

NSF ACI-1620695: “RCN: Advancing Research and Education Through a National Network of **Campus **R**esearch **C**omputing Infrastructures - The **CaRC** Consortium”**

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HPC Clusters

www.carcc.org

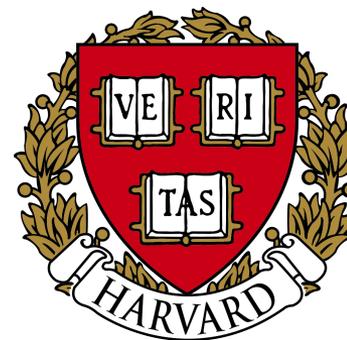
NSF ACI-1341935: “Advanced Cyberinfrastructure - Research and Educational Facilitation: Campus-Based Computational Research Support” – ACI-REF



THE UNIVERSITY
of
WISCONSIN
MADISON



USC University of
Southern California



http://aci-ref.github.io/facilitation_best_practices/

ACI-REF Best Practices of Facilitation

What is an ACI-REF, and What Activities Exemplify Facilitation?

Introduction and Main Ideas

Major Activities of Facilitation

+ blog, ...

Definitions

Appendix

Contribute

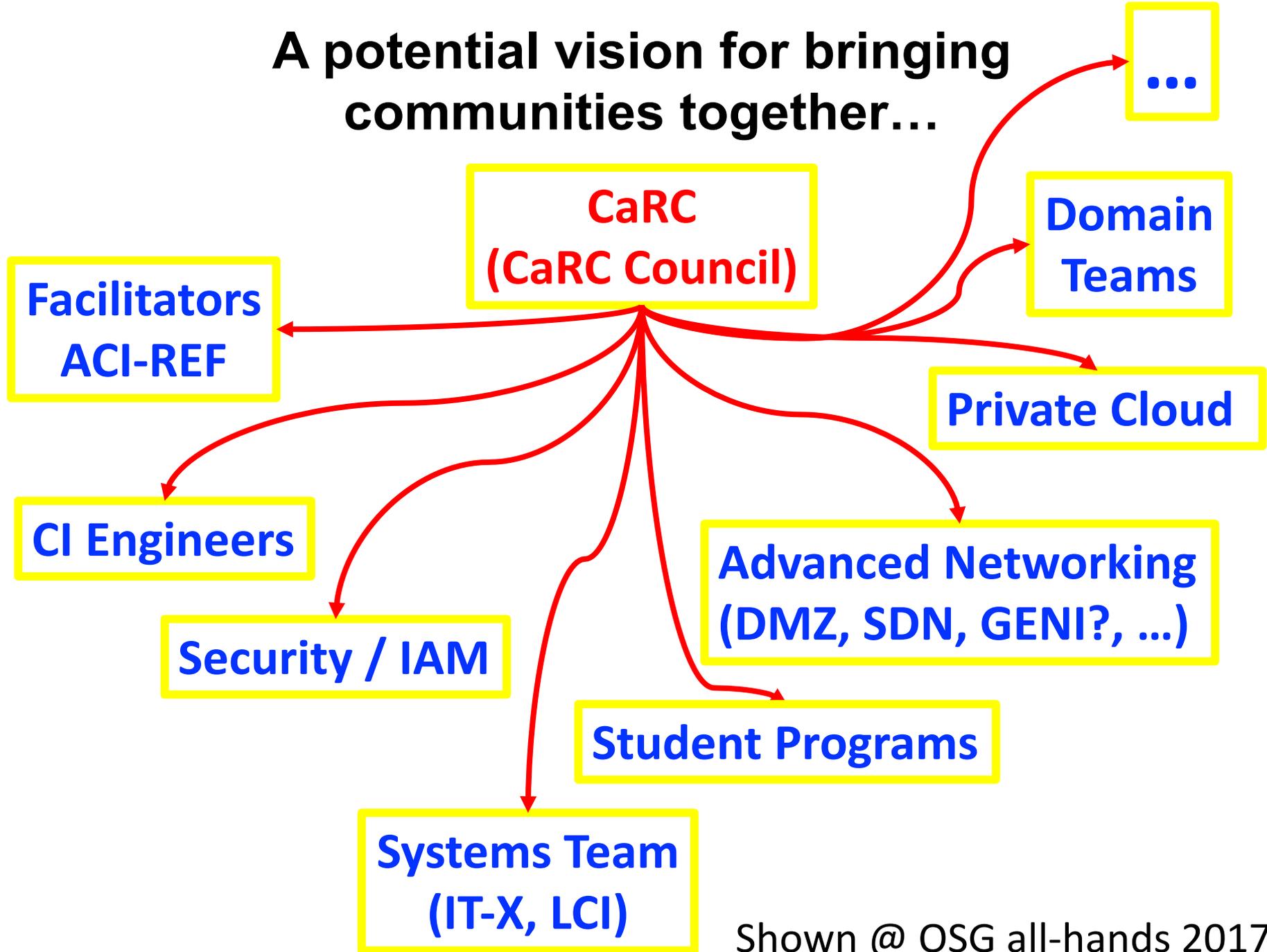
Acknowledgements

<http://aciref.org>

Learn more about the ACI-REF program



A potential vision for bringing communities together...

