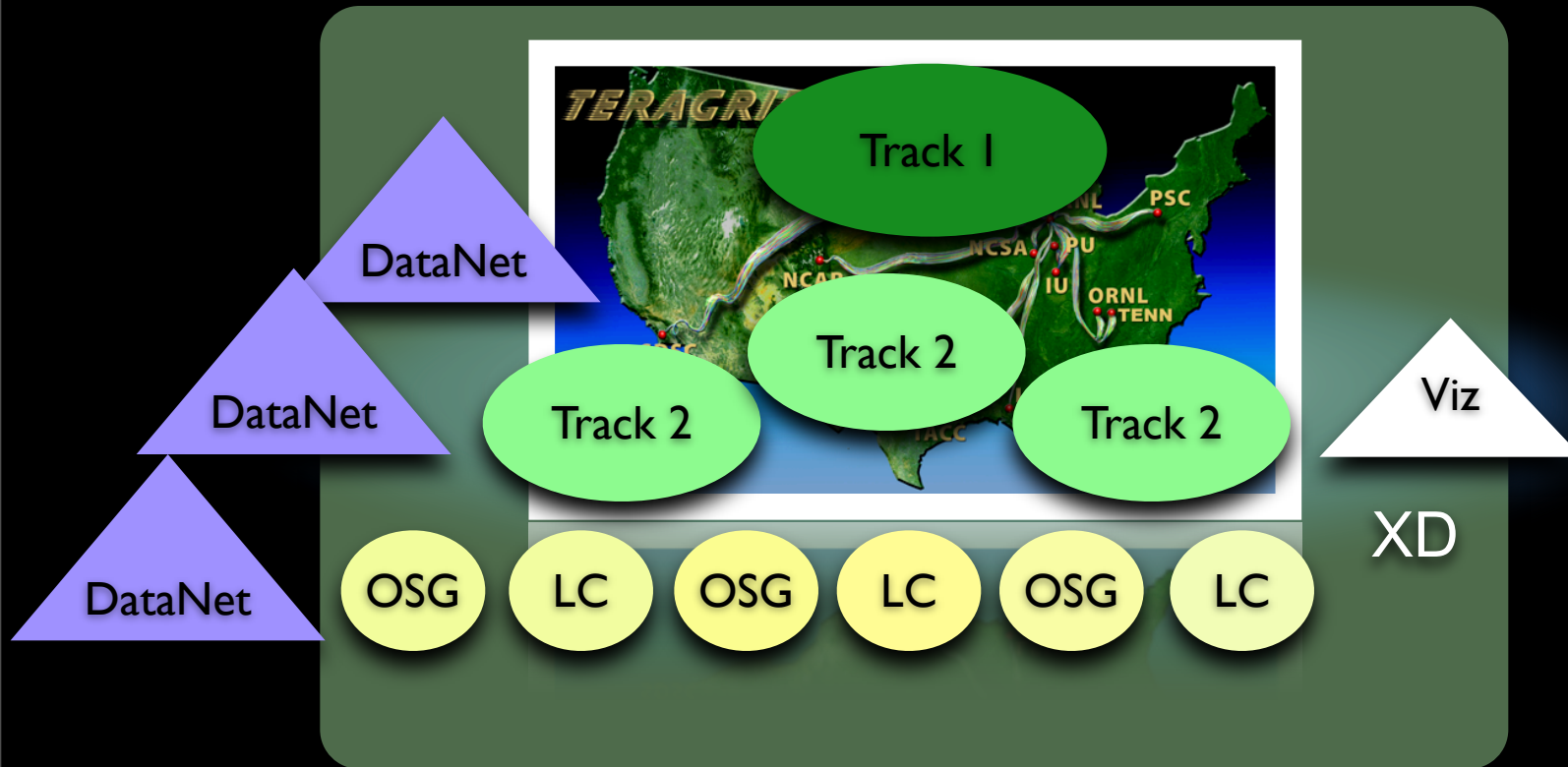
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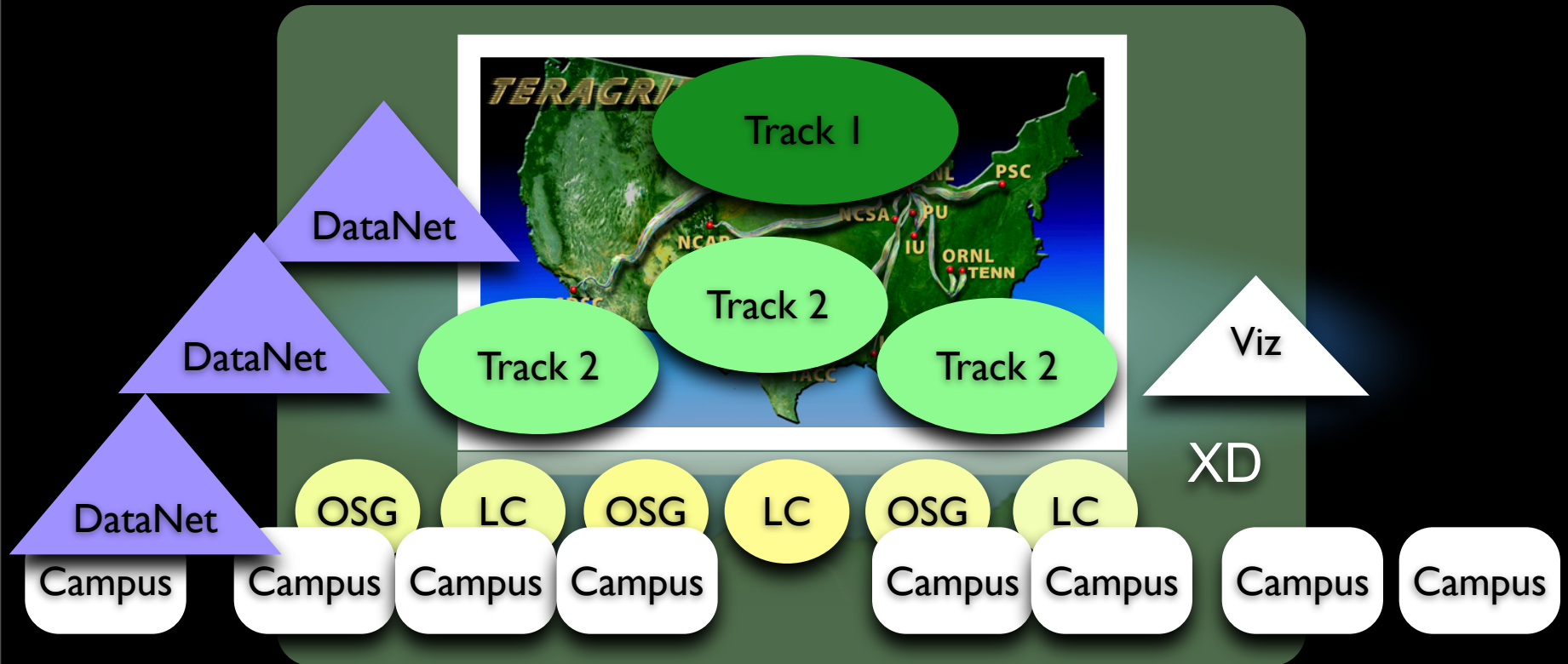
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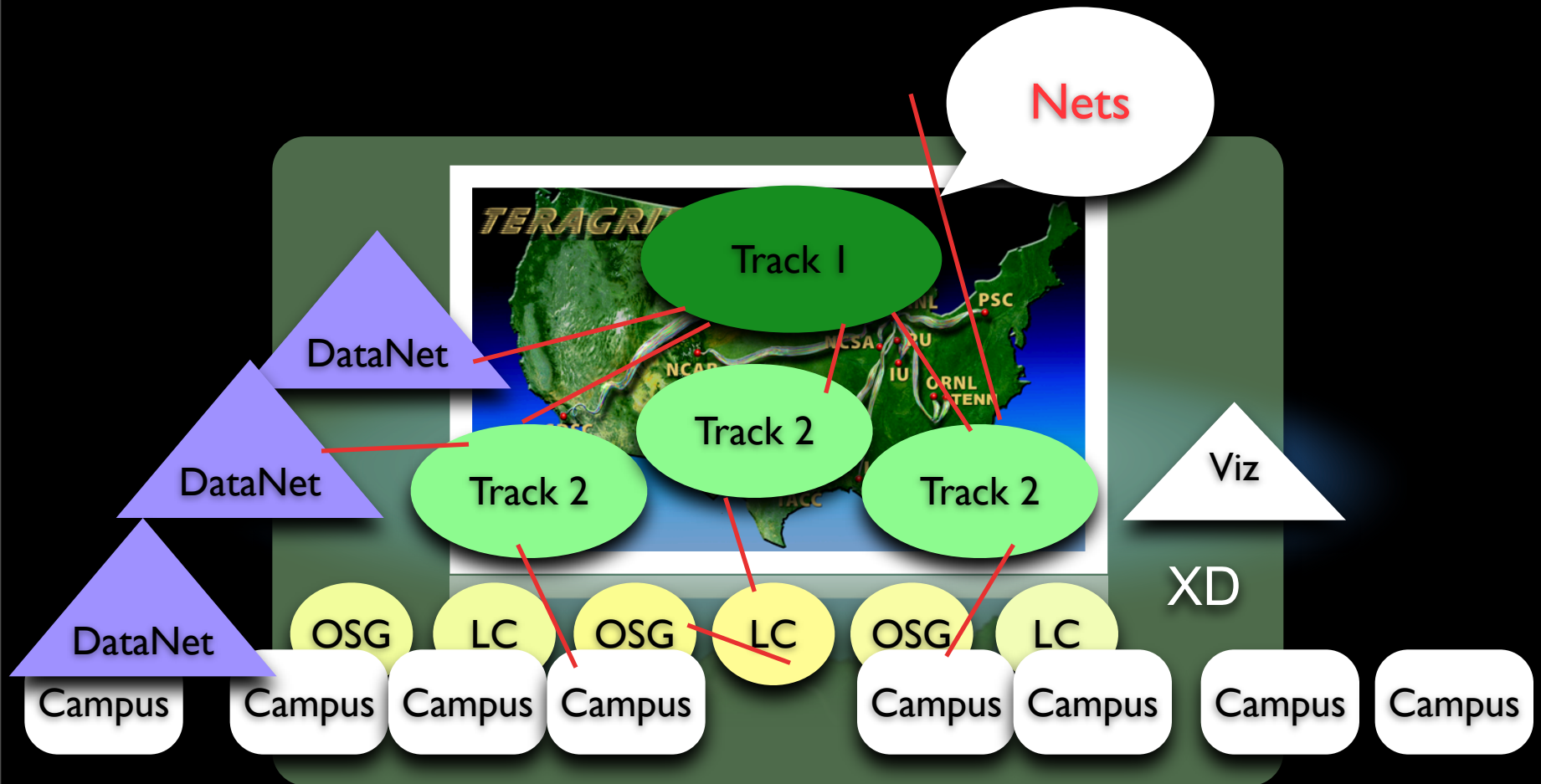


