

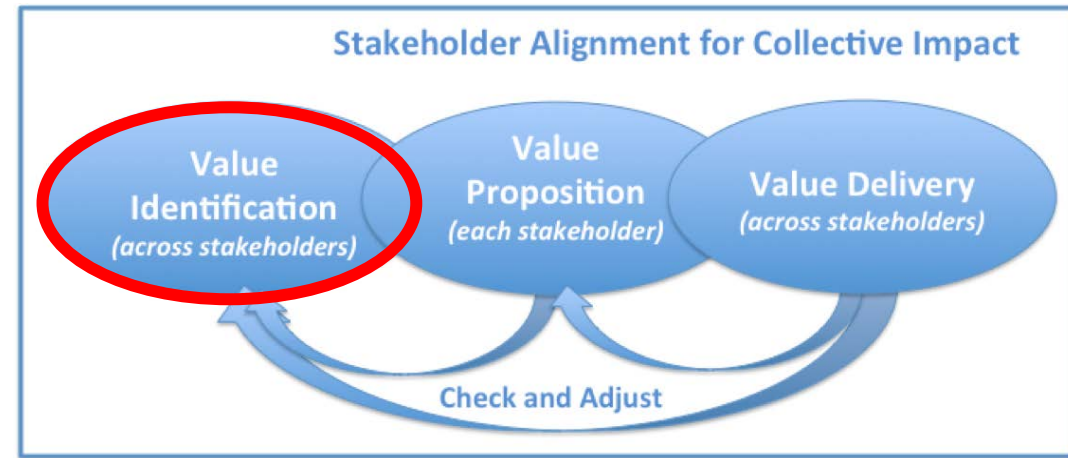
The background of the slide is a photograph of a server room. It shows several rows of server racks. The racks are filled with equipment, and there are many colorful cables (yellow, blue, red) running through them. The lighting is dim, with the primary light sources being the glowing lights on the server racks and the cables, creating a futuristic and technical atmosphere.

Campus Research Computing (CaRC) Consortium <https://carcc.org/>

**A Report to CC on CI Professionalization
Workshop Outcomes by
Scott Yockel (Harvard), Patrick Schmitz
(Berkeley), Tom Cheatham (Utah)**

**NSF Award #1620695 RCN: Advancing Research and
Education Through a National Network of Campus Research
Computing Infrastructures - The CaRC Consortium**

CaRC Vision



The vision of the CaRC Consortium is to advance the frontiers of research at academic institutions by **supporting on-campus awareness and facilitation** services related to computation for researchers, including inter-institutional resource and **knowledge sharing** among research computing professionals, and continuous innovation in research computing capabilities.