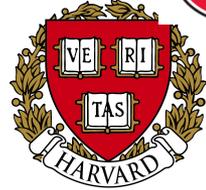


How to scale / grow / serve campuses & share?

- Many universities wanted to join ACI-REF (yet *we were not ready* as we are still learning how to collaborate and scale).
- Who / where is our “home” or “parent”?
- What broader activities (beyond Facilitation)?
- Who else to collaborate with? (CC, CI Engineers, CI Practitioners, Technical Leads, ...)

(RCN → CaRC)

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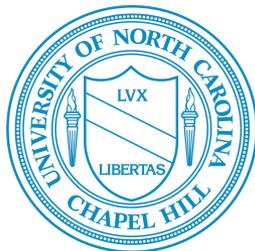
UNIVERSITY OF MINNESOTA



Stanford University



Ohio Supercomputer Center



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.

Purpose: The Consortium is committed to supporting the sustainability of campus efforts through professional and career development for the individuals (“Facilitators” and other professionals) who enable and collaborate with researchers to better utilize large-scale, advanced computing resources. The Consortium is further dedicated to extending and enhancing the reach and impact of campus and national research computing infrastructure on research conducted at the campus level (including multi-institution collaborations). The Consortium explores and develops effective strategies and best practices that campuses may use to empower their researchers to become more effective users of advanced research cyberinfrastructure (CI) at the campus, regional, national, and international levels.

Respondent profile (n=255) – Selected items

Select one:

4.3%	CaRC Leadership
6.7%	CaRC Council
83.1%	Involved in RC, but not a member of CaRC
5.9%	Other

Years experience in primary role:

16.7%	Under 5 years
23.0%	5-10 years
29.4%	11-20 years
19.8%	21-30 years
11.1%	Over 30 years

Gender:

18%	Female
80.4%	Male
1.6%	Prefer not to answer

Check all that apply:

5.1%	Campus executive leadership (Provost, CIO, VPR)
25.9%	Campus research computing leadership (VP, Director RC)
25.1%	Campus IT services (systems, security, networking, engineering)
36.5%	Campus RC facilitators (not part of CaRC or ACI-REF)
24.7%	Campus RC/data science instructor
26.7%	Campus IT/RC training and workforce development
36.1%	XSEDE Champions (campus champion, domain champion, student champion)
7.8%	ACI-REF Facilitator
16.9%	CASC Leader or member
18.4%	XSEDE leader or member

Check all that apply:

46.3%	Principle Investigator
24.7%	Research software developer
18.0%	Research team member
2.4%	Government research lab

CaRC Survey – 150 Universities responded

If CaRC Consortium could deliver one thing to you, "a must have," what would it be? (Something that you personally value or that is professionally useful to you. It would motivate you to want this to move forward.)



What is the biggest barrier preventing or limiting your “must have”?



Top interests

(not important=0; very important=1; very difficult=0; very easy=1)

Rank by importance:

- 1. Workforce development** for cyberinfrastructure administrators and staff (mean=.84)
- 2. Supporting facilitators** (broadly defined) on campus, bridging between research teams and research computing resources (mean=.84)
- 3. Research computing expertise sharing** among universities (mean=.84)

Rank by difficulty:

- 1. Influencing state and federal policies** impacting research cyberinfrastructure (mean=.18)
- 2. Research computing resource sharing** among universities (mean=.26)
- 3. Effective models for demonstrating return on investment (ROI)** in research computing resources (mean=.26)

