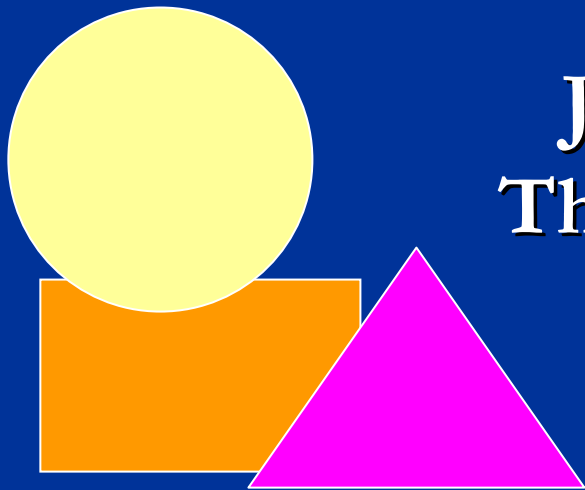
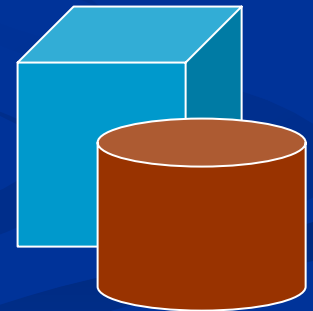


Vision of Research Computing

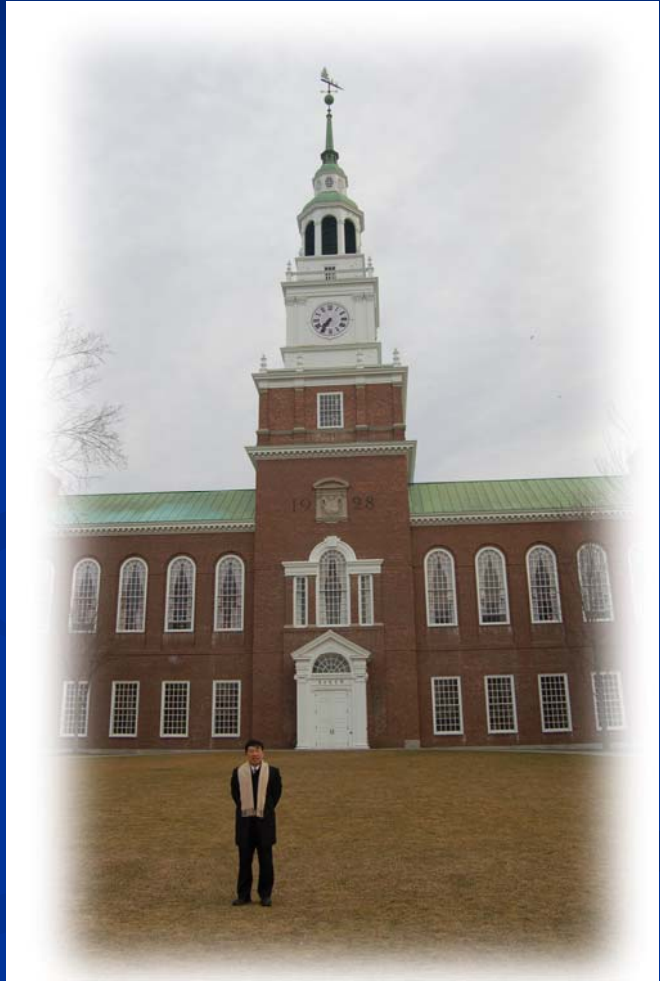
A Object-Oriented Geometrical Description