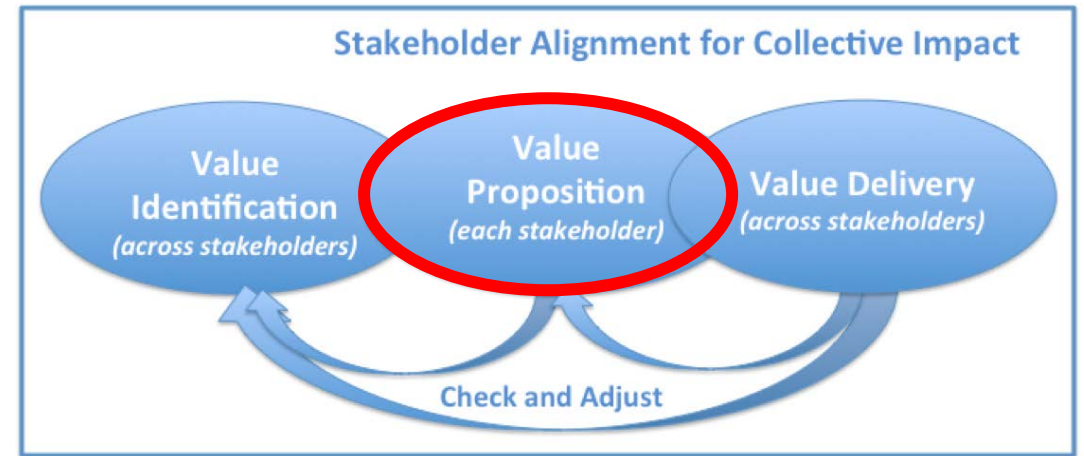
CaRC Members

- Arizona State University
- Brandeis University
- Clemson University
- Cornell University
- Florida Atlantic University
- Harvard University
- Kansas State University
- Montana State University
- Ohio Supercomputing Center
- Oklahoma State University
- Rutgers, The State University of New Jersey
- Stanford University
- University of California, Berkeley
- University of California, San Diego
- University of Colorado, Boulder
- University of Florida
- University of Georgia
- University of Hawaii
- University of Illinois, Urbana-Champaign
- University of Miami
- University of Minnesota
- University of Missouri
- University of Nebraska, Lincoln
- University of North Carolina, Chapel Hill
- University of Notre Dame
- University of Oklahoma
- University of Southern California
- University of Utah
- University of Virginia
- University of Wisconsin, Madison
- Yale University

Draft Stakeholder Value Propositions

Overarching CaRC Value Propositions

- The CaRC Consortium will advance the frontiers of research through **improved access** to and use of Research Computing (RC) and supporting resources.
- CaRC will enhance members' ability to **optimize the use** of RC and supporting resources on each campus and across the CaRC Consortium.
- CaRC will enhance members' ability to identify and share RC **leading practices** and innovations.
- CaRC will enhance members' ability to access **domain-specific RC expertise** in a range of fields and disciplines that exceeds the expertise on any one campus.
- Through CaRC, individual campuses will be better able to provide **leadership** in the RC ecosystem, with an underlying culture of **collaboration**.



CaRC Working Committees

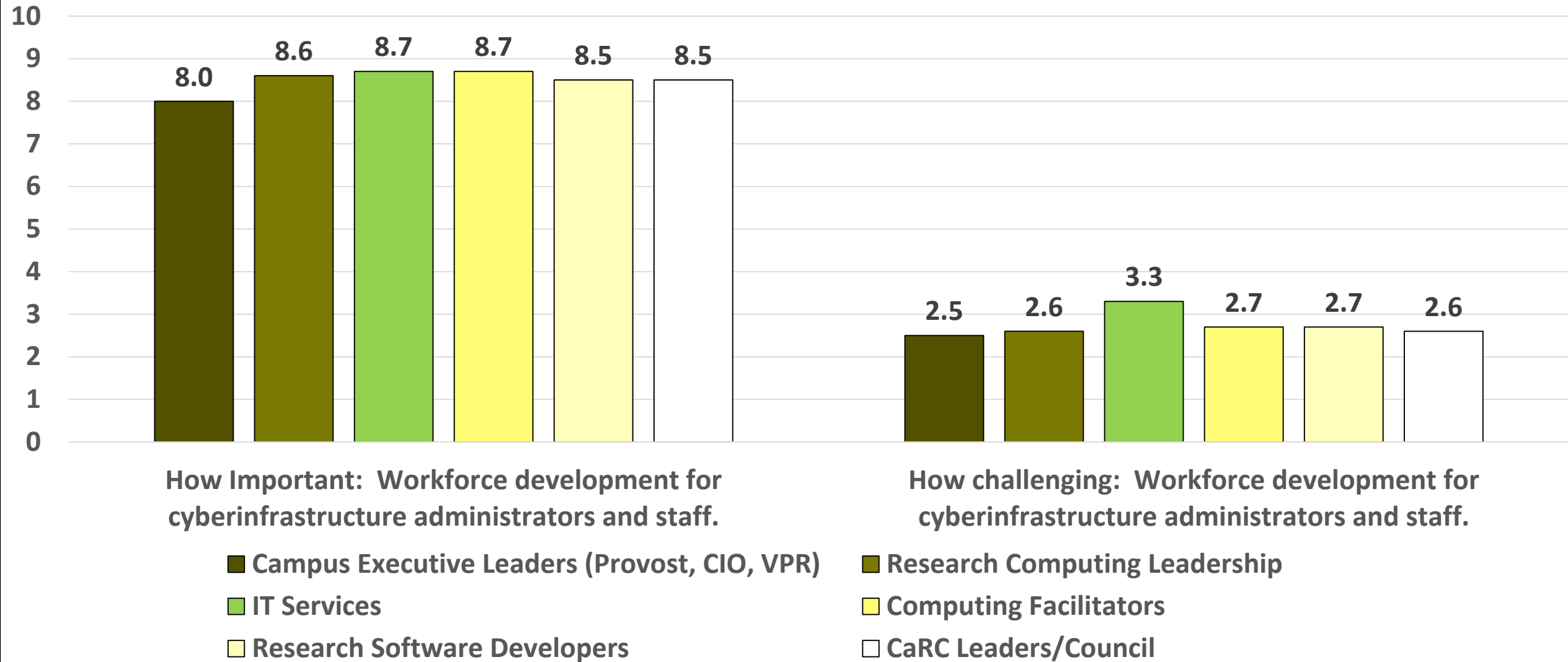
- **CI workforce development/professionalization**
 - **Co-Chairs:** Jim Bottum (Internet2) and Thomas Hauser (Colorado)
- **Defining stakeholders and value propositions**
 - **Co-Chairs:** Andy Sherman (Yale) and Barr von Oehsen (Rutgers)
- **Developing the CaRC and facilitator network**
 - **Co-Chairs:** Lauren Michael (Wisconsin) and Dana Brunson (Oklahoma State)
- **Expertise and resource sharing**
 - **Co-Chairs:** Jerry Sheehan (Montana State) and Shelley Knuth (Colorado)