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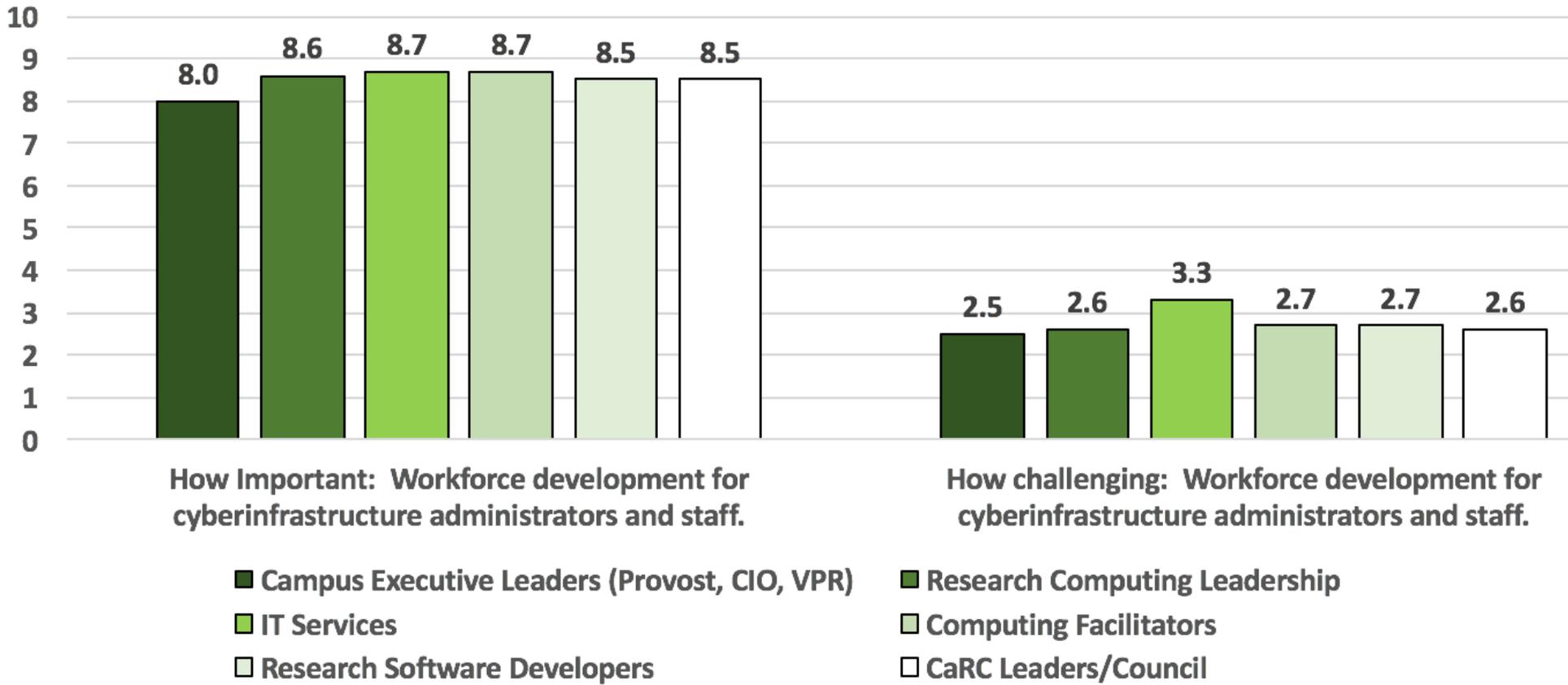
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Gaps between importance and difficulty:

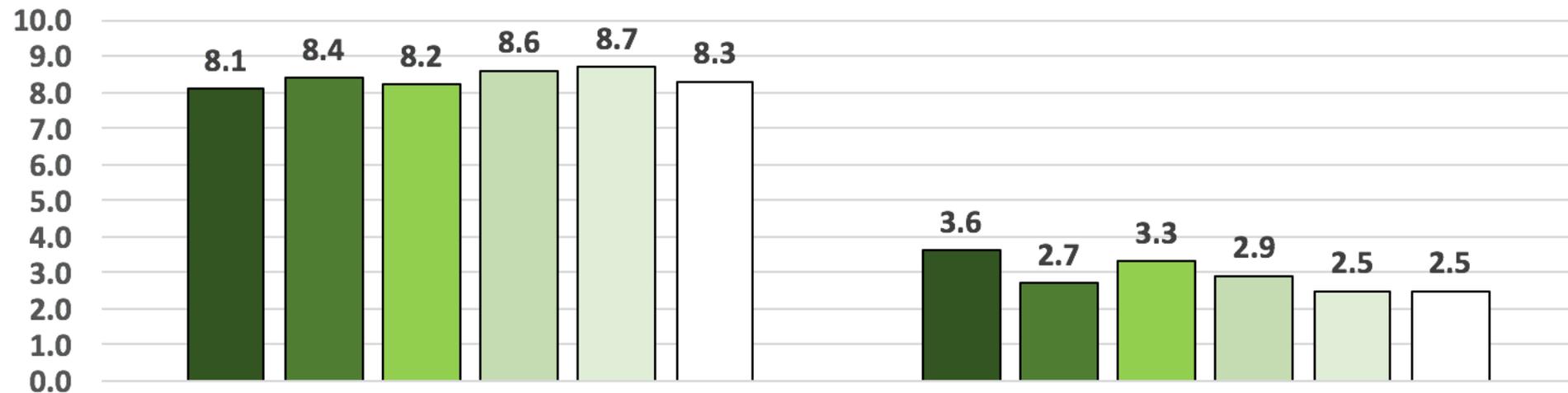
- 1. Influencing state and federal policies** impacting research cyberinfrastructure (gap=.59)
- 2. Workforce development** for cyberinfrastructure administrators and staff (gap=.56)
- 3. Supporting facilitators** (broadly defined) on campus, bridging between research teams and research computing resources (gap=.54)

