**Capability profile**

**Version: 0.05**

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Capability profile is defined as capacity to perform tasks in a given role. It consists of 2 components.

1. Core function – main function of a given role
2. Competency – related competencies of a profile

There are 5 levels of each discipline as follows.

1. **Apprentice** Have limited set of skills. Able to work on guided projects or narrow specific tasks. Supervision is needed for brand-new or complex tasks.
2. **Practitioner** Have basic set of skills covering the majority of aspects. Able to work on specific tasks. Recommendation is needed for complex tasks.
3. **Competent** Able to apply set of skill to solve real-world problem. Able to solve common problems independently.
4. **Proficient** Able to lead a project for solving real-world problems. Able to solve unseen problems with some advice.
5. **Expert** Able to lead a team to conduct a research or development project. Able to solve unseen problems and create new research protocols.

**Disclaimer**

This competency and capability profile framework does not cover the diversity of background knowledge in research domain. They are packed in *D1 Scientific background knowledge, methodology, process, and tools*. The diversities are in *A high performance computing* and *B computing competency*. The competency of *E Soft skills* is not covered in this version.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Competency/Role | HPC AI specialist | | | HPC computational chemistry specialist | | |
| **Apprentice** | **Practitioner** | **Competent** | **Apprentice** | **Practitioner** | **Competent** |
| A1 Estimate benefit of HPC on specific use case | remember | understand | apply | remember | understand | apply |
| A2 Running specific software/tool/workflow on HPC environments | remember | apply | analyze | remember | apply | analyze |
| A3 Performance optimization on HPC |  | understand | apply |  | understand | apply |
| A4 Debugging software/workflow on HPC |  |  |  |  |  |  |
| A5 Operating HPC system |  |  |  |  |  |  |
| B1 Working remotely in Linux environment via command line interface | apply | apply | evaluate | apply | apply | evaluate |
| B2 Managing programming languages and their packages via package manager | understand | apply | analyze |  |  | apply |
| B3 Installing and managing scientific software and preparing a related environment | remember | understand | understand | remember | understand | apply |
| B4 Using specific tools, software, or IDEs as each individual or together | apply | apply | analyze | understand | apply | analyze |
| B5 Estimating computing resource requirement | remember | apply | analyze |  | apply | analyze |
| B6 Distribute software, data, or trained model |  |  |  |  |  |  |
| C1 Compliance with license, policy, and ethics | understand | understand | apply | remember | understand | apply |
| D1 Scientific background knowledge, Methodology, process, and tools | understand | understand | apply | understand | understand | apply |
| D2 Literature Review | remember | understand | apply | remember | understand | apply |
| D3 Scientific Data management and analysis | apply | apply | apply | apply | apply | apply |

**Roles**

[HPC AI specialist apprentice 4](#_Toc196690360)

[HPC AI specialist practitioner 5](#_Toc196690361)

[HPC AI specialist competent 6](#_Toc196690362)

[HPC computational chemistry specialist apprentice 7](#_Toc196690363)

[HPC computational chemistry specialist practitioner 8](#_Toc196690364)

[HPC computational chemistry specialist competent 9](#_Toc196690365)

## HPC AI specialist apprentice

**Computational core function**

* Able to utilize a node of HPC for running AI workload
* Able to prepare a Python environment by following a guideline
* Able to work in batch and offline mode which is a common HPC environment

**Research core function**

* Basic knowledge of related topics
* Communicate finding results

**Competency**

* A1 remember
* A2 remember
* B1 apply
* B2 understand
* B3 remember
* B4 apply
* B5 remember
* C1 understand
* D1 understand
* D2 remember
* D3 apply

## HPC AI specialist practitioner

**Computational core function**

* Able to utilize HPC for running AI workload using multinode
* Able to prepare a Python environment by adapting from a guideline
* Able to set relevant environment variables efficiently by following guidelines
* Able to work in batch and offline mode which is a common HPC environment

**Research core function**

* Basic knowledge of related topics
* Able to find relevant articles, publications, or repositories
* Communicate finding results

**Competency**

* A1 understand
* A2 apply
* A3 understand
* B1 apply
* B2 apply
* B3 understand
* B4 apply
* B5 apply
* C1 understand
* D1 understand
* D2 understand
* D3 apply

## HPC AI specialist competent

**Computational core function**

* Able to utilize HPC for running AI workload using multinode efficiently
* Able to write guidelines to prepare a Python environment for specific environment
* Able to set relevant environment variables efficiently by applying knowledge from guidelines
* Able to work in batch and offline mode which is a common HPC environment

**Research core function**

* Basic knowledge of related topics
* Able to find and describe relevant articles, publications, or repositories
* Share ideas and efficiently communicate finding results

**Competency**

* A1 apply
* A2 analyze
* A3 apply
* B1 evaluate
* B2 analyze
* B3 understand
* B4 analyze
* B5 analyze
* C1 apply
* D1 apply
* D2 apply
* D3 apply

## HPC computational chemistry specialist apprentice

**Computational core function**

* Able to utilize HPC for performing given tasks according to the instructions strictly
* Able to work in batch and offline mode which is a common HPC environment

**Research core function**

* Basic knowledge of related topics
* Communicate finding results

**Competency**

* A1 remember
* A2 remember
* B1 apply
* B3 remember
* B4 understand
* C1 remember
* D1 understand
* D2 remember
* D3 apply

## HPC computational chemistry specialist practitioner

**Computational core function**

* Able to utilize HPC for performing given tasks by applying knowledge from guidelines
* Able to set relevant environment variables efficiently by following guidelines
* Able to work in batch and offline mode which is a common HPC environment

**Research core function**

* Basic knowledge of related topics
* Able to find and describe relevant articles, publications, or repositories
* Communicate finding results

**Competency**

* A1 understand
* A2 apply
* A3 understand
* B1 apply
* B3 understand
* B4 apply
* B5 apply
* C1 understand
* D1 understand
* D2 understand
* D3 apply

## HPC computational chemistry specialist competent

**Computational core function**

* Able to utilize HPC for performing a given task from a guideline efficiently
* Able to set relevant environment variables efficiently by applying knowledge from guidelines
* Able to prepare software and related environments by following guidelines
* Able to work in batch and offline mode which is a common HPC environment

**Research core function**

* Basic knowledge of related topics
* Able to find and describe relevant articles, publications, or repositories
* Share ideas and efficiently communicate finding results

**Competency**

* A1 apply
* A2 analyze
* A3 apply
* B1 evaluate
* B2 apply
* B3 apply
* B4 analyze
* B5 analyze
* C1 apply
* D1 apply
* D2 apply
* D3 apply