Jun Ni, Ph. D. M.E
The University of Iowa

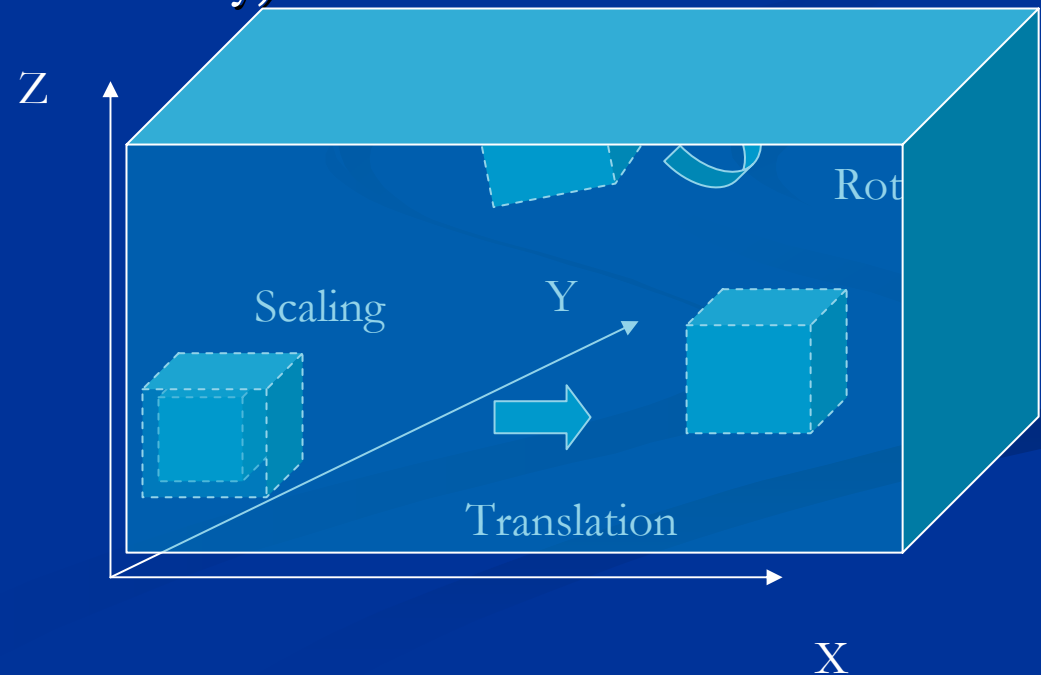


Dartmouth College, March 30, 2007



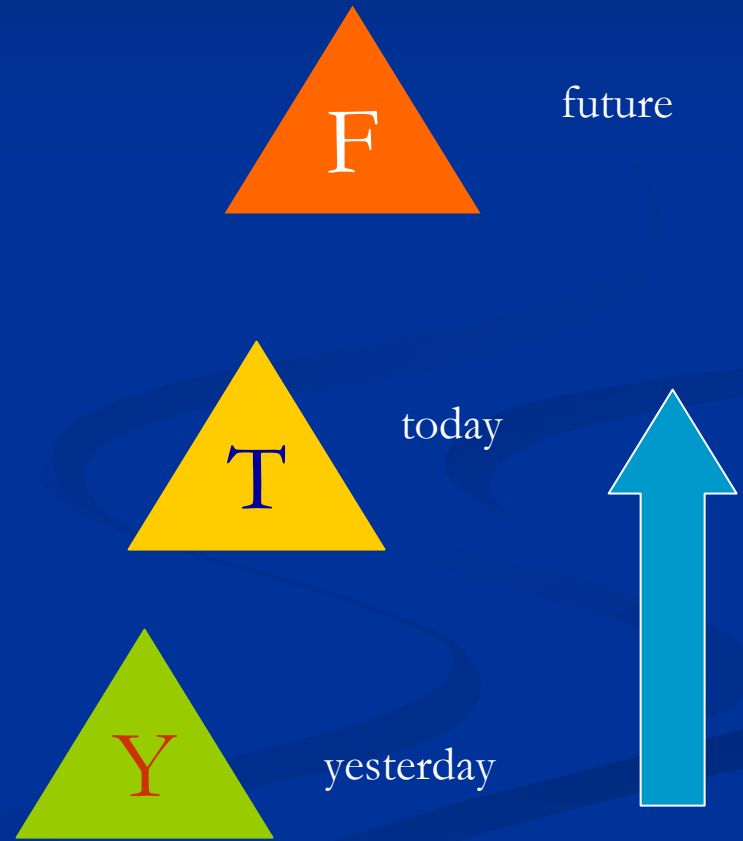
Research Computing (RC)