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

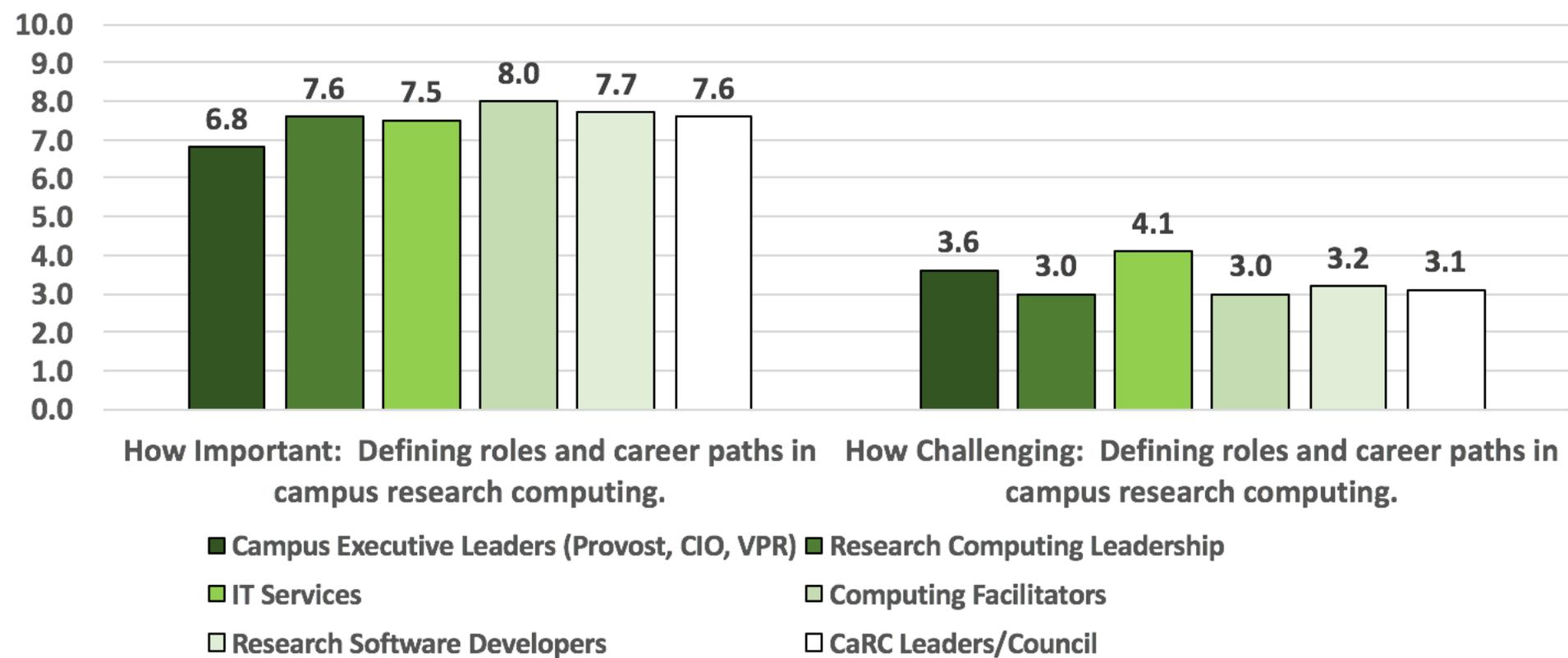


How Important: Supporting facilitators (broadly defined) on campus, bridging between research teams and research computing resources. **How Challenging: Supporting facilitators (broadly defined) on campus, bridging between research teams and research computing resources.**

- 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.

CaRC Consortium inaugural committee / focus areas*

- **CI workforce development** – A working group within CaRC to interface with the many regional and national efforts aimed at advocating for, defining, and developing the CI workforce. Profession? Titles? Roles? (Co-Chairs: Bottum/Hauser)
- **Developing the CaRC facilitator network** – A group charged with figuring out how to coordinate the facilitators within the expanding CC network. (Michaels/Brunson)
- **Expertise and resource sharing** – Consulting teams / skunkworks, human resource sharing (facilitation, systems, ...), physical resource sharing. (Sheehan/Knuth)
- **Stakeholder and value proposition** – A critical element that needs to be well-defined for CaRC to succeed, grow and move towards sustainability is to define who are the customers or stakeholders and what do these customers gain in terms of services and deliverables, i.e. what is the value proposition? (Sherman/von Oehsen)

CaRC Consortium future committees (*)

- **Leading practices in security** – Share security tips, leading practices, technologies/solutions, ...
- **Business model / administrative structure** – Formation of this will be delayed until the stakeholder / value proposition discussion matures.
- **Marketing / communications** – Development of a WWW presence, dissemination of survey results, and communication with stakeholders.