2017 CaRC Stakeholders Survey: 250 respondents

- **Campus Executive Leadership** (e.g. Presidents, Chancellors, Provosts, Deans)
- **Campus Information and Research Leadership** (e.g. CIOs, VPRs)
- **Campus Research Computing (RC) Leadership** (e.g. VP, AVP or Director RC; Associate CIO)
- **Principal Investigators and Research Team Members**
- **Students** (in classrooms) and as RC employees
- **Campus Research Computing Facilitators**, including CaRC and ACI-REF Facilitators, RC Software Engineers, and XSEDE Campus Champions
- **Campus Research, Academic, Enterprise IT Services** (systems, security, networking, engineering)
- **Campus Research Computing/Data Science Instructors**
- **Campus IT/Research Cyberinfrastructure Workforce Development Providers**
- **Research Funders**

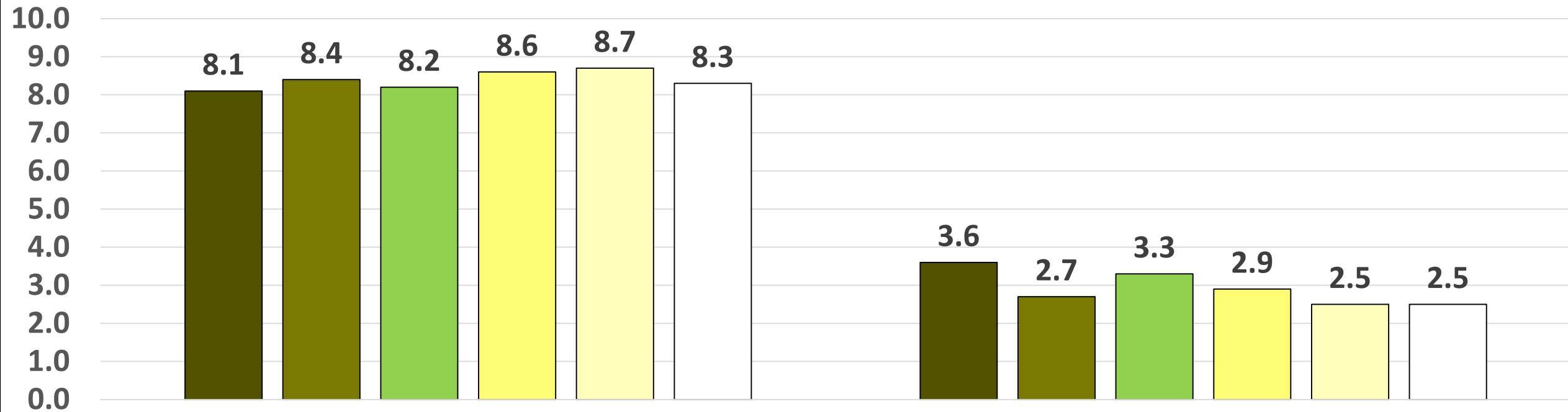
Note: Titles, roles, and responsibilities vary across campuses with respect to research and research computing.