- Abstract description
 - Integrity
 - Coordinates (origin, boundary, grid, and unity)
 - Attributes
 - Functions
 - Integration
 - Interface
 - Inheritance



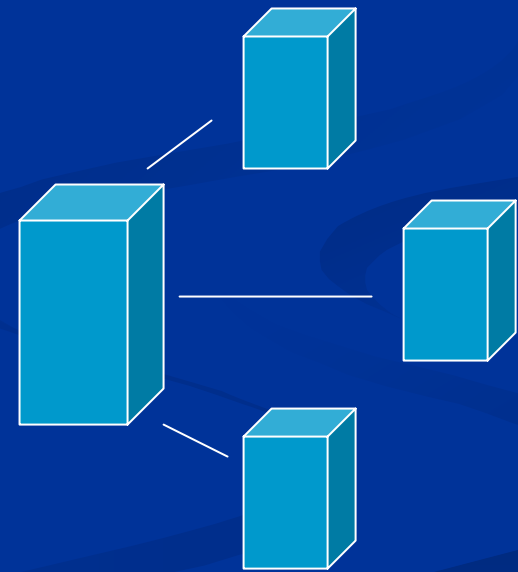
RC – Integrity and Unification

- Cutting-edge computing technology for research
- Persistent services for research community
- Functional catalyst to research discovery
- Organizational dependency and technical independency



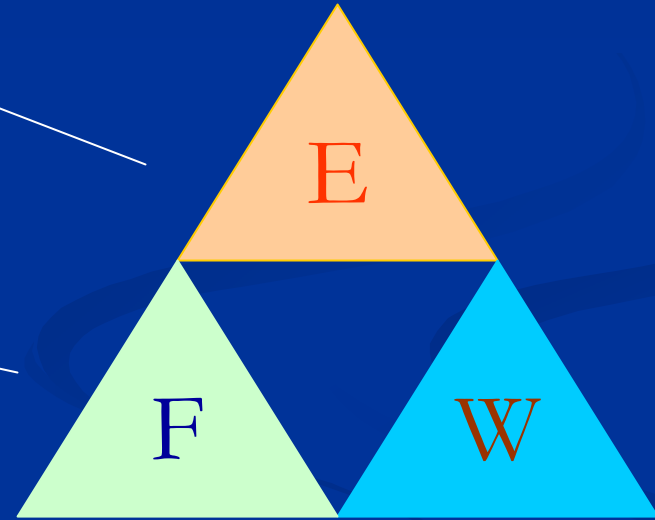
RC – Coordinates

- Centralized HPC system and service locations
- Departmental units and contacts
- Regional and national resources
- System networking
- System clustering



RC-Attribute Description

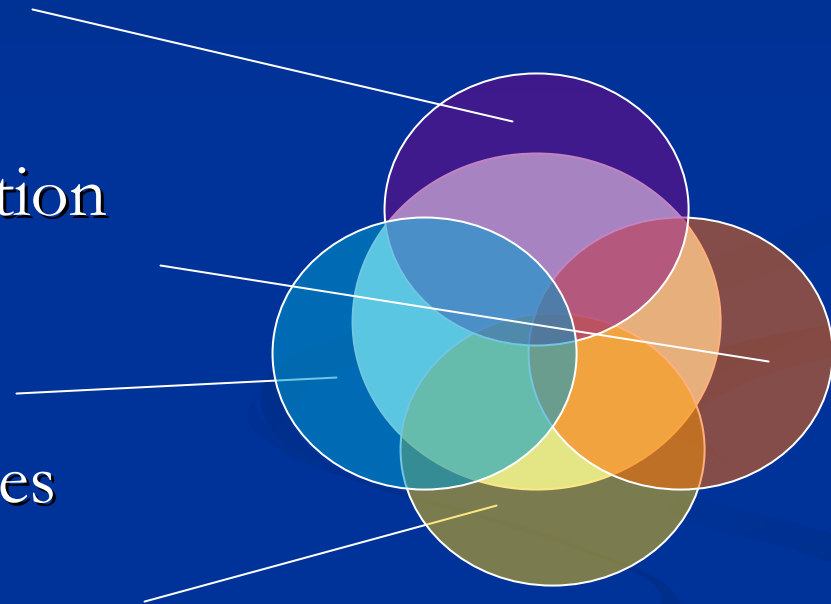
- Environment
 - Culture and management system
 - Vision and mission
 - Infrastructure, strategies and taskforces
- Facility
 - Hardware
 - Software
 - Applications
- Workforce and Expertise
 - People
 - Knowledge
 - Training