(*) aka maybe; will soon have leadership retreat

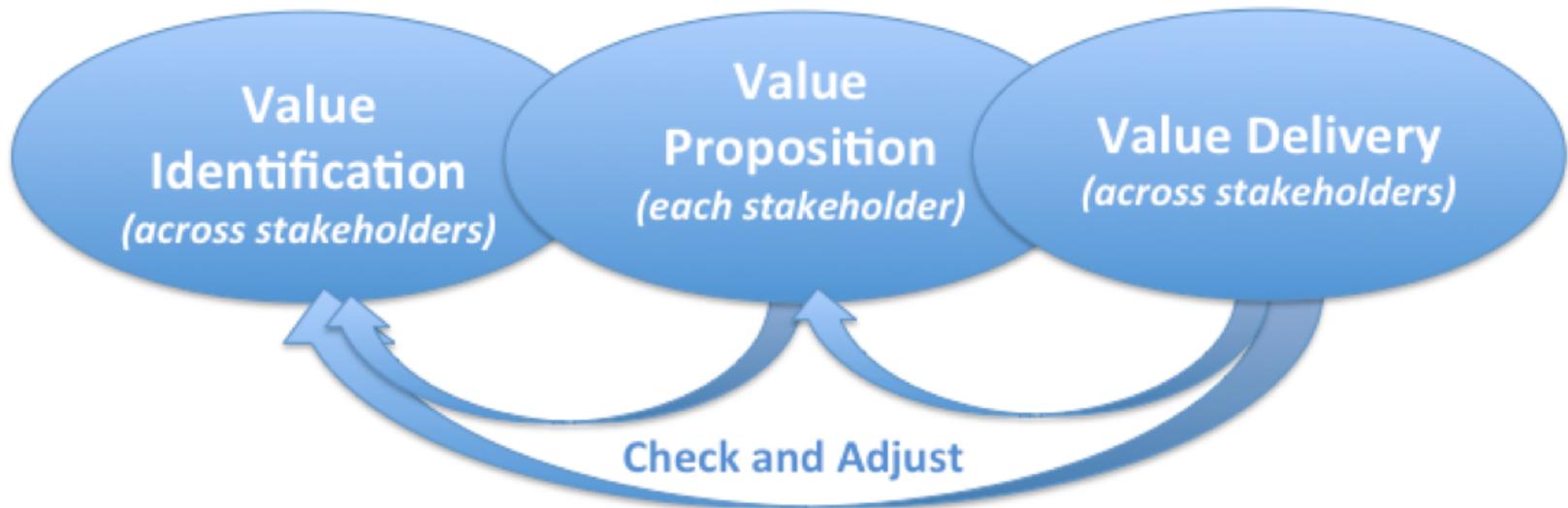
CaRC Consortium inaugural committee / focus areas*

Stakeholder and value proposition

- **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, 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.

Stakeholder Alignment for Collective Impact



Overarching CaRC Value Propositions

- The CaRC Consortium will advance the frontiers of research through **improved access** to and use of Research Computing (RC) resources.
- Members of CaRC will be better able to **optimize the use** of RC resources on each campus and across the CaRC Consortium.
- Members of CaRC will be better able to identify and share RC **leading practices and innovations**.
- Members of CaRC will be better able 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**.

Campus Executive Leadership (e.g. President, Chancellor, Provost)

- Membership in the CaRC Consortium helps your campus maximize the value generated from investments in research and research computing. As a CaRC Consortium member, your campus is well-positioned within the ecosystem of world-class research computing campuses in order to best meet current and future research needs.

Campus Information and Research Leadership (e.g. CIO, VPR)*

- Membership in the CaRC Consortium multiplies the research computing expertise and resources available to principal investigators and research teams across your campus. The CaRC Consortium is dedicated to helping its members document the impacts of research computing in grants and publications, increase the security compliance capabilities, increase compliance with data management plans, and ensure career paths for research computing talent.

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:
 - Researcher facing roles
 - Systems 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?
- Breakout report to CASC