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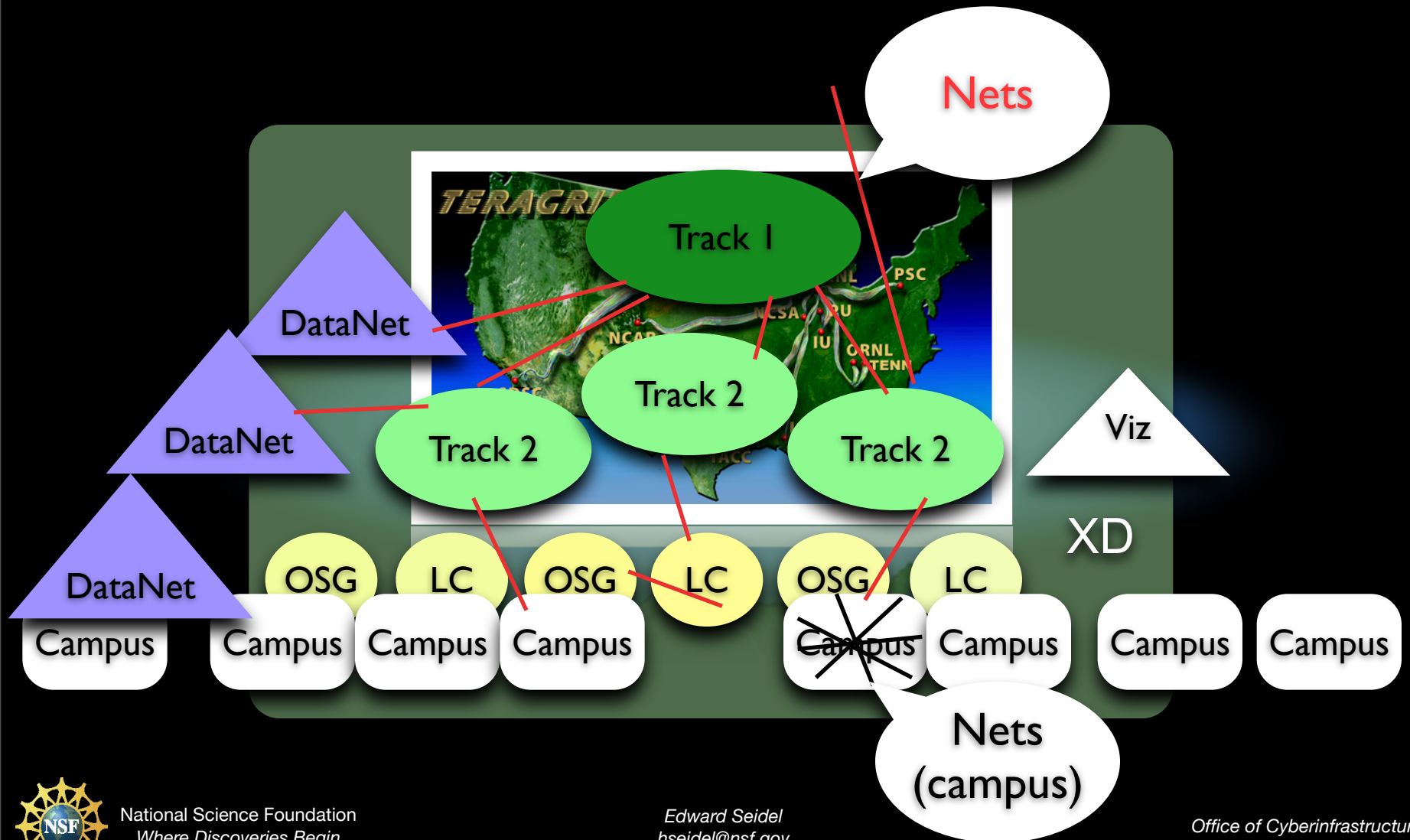