RC-Functions

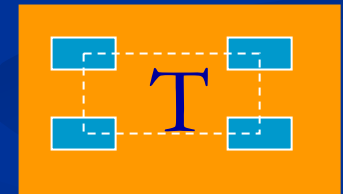
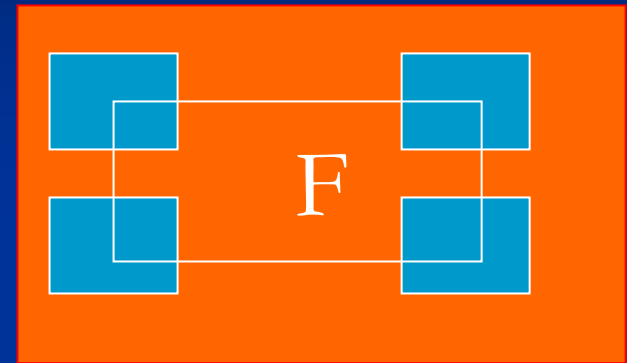
Technological Challenges

- Based on computer science
- Evolution with the cutting-edge information technology
- Bridging with the computational sciences
- Stimulated by multidisciplinary research



RC-Functions: Today's RC Demands & Characterizes

- Huge demands
 - Unprecedented HPC power
 - Super DIC capacity
 - Large-scale, cross-domain, cross boundaries, geographically—distributed, multidisciplinary collaboration and cooperation
 - Knowledge-based management system and workforce development
- Scalability (applied to all the attributes)
- Scope expansion in terms of functionality
- Scale increase for each project
- Integration of multiple projects
- Integrity for resource and information sharing
- Urgent requisition, fast processes, high competitiveness



RC – Functions: Infrastructure

University Mission

National IT Roadmap for HE

IT Infrastructure

RC community

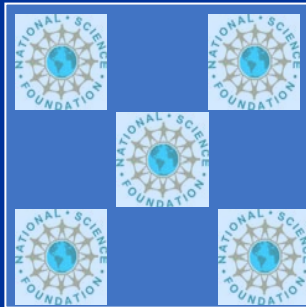
AC Infrastructure

NSF-CI

RC Infrastructure

RC – Functions: NSF Roadmap & Cyberinfrastructure

- NSF-OCI
- Cyberinfrastructure Vision for 21 Century Discovery
- 4 CI components
- 5 Missions