Research facing roles

Provide possible solutions to facilitate and/or transform research

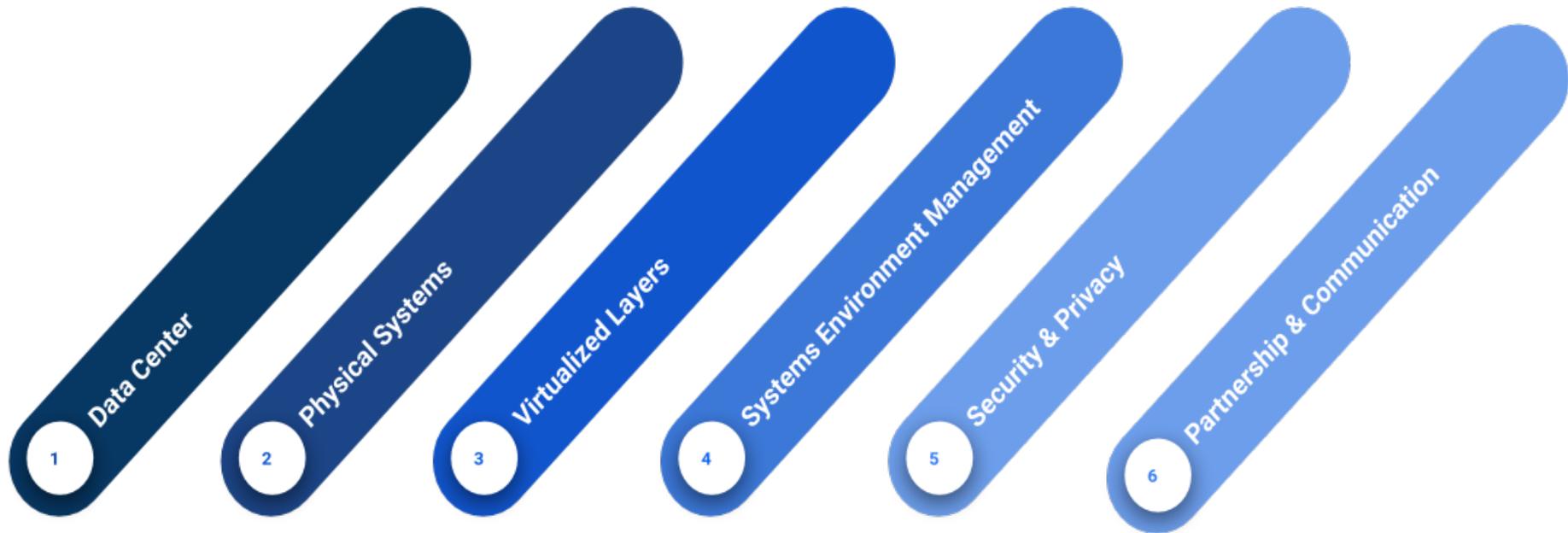
Actively solving problems and enhancing learning with full awareness of the local and larger research computing and data landscape. This includes being agile and proactive.

Facilitating collaboration and coordination with other people in the technology/research landscape

Engaging researchers to co-create and co-learn relevant advanced computing capabilities

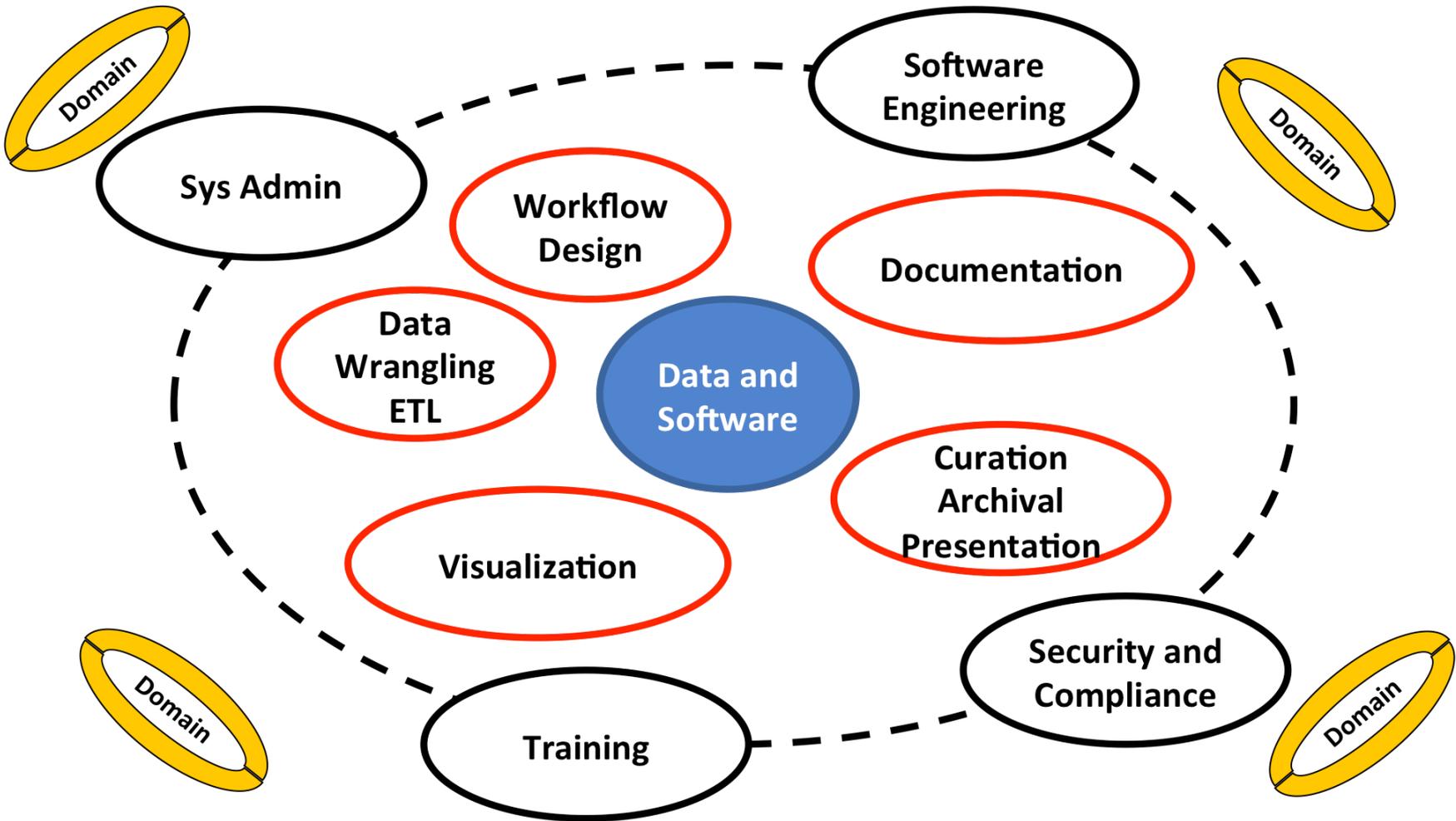
Providing regular communications to the campus or external research community