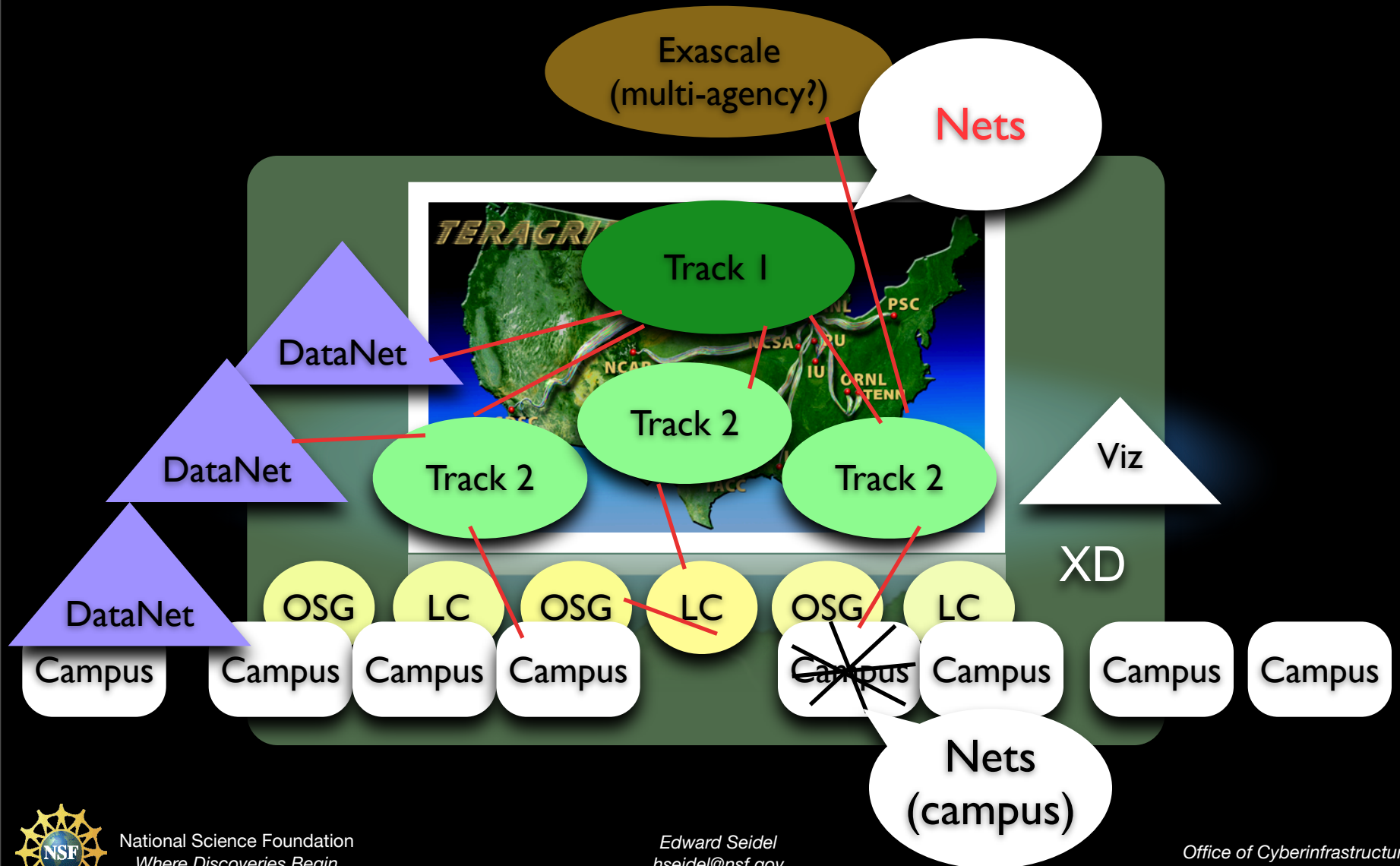
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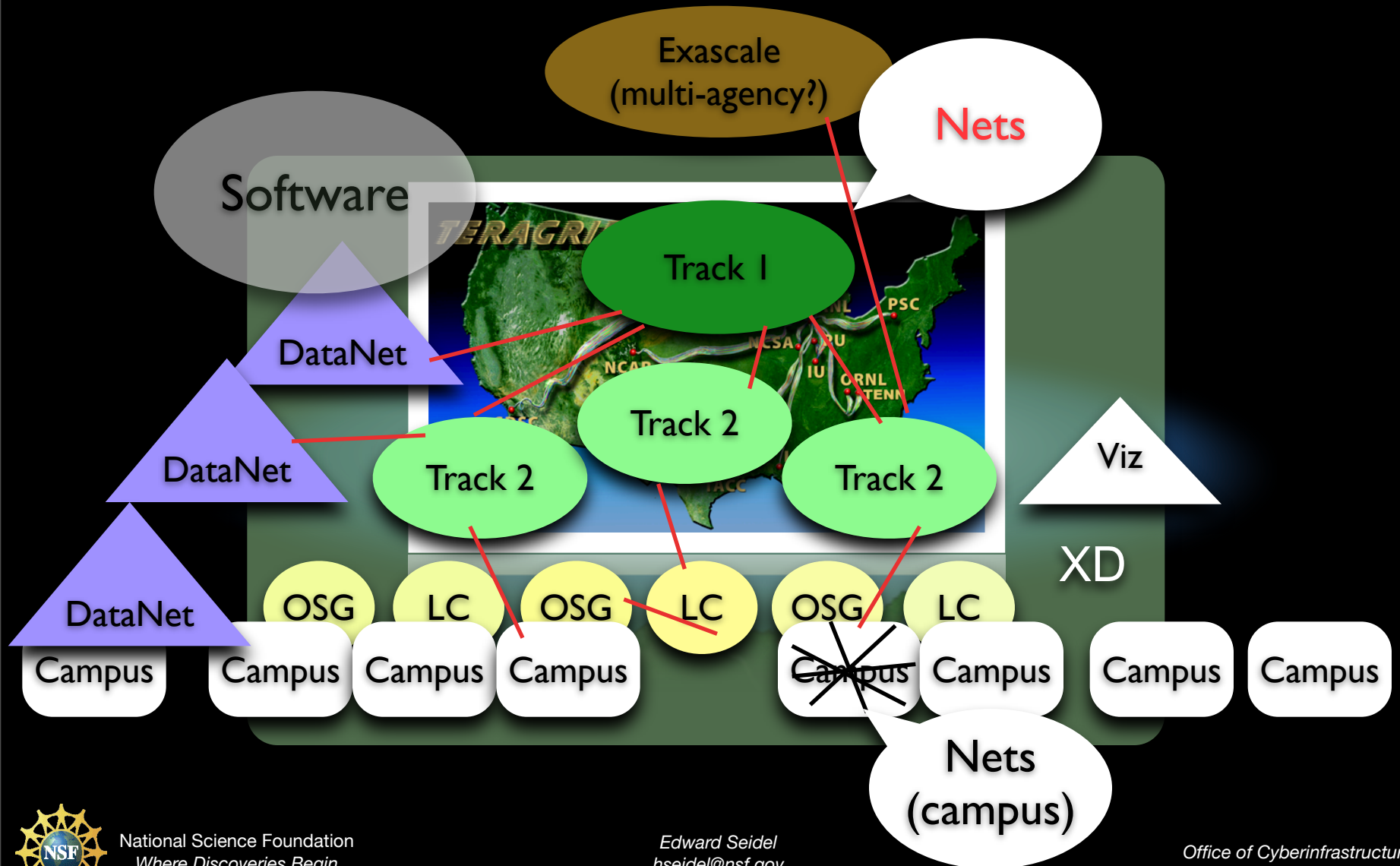
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