Workforce Development



Comment: Workforce development is very important for all stakeholder groups. The response from campus executive leaders is lower than the rest. Although this difference is not statistically significant, it may still be reflective of an important gap in views on the part of these leaders. IT leadership see workforce development as less challenging than others (sig. at the .05 level).

Supporting Facilitators

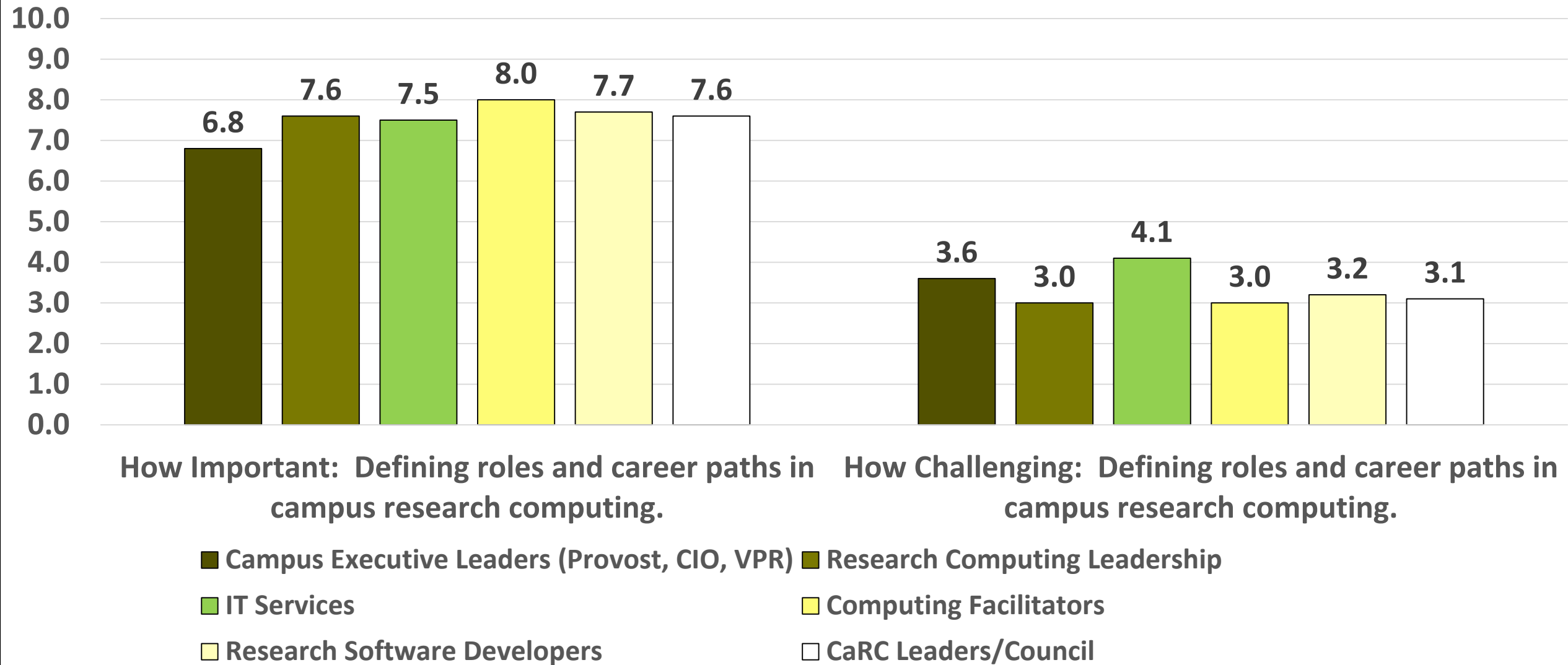


How Important: Supporting facilitators (broadly defined) on campus, bridging between research teams and research computing resources. **How Challenging: Supporting facilitators (broadly defined) on campus, bridging between research teams and research computing resources.**