Systems facing spectrum

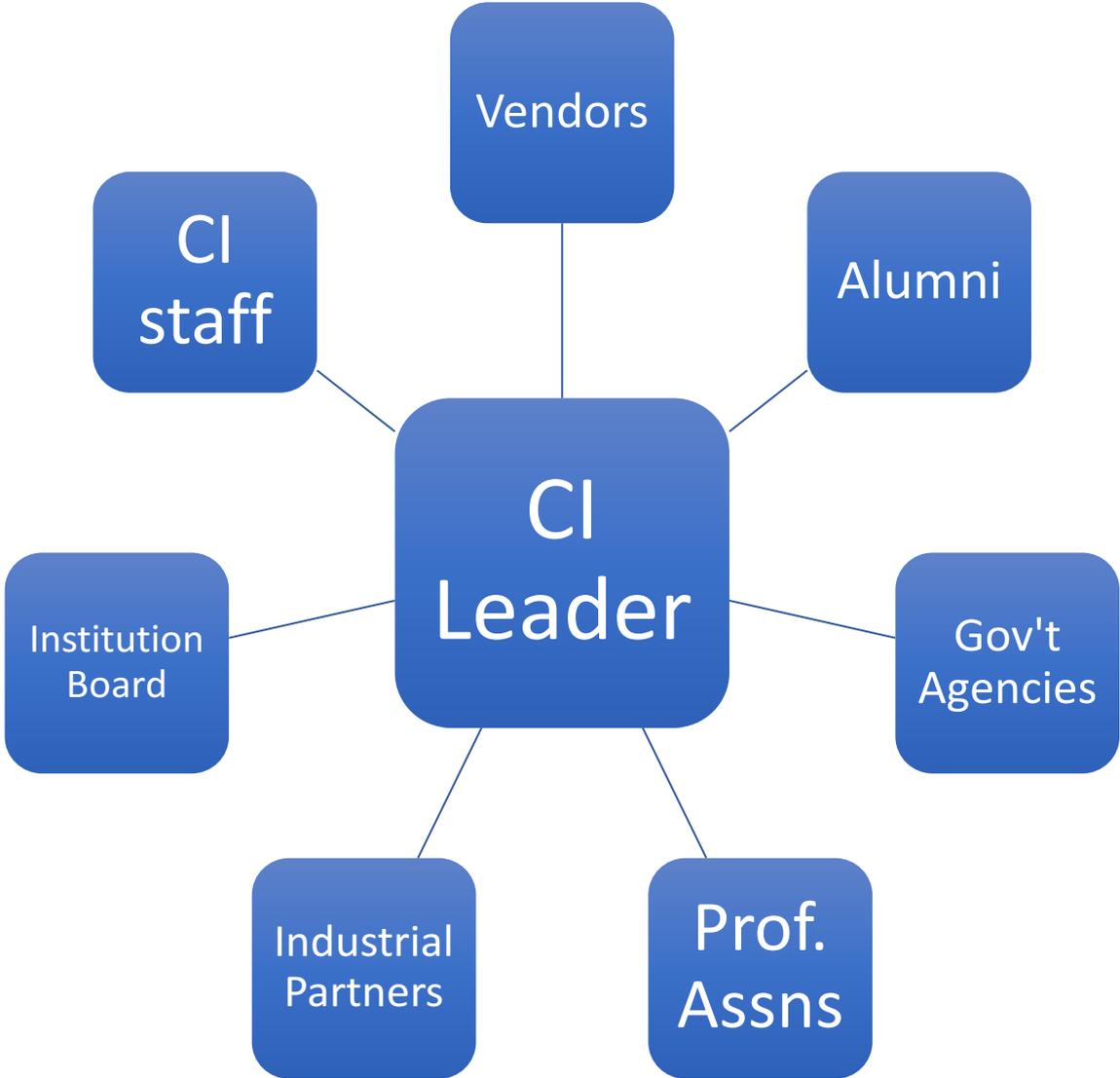


Next focus area (for me): Collaboration of CC, RMACC, CaRCC (and maybe CI Eng)