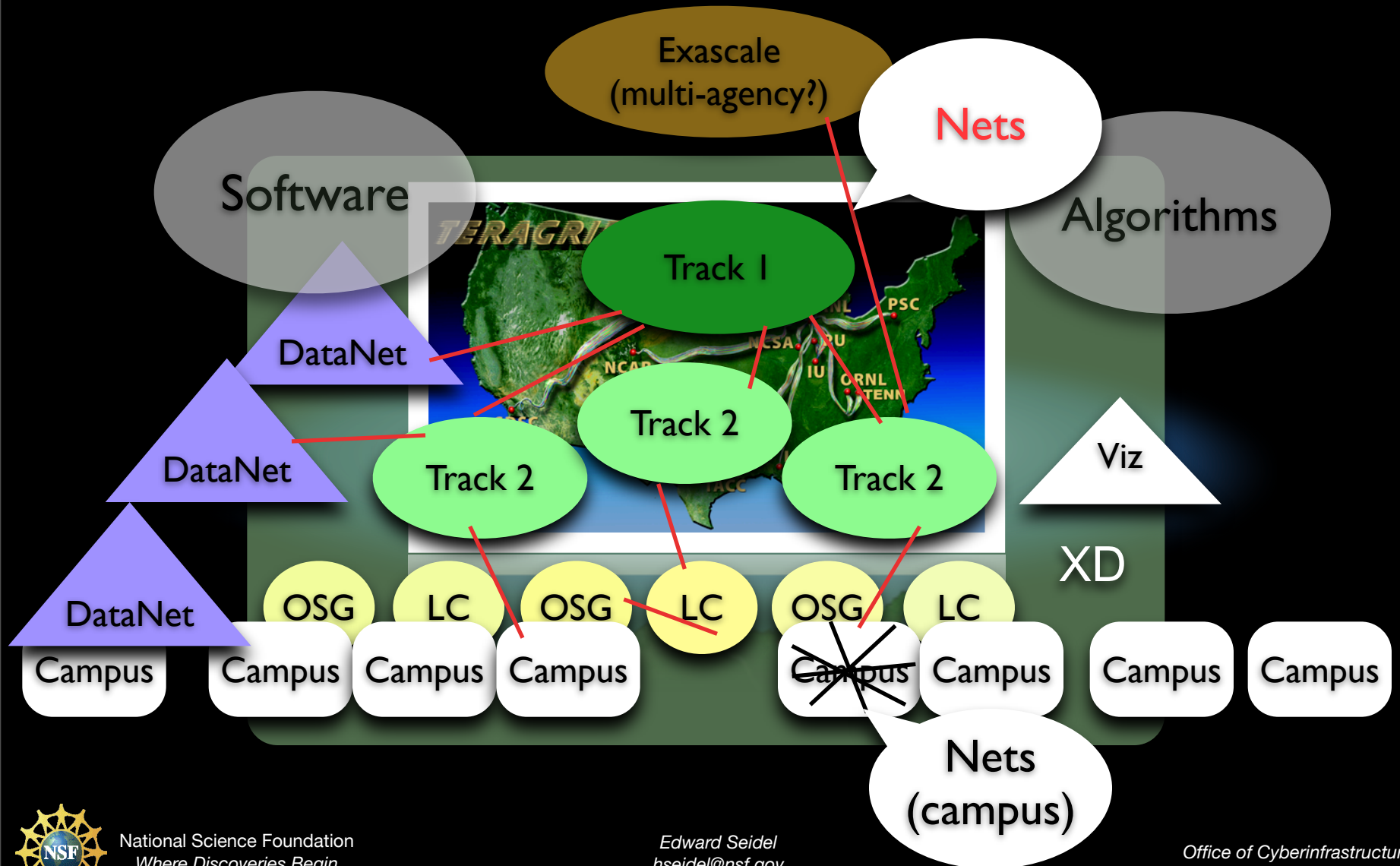
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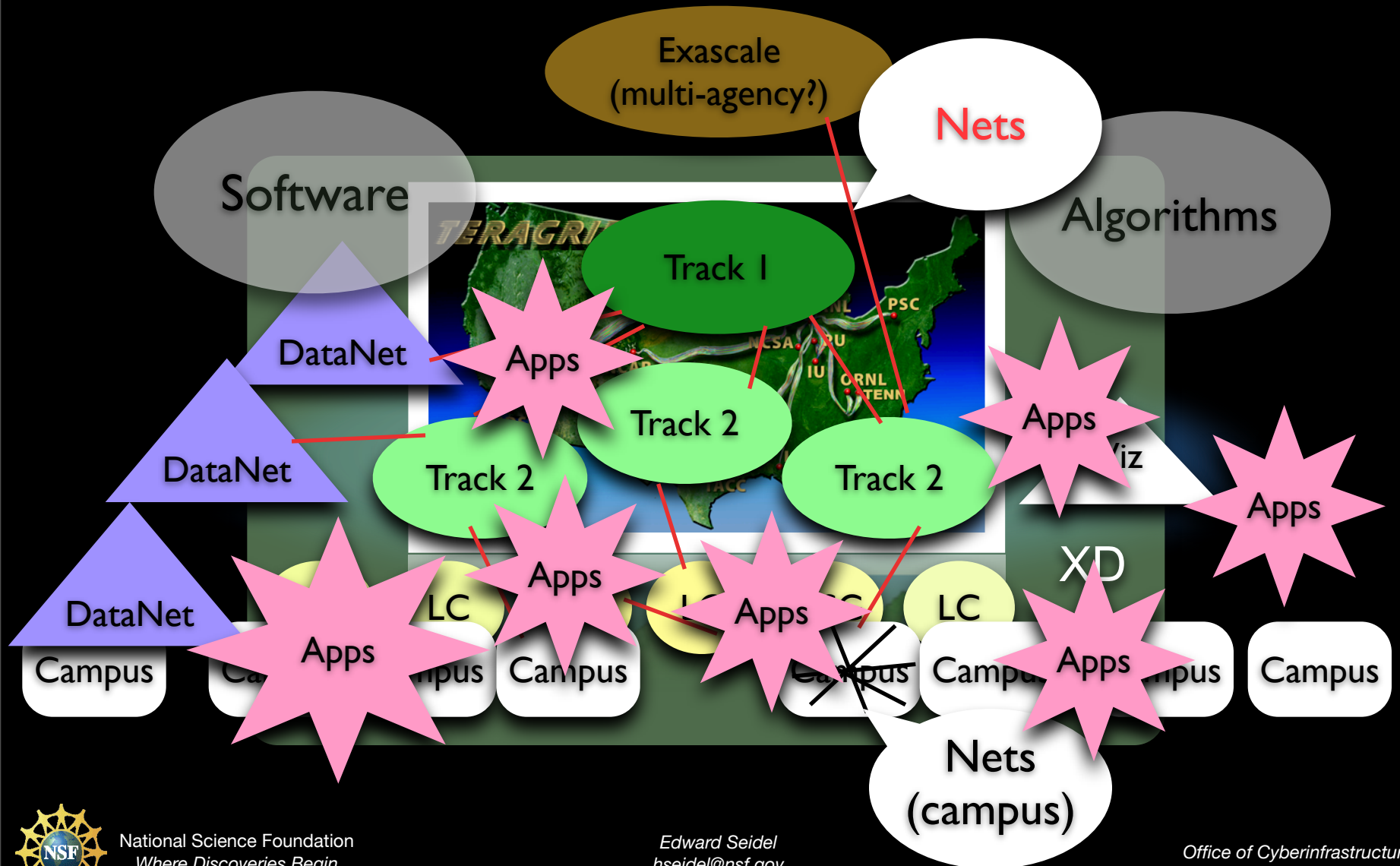