- Campus Executive Leaders (Provost, CIO, VPR)
- Research Computing Leadership
- IT Services
- Computing Facilitators
- Research Software Developers
- CaRC Leaders/Council

Comment: *All stakeholders see supporting facilitators as very important and most see it as very hard to do. Executives do not see this as challenging as others do (while the difference is not statistically significant, that may reflect the relative small n for executives (n=13). There are also some bright spots on the visualization on the prior slide to be explored.*

Research Computing Roles and Career Paths



Comment: *Campus executive leaders are somewhat less likely to see defining roles and career paths for research computing as important (the difference is not statistically significant, but the “n” is small). This points to the need for increased education and awareness. A substantial number (28.6%) indicate don’t know or not applicable.*

CI Professionalization Workshop Goals

- Learn from leading practices regarding cyberinfrastructure (CI) job definitions and career paths
- Develop a flexible framework to organize CI hiring, career development, retention and other aspect of HR in the CI ecosystem
- Apply the framework for research computing and data work that is:
 - Systems facing roles
 - Researcher facing roles
 - Software/Data facing roles
 - Sponsors/Stakeholder facing roles
- Anticipate potential complications and disconnects when implementing the framework across diverse campuses
- Specify next steps in the utilization of the framework and, as a result, the further professionalization of CI work

Meeting Structure

Monday Evening

- Panel discussion from universities that have recently created a job family classification for CI, Research Computing, or similar.

Tuesday Morning (breakout groups)

- Defining and organizing **roles and responsibilities**

Tuesday Afternoon (breakout groups)

- **Talent pipeline**: education, experience, competencies
- **Professional development**: career opportunities, organizations

Wednesday Morning

- What are the hesitations or cautions?
- What will the flushed out product look like?
- How will it be used?

Systems facing roles

Partnership & Communication

Work with partners across the distributed IT community within the institution to gather requirements, communicate changes, and develop strategies for services. Build and manage relationships with relevant vendors to evaluate, purchase, and implement new and existing technologies.

Internal & External Security & Privacy

Develop and manage the security posture of research systems. Responsible for operating, tuning, and reviewing maintenance of all cybersecurity tools, software suites, devices, appliances and systems. Ensures systems meet security and disaster recovery requirements of the institution, research, and data.

Systems Environment Management

Identify and maintain appropriate software technologies that are essential to maintaining the integrity of the large-scale cyberinfrastructure environment

Virtualized Layers

Design, implement, and manage virtual systems to provide resources for computing, storage, and software. Develop strategy for management and migration of research data to utilize cloud resources

Physical Systems

Responsible for the planning, installation, and management of physical systems installed within a facility and connected to the network

Data Center

Maintain the integrity of the core utilities and services that provide the space, power, cooling, and physical security of the Data Center. Maintain a relationship with utility/service providers -- either directly or in concert with others who have this direct responsibility

Researcher facing roles

1

Engage researchers

Engage researchers as a partner to co-create and co-learn research activities and relevant advanced computing capabilities to provide possible solutions to facilitate and/or transform research.

2

Facilitate collaboration

Connecting and coordinating interactions between researchers and technology providers