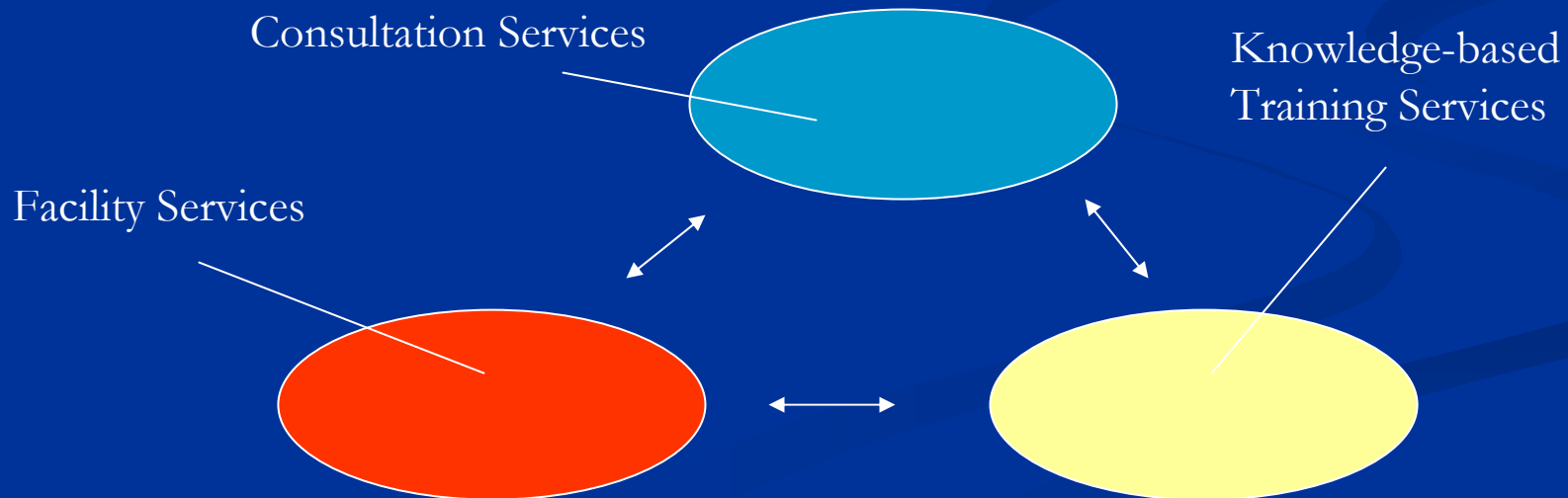


RC – Functions: NSF Roadmap & Cyberinfrastructure

- Develop a human-centered CI driven by science and engineering research and education
- Promote the access to world-class CI tools and services
- Broadening participation and strengthening the Nation's workforce in all areas of science and engineering
- CI evolves as an essential national infrastructure for conducting science and engineering research and education
- Create a stable CI environment that enables the research and education communities to contribute to the agency's statutory mission

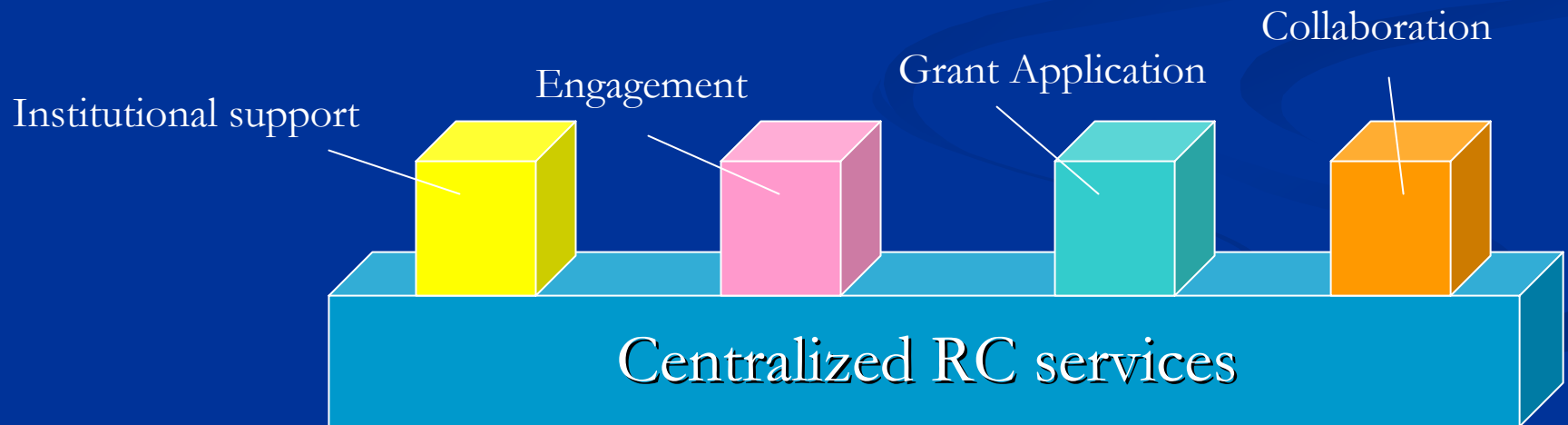
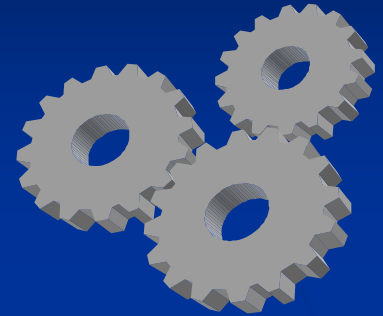
RC – Functions