Software/Data facing roles



Stakeholder Facing Network



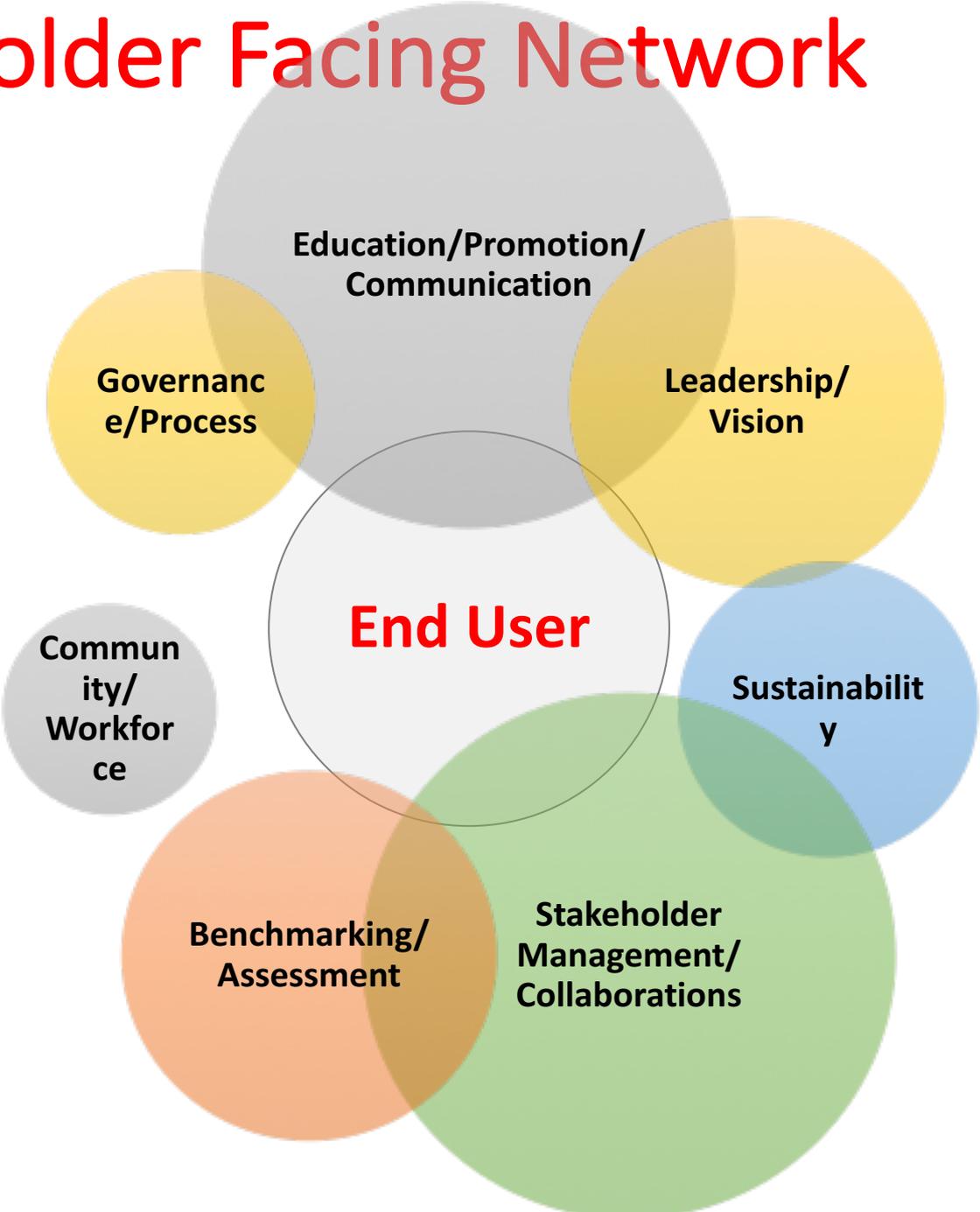
Stakeholder Facing Network



Stakeholder Facing Network



Stakeholder Facing Network



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.

CaRC is in its early phase of instantiation and is likely malleable

What should CaRC do?

Who should CaRC support?

What is CaRC's value to you?

Is your institution seriously interested in joining? Why not!!!

jb@clemson.edu, tec3@utah.edu



CARCC.ORG

Campus Research Computing Consortium

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