3

Provide communication

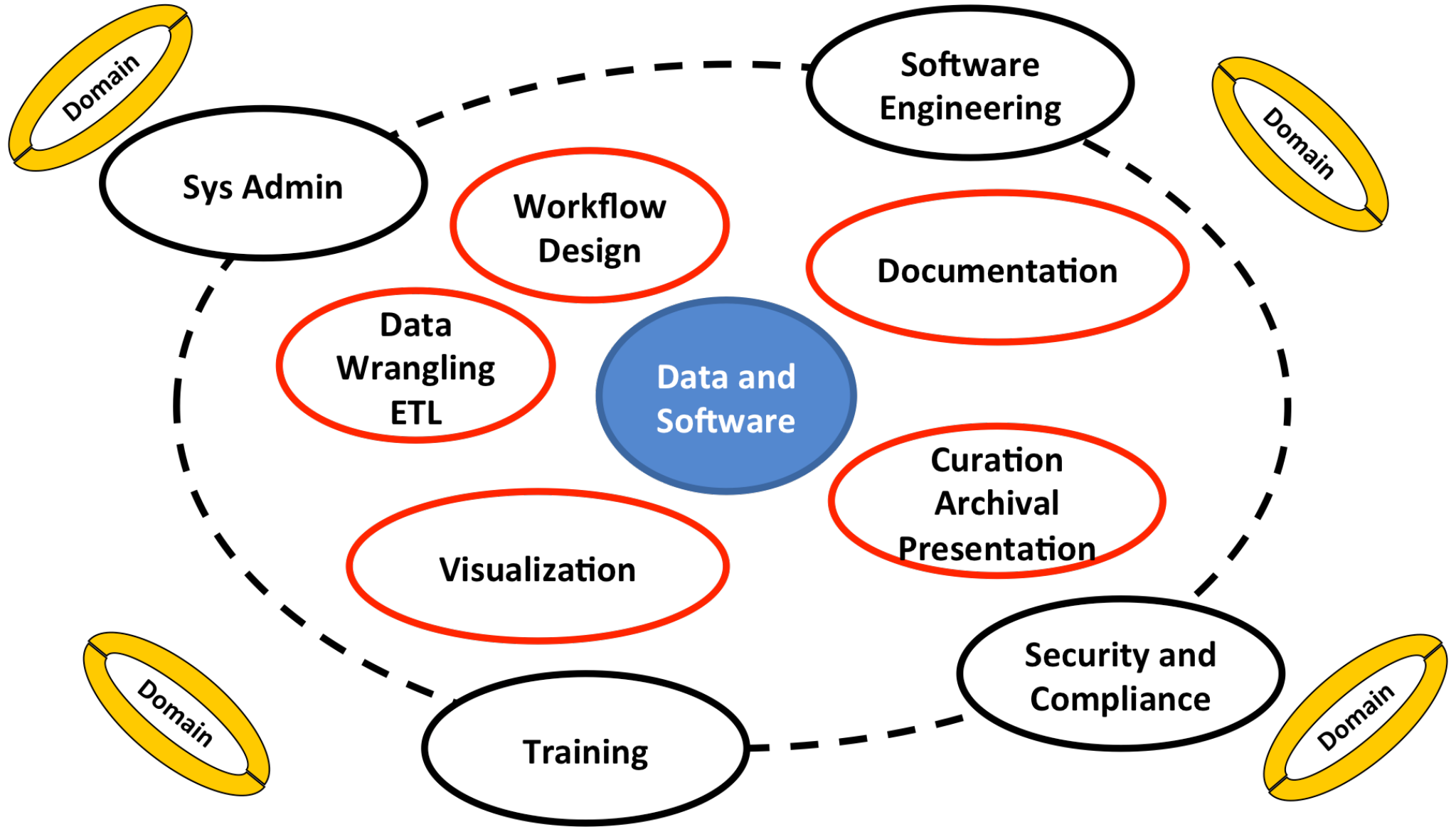
Provide regular communications to the campus or external research community

