

# Virtual Grid Application Development Software

## Partners

Rice University  
 University of California at San Diego  
 University of California at Santa Barbara  
 University of Houston  
 University of North Carolina at Chapel Hill  
 University of Southern California Information Sciences Institute  
 University of Tennessee at Knoxville

## Funded By

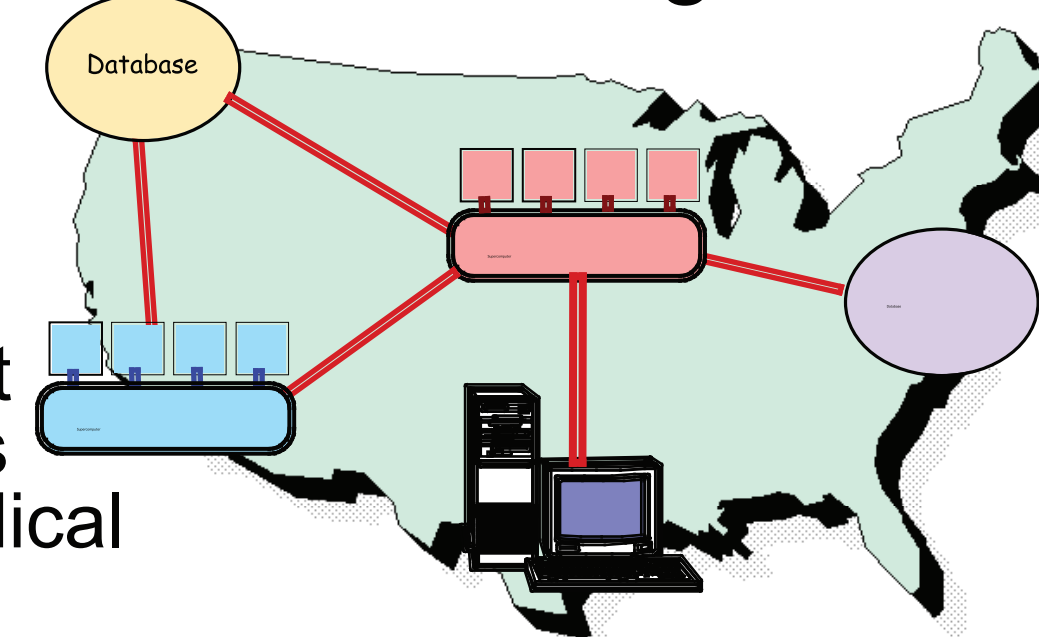
National Science Foundation

## What It Is

Grids hold great promise for researchers who need to connect to remote computers, databases and other resources, however, they can be complex, unreliable, and require a huge time investment for even low-level operations. To keep these problems from impeding the potential of grids and distributed resources, the Virtual Grid Application Development Software (VGrADS) project was developed. VGrADS attacks a fundamental part of the grid usability problem: how to more effectively program these highly complex and dynamic systems. VGrADS is developing software tools that simplify and accelerate the development of grid applications and services, while delivering high levels of performance and resource efficiency. VGrADS is based on the earlier GrADS project.