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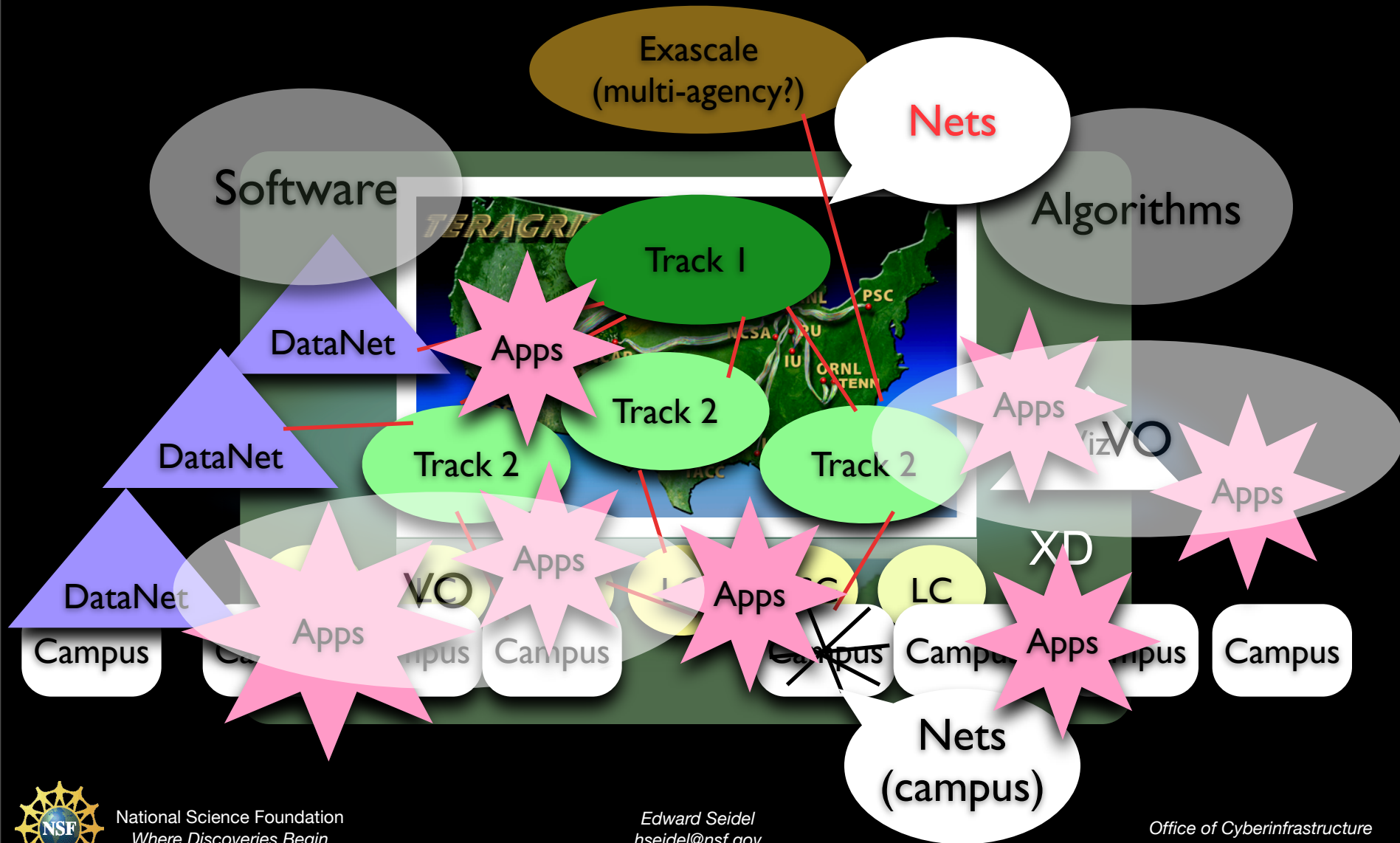