4

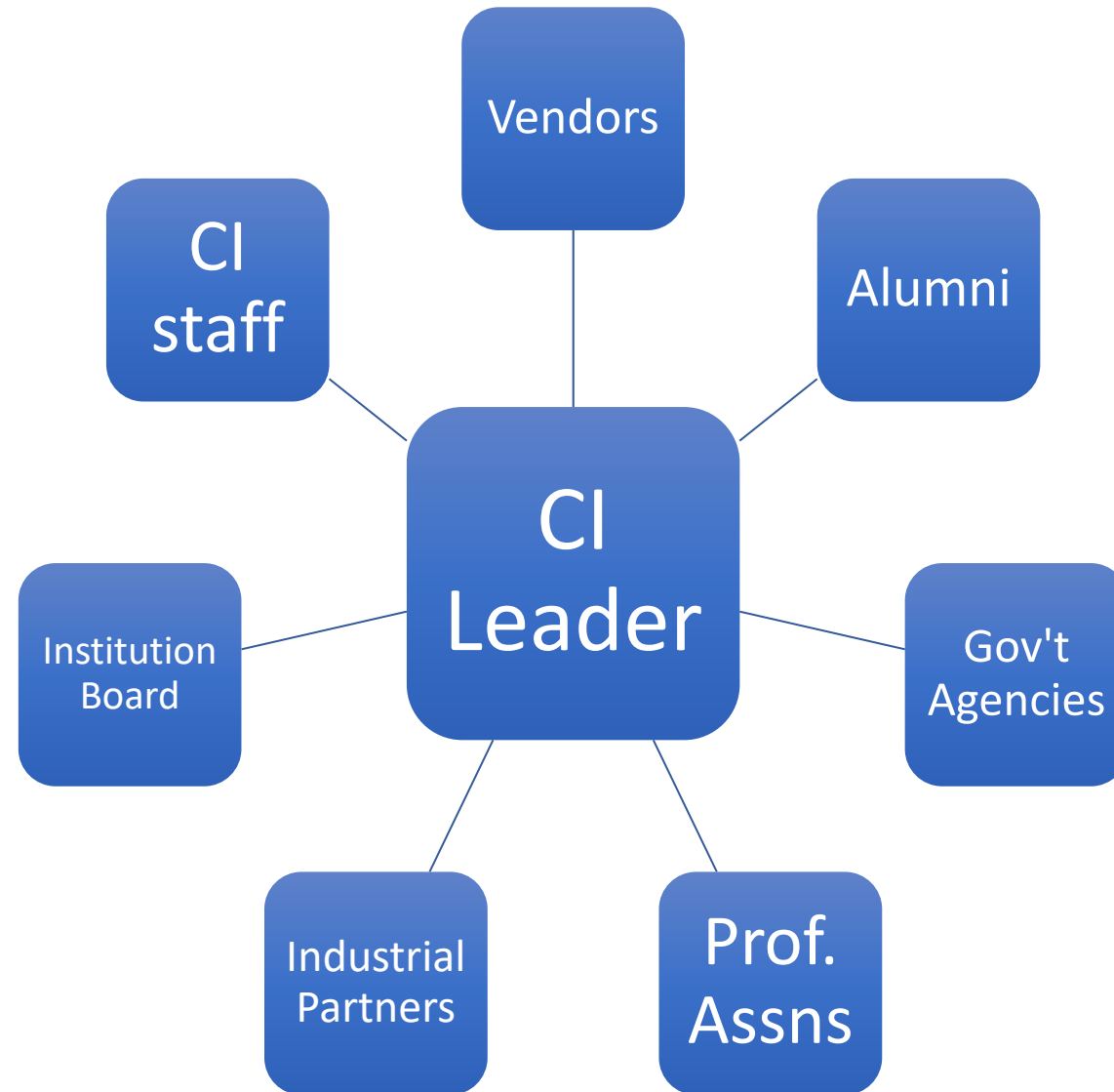
Solve complex problems

Actively solve problems and enhance learning with full awareness of the local and larger research computing and data landscape.