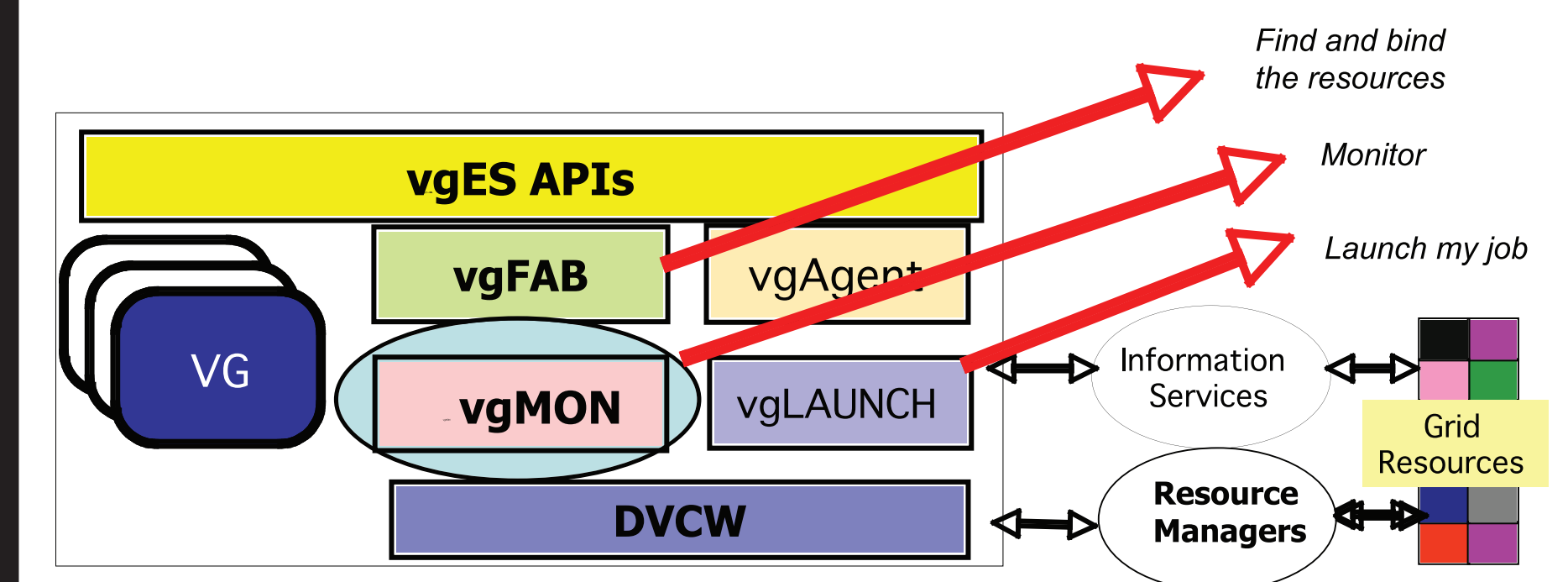
## Global Distributed Problem Solving

- **Vision: Transparent Grid computing**
  - Easily accessible to different application domains such as weather forecasting, biomedical modeling, etc
- **Reality: Low-level programming**
  - Programmer effort required to manage resources
  - Hard to guarantee performance and reliability
- **VGrADS Proposed Solution**
  - Separate application development from resource management
  - *Provide tools to enable application scientists*



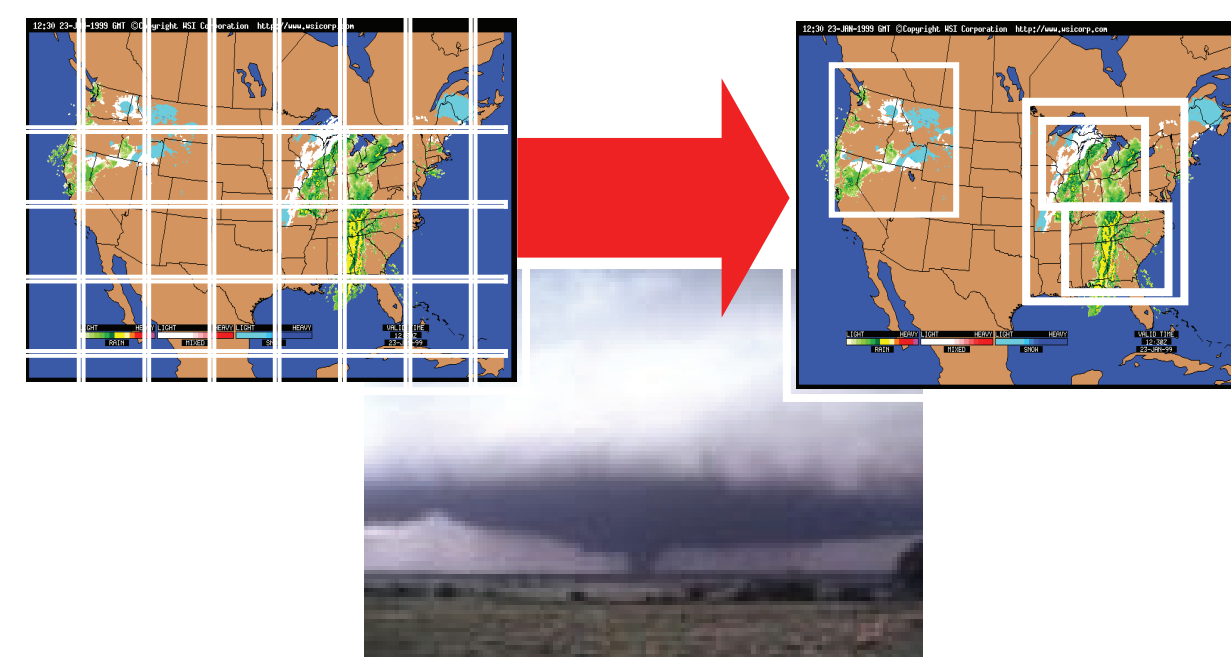
## VGrADS: A Quick Overview

- Abstract resource management for applications
  - Language allows the users to specify qualitative requirements
    - "I want resources with high network connectivity and medium reliability"
  - The infrastructure provides performance and **reliability** stability



## LEAD: Adaptive Weather Prediction

- **Linked Environments for Atmospheric Discovery (LEAD):**
  - Move from static configurations to dynamic adaptive, on-demand system
- **Adaptivity**
  - changes in response to weather
  - responds to user inputs
  - steers remote observing technologies



- **Challenges**
  - provide scalability, adaptability and real-time response to weather
- **LEAD-VGrADS collaboration scenario:** There is a storm observed in a certain region of the Continental US. Results must be obtained in an hour.
  - Goal: Schedule towards the workflow deadline
  - Procure resources for the workflow, minimizing wait times in batch queues, scheduling to optimize running time and data movement costs

## LEAD-VGrADS Integrated Architecture