- Provide faculty-oriented HPC-IDC service supports
 - Facility services (maintain, sustain, and expand facility and resources)
 - Hands-on training services
 - Consultation services



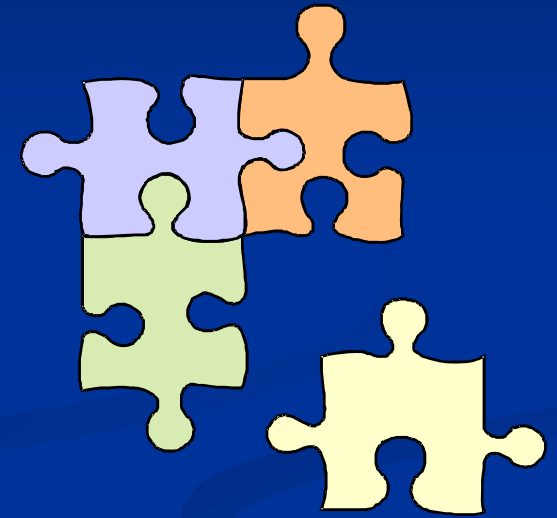
RC – Functions

- Collaborative engagement
 - Participate in institutional service support
 - Engage faculty's research projects
 - Assist faculty to apply for external grants
 - Promote cross-domain collaborations



RC -Integration

- Build easy-to-use RC solution library for faculty
- Sharp the knowledge
- Develop advanced enterprise RC solutions
- Integrate exiting computing technology
- Build RC-knowledge database management system
- Promote large-scale computations in promising domains



RC -Interfaces

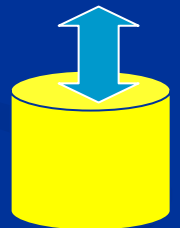
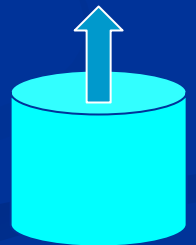
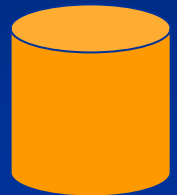
■ Outreach and Communication

- Involvement in university, national and international level RC activities
- Exhibition of research computing achievements
- Technology transfers

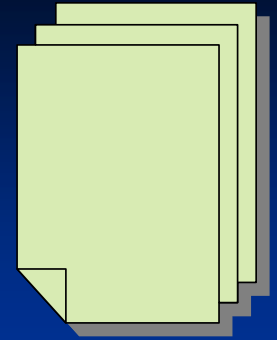
■ Local communications

- IT Departmental collaborations
- IT Departmental knowledge sharing
- Other campus computation institutes or programs