Software/Data facing roles



Sponsor/Stakeholder facing roles



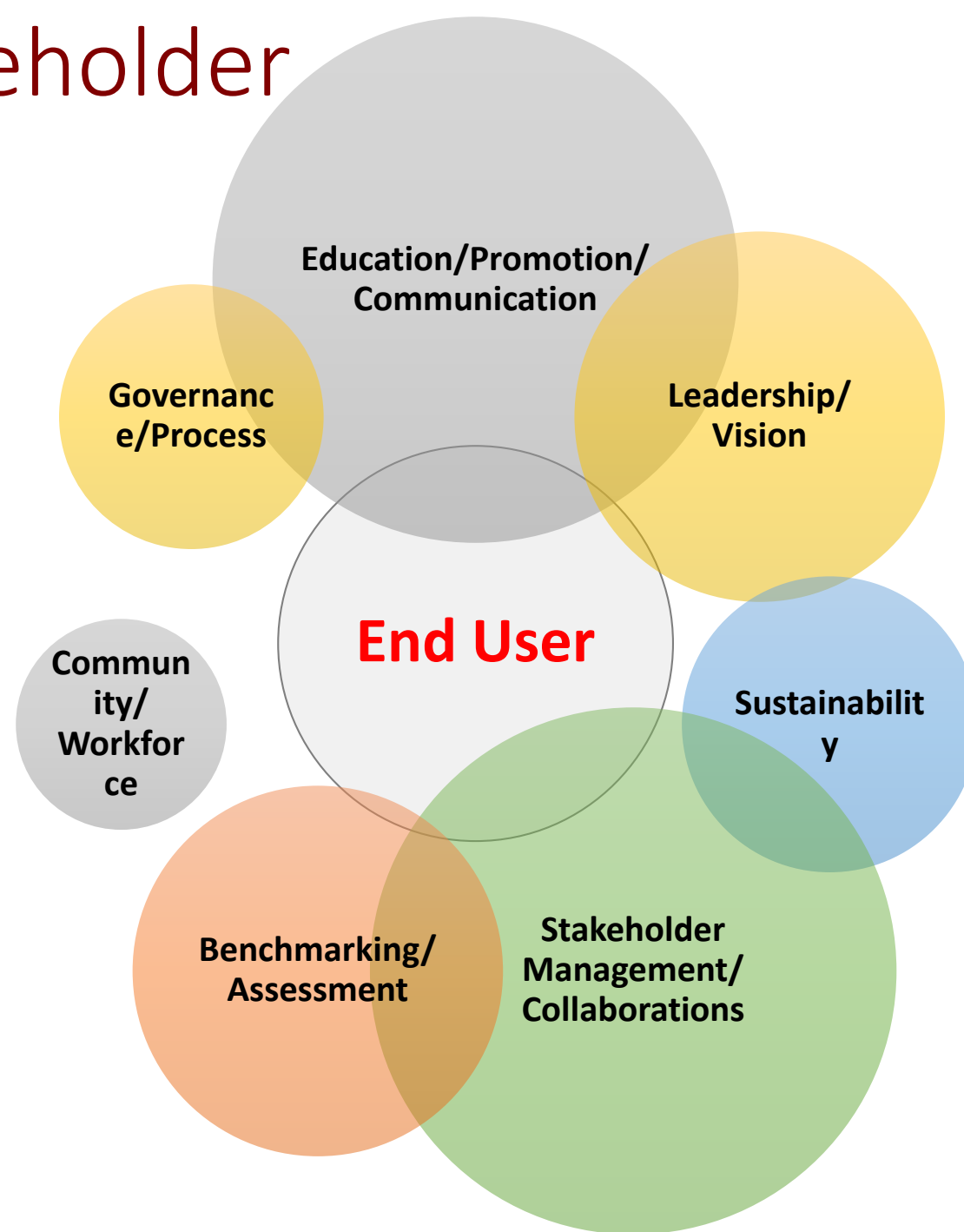
Sponsor/Stakeholder facing roles



Sponsor/Stakeholder facing roles



Sponsor/Stakeholder facing roles



Common Themes That Emerged

- **Co-Creation (partnering with researchers):** Research computing and data professionals are co-creating methods and software models; Collaborative process, very different from delivery of traditional IT and software services
- **Career Paths** are incomplete in most organizations; creating challenges for recruiting, developing and retaining these professionals.
- **Digital:** The exponential growth of digital technologies underlies work; accelerating change in the work due to changes in hardware, software, systems, and the nature of the data itself.
- **Status:** Work of research computing & data professionals generally held in high regard by faculty with whom they work; important status and power differences between these professionals and principle investigators that are part of a larger “two-tier” culture in most university settings.
- **Terminology:** Work centered on “cyberinfrastructure for research” and touches on many related domains, including “data science” and “high performance computing.” This work is distinct from, but connected to the work of “information technology” professionals.

Your Feedback

We have produced a living document:

Research Computing and Data Professionals: Job Elements and Career Guide

- <https://carcc.org/wp-content/uploads/2018/05/CI-Professionalization-Job-Families-Career-Guide.pdf>

- 1) Are the products we have described of use to you and your campus?
- 2) Comments are welcome.