# National CI Blueprint



# National CI Blueprint



# Shared Resource Environments



# Shared Resource Environments

Computers

Data services

Visualization services

People



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# Shared Resource Environments

Computers

Data services

Visualization services

People



Modeling and simulation

Data analysis & visualization

User support

Training

Common user environments

Tools for educators

Science Gateways





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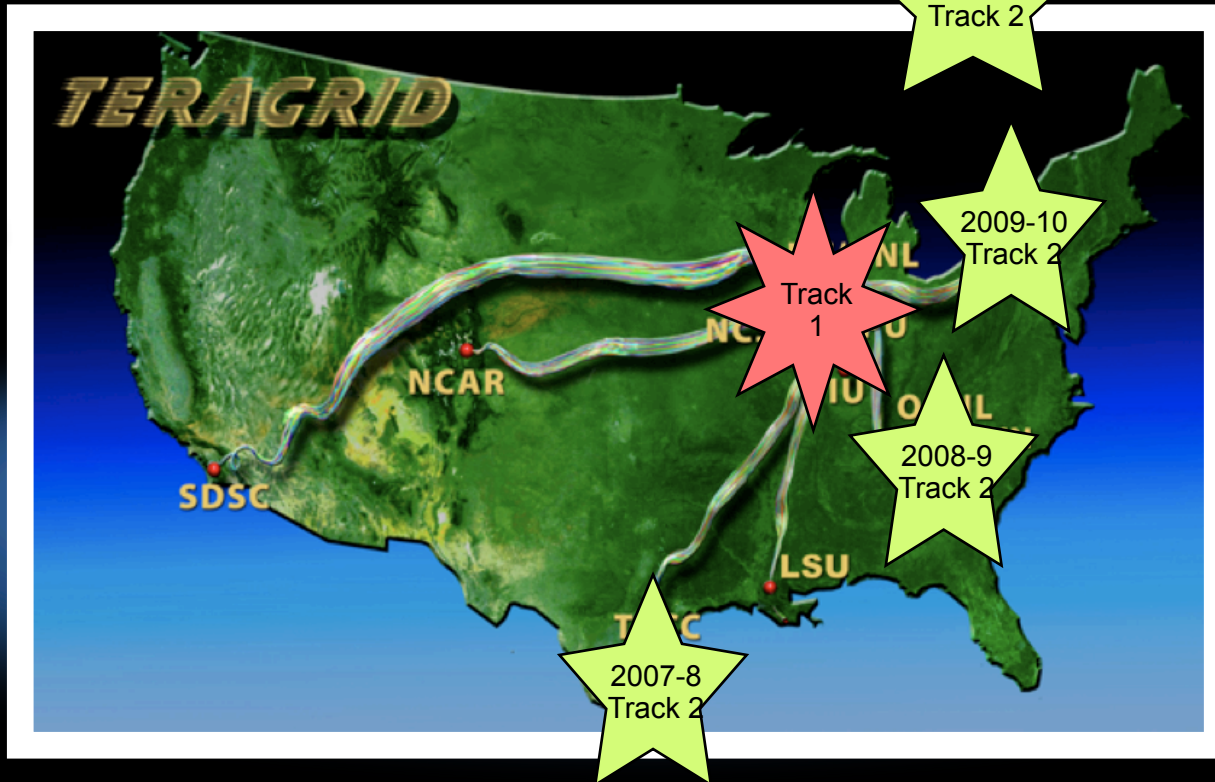
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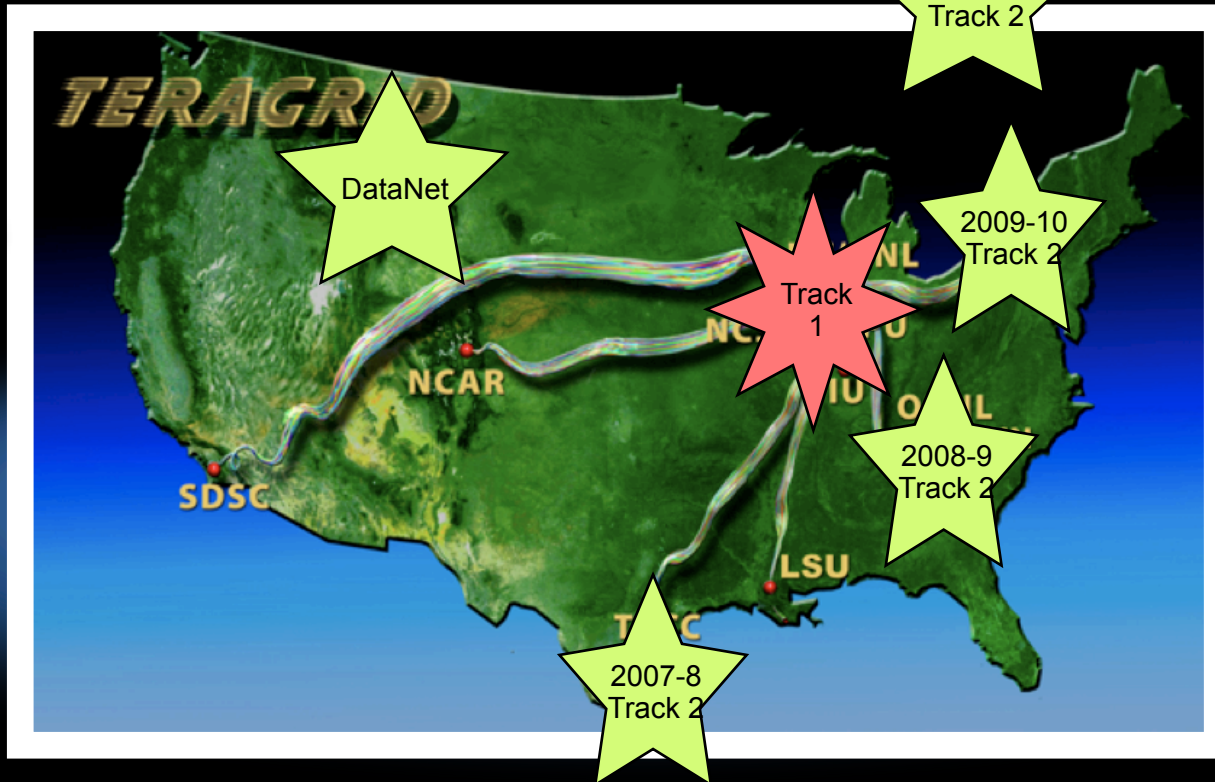
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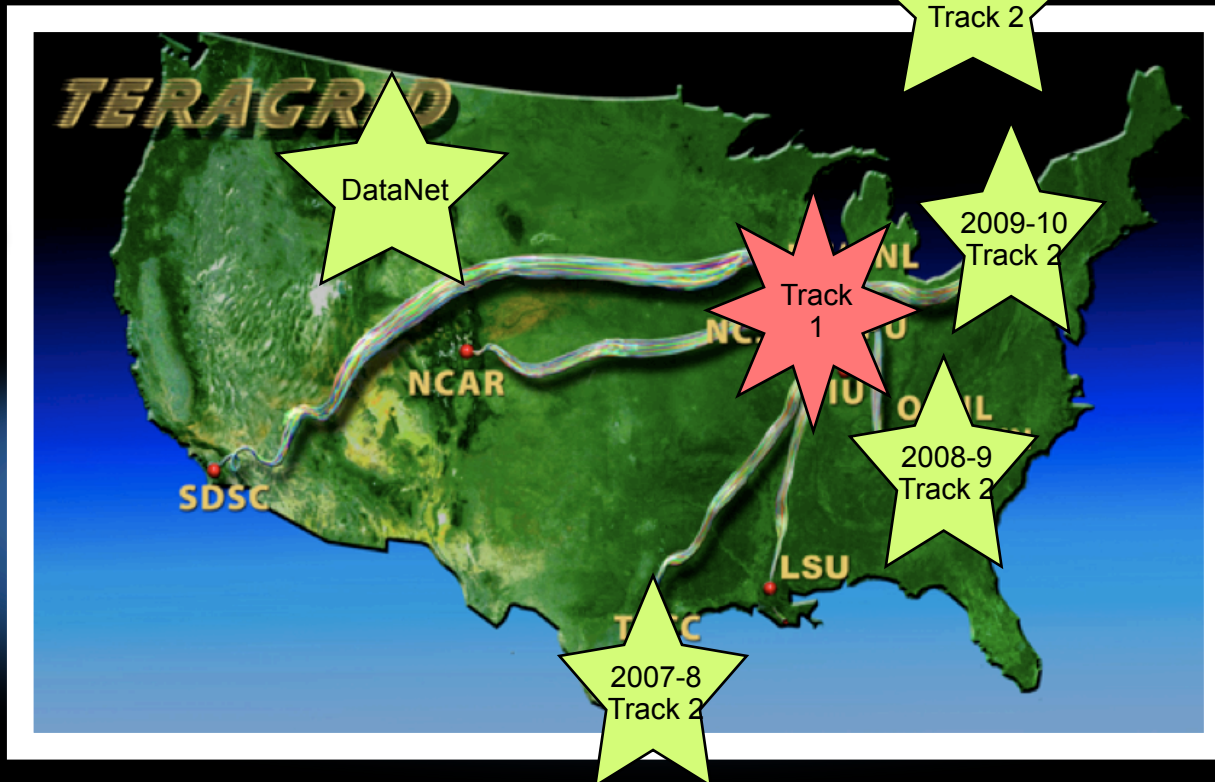
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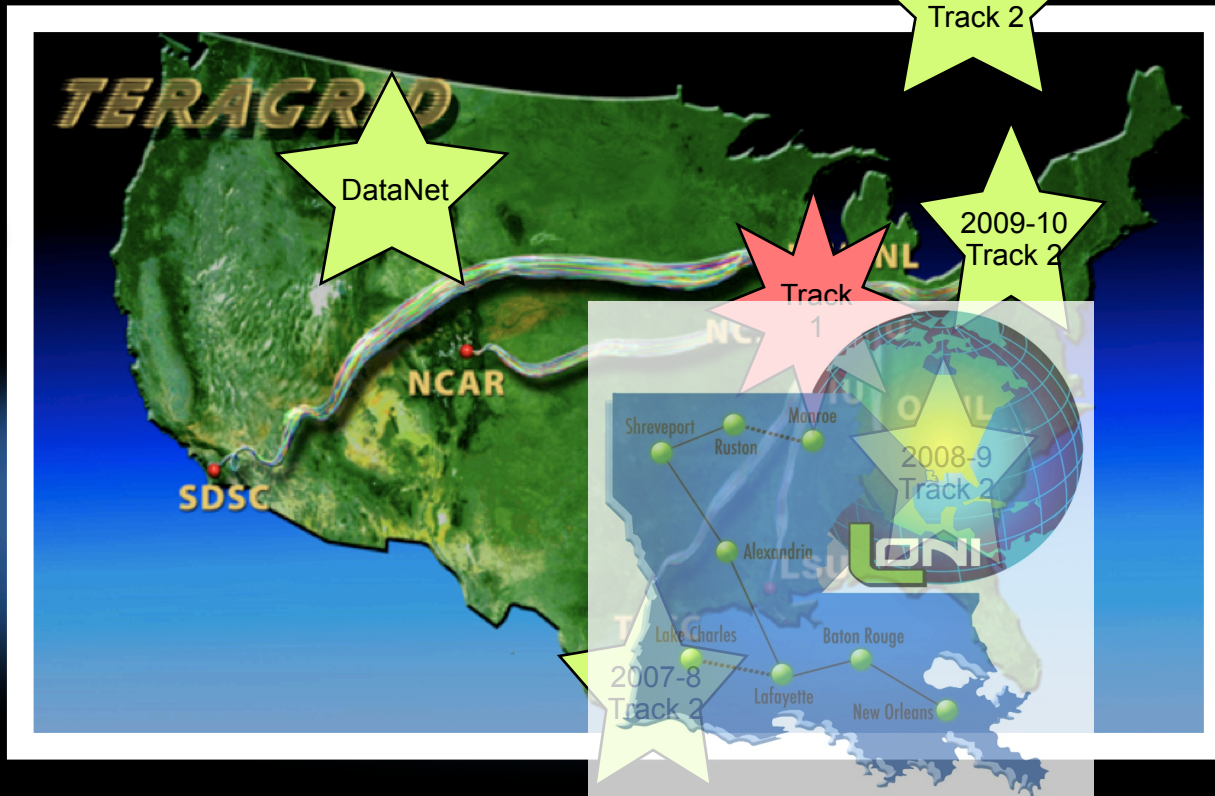
LA parallels TeraGrid locally

