Guide to CI Job Family Matrix

Background:

In 2018 the [CaRCC](#) CI [Workforce Development/Professionalization Committee](#) held a CI Professionalization Workshop. One of the outcomes of this workshop was creating the *[Research Computing and Data Professionals Job Elements and Career Guide](#)*. This work spurred a sustaining CI Professionalization group that will further develop and disseminate frameworks and approaches to guide conversations between Human Resources leaders and research computing and data leaders around attracting, retaining, diversifying, and developing cyberinfrastructure and research computing and data talent.

In 2019, a working group was formed to create an HR framework for a *Cyberinfrastructure (CI) Job Family.* This involves building a series of positions based off of the four distinct systems-facing, researcher-facing, software/data-facing, and leadership/stakeholder-facing roles from the job elements and career guide linked above. Like the guide, this HR framework encompasses a large variety of roles/responsibilities and desired skills, which are needed to enhance research capabilities at local institutions. It is understood that there will be differences in institutional size, scope, and relationship with enterprise IT that will create a need for customized sets of Core Duties and Additional Qualifications and Skills at each independent institution. However, the structure, the series, the hierarchy of position levels, and the needs for having highly skilled lead and principle level individual contributors should all remain very relevant and normally be maintained. This set of living documents will provide a family of job tracks that each institution can use as a reference when shaping the future of their CI workforce, with the knowledge that a large number of institutions provided feedback in the final product.

Structure:

This [HR Framework](#) for CI consists of a structure with job functions, families, series/tracks, grade levels, and salary ranges that provides a strong foundation to describe the different kinds of work undertaken at an Institution. Within the framework, the categories are described in the [Definitions tab](#).

There are some notes to consider before jumping into one of the series. The Job Function at some institutions might be Information Technology, while others within the Research or Research Technology. Throughout this document the Job Family is referred to as Cyberinfrastructure and CI is used subsequently throughout. This could easily be changed to Research Computing (RC), Research Computing and Data (RCD) or Research IT (RIT), wherever one sees fit. For example, a CI Support Specialist, could be a RC Support Specialist, which for most of us is distinct from Enterprise IT, User Support, or Help Desk roles.

A full job matrix includes grades 1 (entry-level) through 5 (expert-level), and has roles for both Professionals (individual-contributors), Managers, and Directors. On each series worksheet (i.e. the tabs at the bottom), there are Professional Level 1 through 5, which are represented in Columns A - E respectively from Rows 5 - 17, while the Manager positions at Level 4 - 5 are only in Columns D - E, Rows 19 - 31 just under the Professional level that they are equivalent. The Leadership-Stakeholder-series contains just 3 levels starting at 6 going through 8, in Columns A - C. The number of levels for some institutions is fixed within the HR framework that currently exists, but this template should provide understanding at how the responsibilities, skills and scope of the positions changes within the ladder.

Notes from the Working Group Discussion:

One of the biggest concerns was to develop individual-contributor roles that are highly-skilled and equivalent in grade to management roles. This is a very important for creating career paths for those that have the desire to grow into technical leadership roles but do not desire to manage, recruit, and retain professional staff.

Even though there may be some overlap with positions in Enterprise IT (such as Systems Administration, Support Services, Application Development, …), in the line of supporting researchers the breath of supporting a wide stack of technologies, the percentage of development, engagement with researchers in a consultation manner warranted each of the unique series within CI Professional Job Family Matrix. There might be lower level positions that have more overlap, but the direction of the series gets much broader at the top, while in Enterprise IT the technical leads generally have a deeper and narrower or more focused scope as they become the expert.

Some of the roles around the business operational aspects of running CI services was left out of these series and might overlap with other Job Functions like Research Administration, Libraries, or Finance. These include roles like vendor management, cloud broker, grants management, data management or data manager, compliance officer, and security officer.

In practice, many of us feel like we need half-steps or mechanisms for in-grade promotions to keep positions competitive and staff feeling noticed and rewarded for regularly going above and beyond to give our researchers the competitive edge.

Within the Systems Professional series, there is quite a bit of internal development of deployment practices, business operations, and collaborations between different technology entities whether it be data center staff, campus networking/security, and other vendors that are not well captured in the current skills and scope of positions.

For the most part, it is the skills and experiences that drive the desired minimum criteria and there is not a specific required education for each series. However, within the Research Facing series, we have found it crucial for a Facilitator to have more specific academic background with

demonstrated research experience as this helps them relate better to the plight of the researcher and the research process. There was even some critical discussion surrounding the idea of whether a level 1 facilitator should exist, but this role is seen much more as a help desk type of position, with the prospect of moving up within the Facilitation Professional track.

For the Software/Data facing series, it was decided to keep these as a single series because the core duties we focused on are relevant to both areas. It is their skills, tools, and data that differ. A Research Software Engineer or Data Scientist who has progressed in this series to Level 4 and 5 are essentially one in the same with a comprehensive set of knowledge and skills. Also, the responsibility of installing software, is most likely suited for the Systems or Facilitation Professionals.

For the Leadership/Stakeholder facing series, the progression of the Director changes with longer timelines and increasing scope of projects and collaborations. The positions are also commensurate to the other leadership positions that the CI Director normally engages with as peers, locally, in the region, and in the nation.

2019 Working Group Participants:

Scott Yockel (lead)- Harvard, University Research Computing Officer
Melissa Lucius and Nicole Breen - Harvard, IT HR
Erik Deumens - U Florida, Director of Research Computing
Anna Thrombly - U Florida, IT HR
Eric Adams - Purdue, Program Manager, Education & Outreach
Brian Balderston - SDSC, Manager of Research Data Infrastructure
Wayne Gilmore - Boston U, Director of Research Computing
Janae Baker - Rutgers, Program Coordinator
Thomas Cheatham - U of Utah, Professor, Director of Research Computing