The Research Computing and Data Capabilities Model

Research Computing and Data[1] (computing, data, and related infrastructure, services, and people) is changing at an accelerating rate, while the range of academic fields and disciplines depending on this infrastructure is expanding and becoming increasingly diverse. This Capabilities Model was developed to identify the breadth and variety of relevant approaches to, and the key factors for providing this support, with a focus on the front lines of Research Computing and Data infrastructure.

The Capabilities Model is designed for use as an input into strategic decision making and organizational planning, and is intended to be inclusive across types of institutions (large and small, public and private, etc.), as well as different organizational models (e.g., centralized or decentralized).

How can the Capabilities Model benefit your institution?

The Capabilities Model can help you answer these questions:

- How well is my institution supporting computationally- and data-intensive research, and how can we get a comprehensive view of our support?
- What is my institution not thinking about or missing that the community has identified as significant?
- How can my institution (and my group) identify potential areas for improvement?

The Capabilities Model is designed to be useful to a diverse mix of stakeholders, including campus research computing and data practitioners, along with the principal investigators and research team members (faculty, staff) with whom they work, as well as key partners (e.g., the Library), and campus leadership.
Some common uses for the Capabilities Model are:

- To identify and understand areas of strength and weakness in an institution's support, e.g., as when conducting strategic planning and prioritization exercises.
- To benchmark your institution's support against peers, e.g., when making an argument for increased funding to remain competitive on faculty recruitment and retention.
- To compare local institutional approaches for supporting Research Computing and Data to a common community model (i.e., a shared vocabulary), to facilitate communications and collaboration.

How can my institution use the Capabilities Model?

An assessment tool allows institutions to conduct a self-assessment on a series of factors across a range of perspectives. To complete the assessment and use it in your strategic planning efforts:

- **Login to the portal, create a profile** for your institution, and **choose the type of assessment** you will conduct. You can choose an *Essentials* version with a subset of capabilities for new and emerging RCD programs, a *Full* assessment with all ~150 capabilities covering a broad range of topics for established programs, or even a fully customized assessment using the *Chart-Your-Own-Journey* version.
- **Gather your team and answer the questions** about different topic areas. The Capabilities Model provides a measure of your coverage for the individual capabilities and for each topic area.

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[1] "Research computing and data" (abbreviated as RCD) includes technology, services, and people supporting the needs of researchers and research, and is intended as a broad, inclusive term covering computing, data, networking, and software. The National Science Foundation (NSF) uses the term "cyberinfrastructure," and others use "Research IT."

- Your team can **mark specific areas for attention**; the tool will include these as part of your summary.
- Your team can **set goals for each of your priority areas**, as part of your strategic planning to improve your institution's capabilities.
- You can repeat the assessment down the road to measure progress.

As the community contributes data from their respective institutions, you will be able to benchmark your institution against your peers, and also understand how RCD is supported in various community segments, regions, etc. The assessment tool is provided as a web application that supports collaboration among individuals or teams involved in Research Computing and Data, who can work together to assess the current capabilities. The tool is organized into five areas of support:

- **Researcher-facing issues** of support, outreach, training, and research lifecycle management
- **Research Data Management issues** including creation, discovery, analysis, visualization, storage and transfer, policy, and security.
- **Research Software issues** including installation, development, optimization, workflows, portability, security, and physical specimens management.
- **Systems issues**, including support of infrastructure (compute, data, network, etc.), operations (monitoring, change management, planning, etc.), and security and compliance.
- **Issues related to Strategy and Policy roles**, including institutional alignment and culture, funding, professional staff development, and diversity, equity, and inclusion.

Access the tool and supporting documentation on the RCD-Nexus Portal at: **https://portal.rcd-nexus.org/**.

The CaRCC Working Group page (https://carcc.org/rcdcm/) for the Capabilities Model has more information about how to get help completing an assessment, including office hours and discussion groups where institutions share approaches and uses of the data.

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