■ Reputation and Visibility

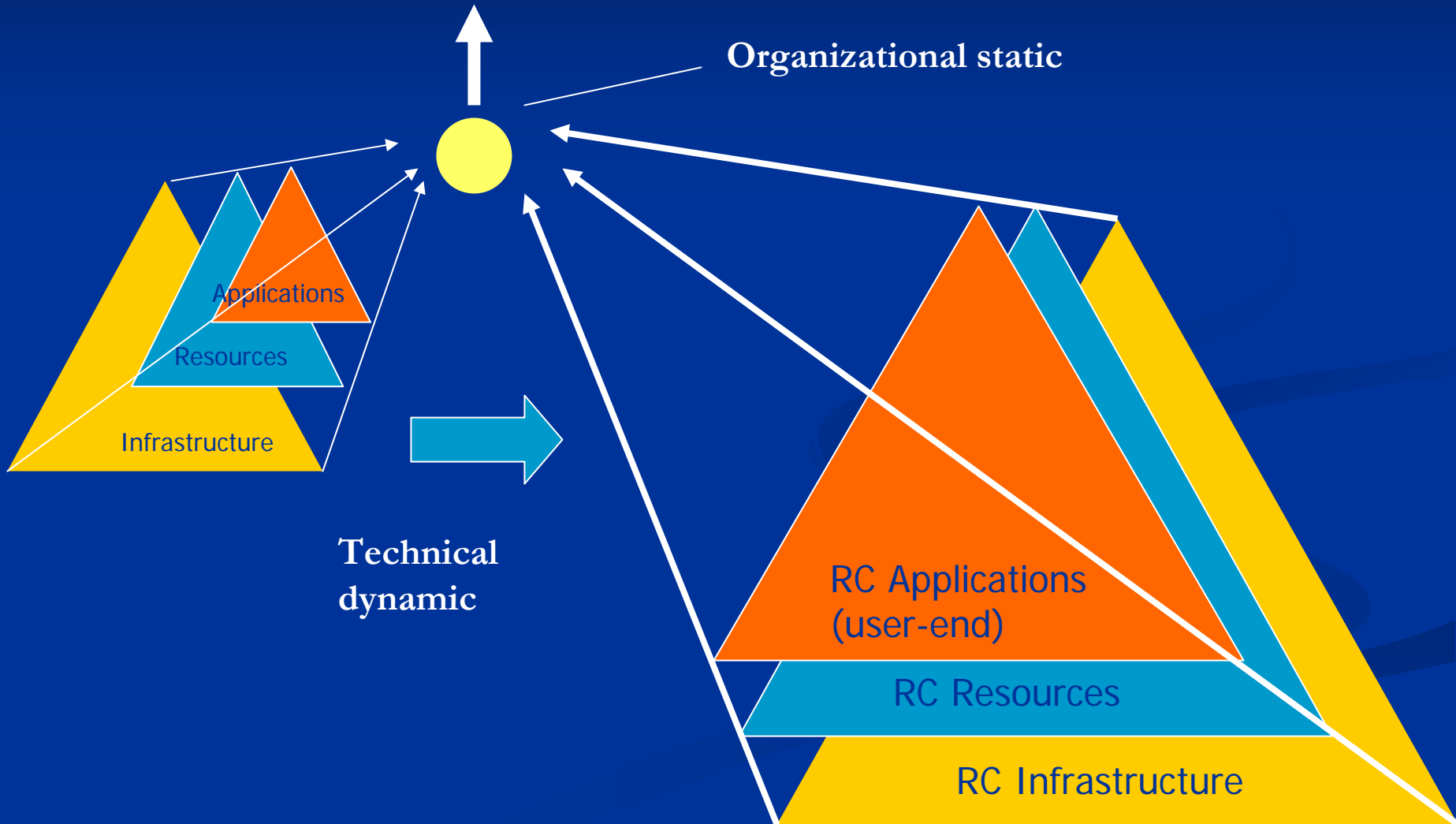


RC -Inheritance



- Project
 - Initiative
 - Definition and description
 - Operations
 - Assessment and review
 - Report

RC: dynamic vs. static



Ultimate

- Establish a low cost/performance, national recognized, CI-powered RC facility which enables the faculty to accomplish their world-level outstanding research achievements.

Thanks!

Q&A?