Courtesy of University of Indiana



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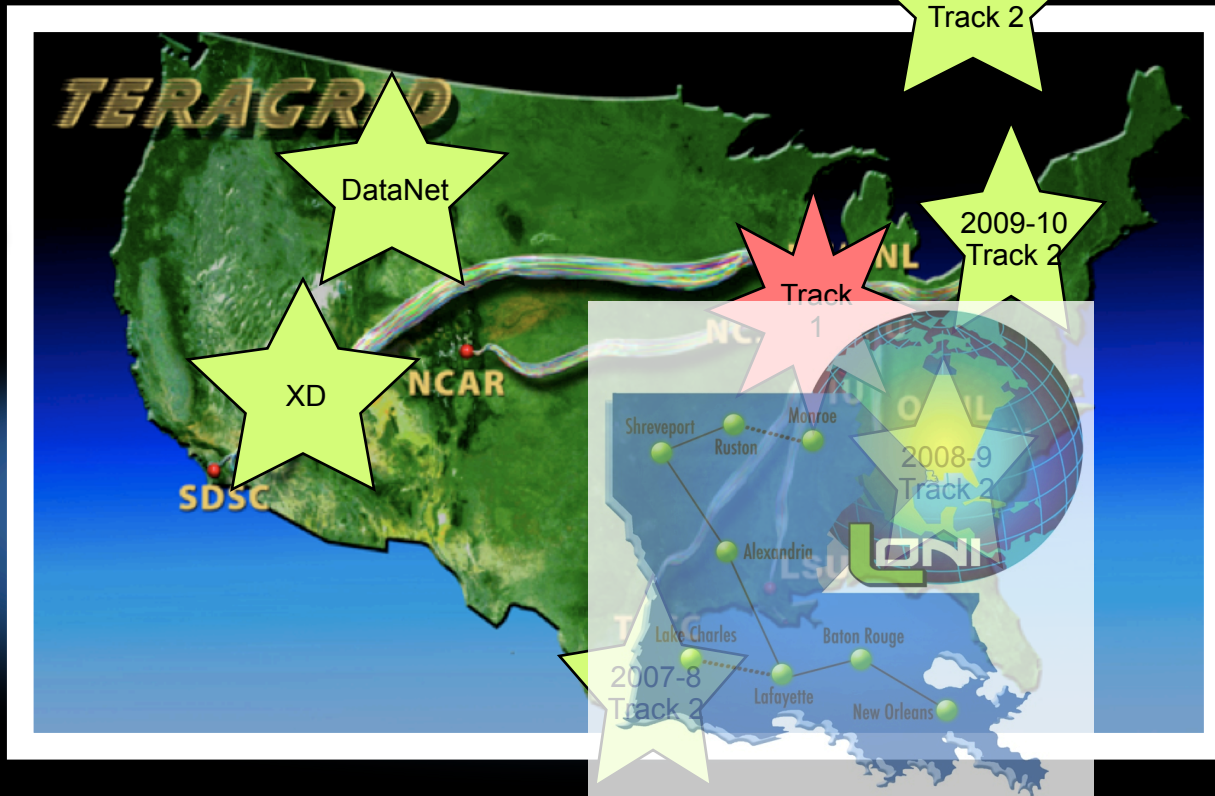
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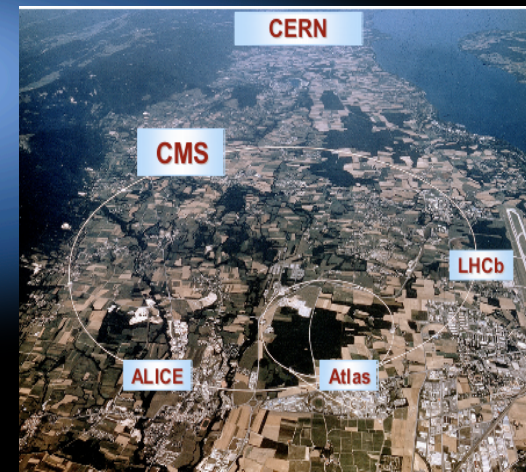
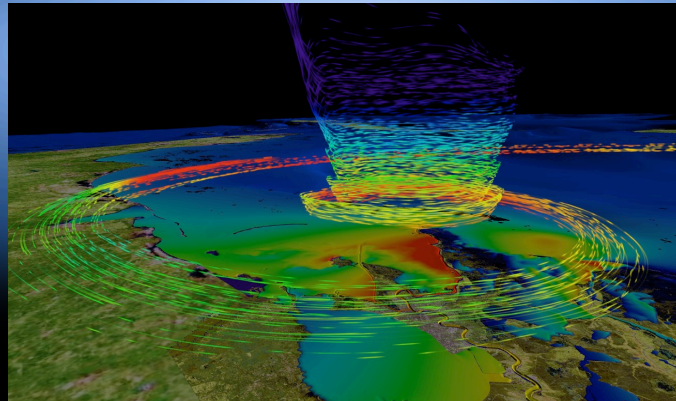
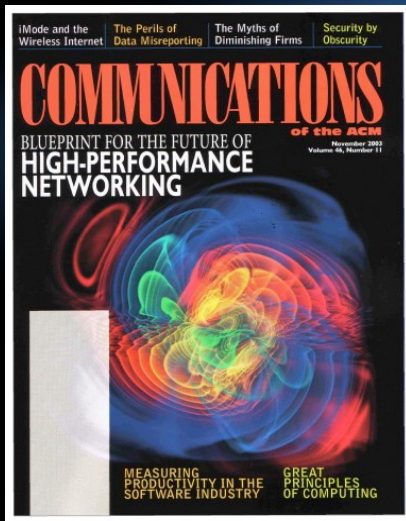
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# Translation to NSF Programs

## *Themes for future development*

- Advanced application development
  - HPC, grids, data, software, tools, nets
  - VOs, laboratories
  - Integrated with CI development teams





# Summary

- LONI Institute provides great opportunities
  - Take advantage of the 4 layers!
    - LONI, LI personnel, computational scientists, CyberTools, more...
  - Work together!
  - You are being watched nationally!
- We have worked very hard to align Louisiana with national trends in research, CI development
  - LONI now part of TeraGrid, Track 1
- NSF, DOE, NIH programs will be emerging that you will be very competitive for if you build on what is already done, and work together.

