

Open HPC Certification and Relationship to OSS



Julian Kunkel

<https://hpc-certification.org>

OSSG Annual General Assembly Lightning Talks

2020-10-15

Outline



1 The Forum

2 Competence Standard

3 Conclusions

Challenges for Training



- Not everyone possess the right level of training
 - ▶ Inefficient usage of systems, frustration, lost potential
 - ▶ Good training saves compute time and costs!
- Diverse user background and goals
 - ▶ The skill set varies significantly
- Learning is not trivial and requires motivation and opportunity
 - ▶ Users need to understand beneficial knowledge for tasks
 - ▶ There exist various training material
 - ▶ Teaching provided by different providers is hard to compare
- Difficulties to verify the skills

This applies to HPC but also industry to verify (Linux) skills.

HPC uses plenty of open source software, so OSS skills matter to HPC!

The HPC Certification Forum



Goals

- Fine-grained standardizing HPC knowledge representation
 - ▶ What competences exist, how are they defined?
 - ▶ Puzzle of competences for everyone (practitioners, students, admins)
 - ▶ Supporting navigation and role-specific knowledge maps
- Establishing international certificates attesting knowledge
- Supporting an ecosystem around the HPC competences

Scope of the forum

- Central authority for competence representation, certification, and support
- Purposeful limitations of the forum:
 - ▶ We do not compete with content providers
 - ▶ We do not create a curriculum (university/centers responsibility)

The HPC Certification Forum



Organization Details

- An independent international body
- Organized into
 - ▶ Steering board (elected)
 - ▶ Full members (with voting rights)
 - Contributors to the project (e.g., 1-2 hours per month)
 - ▶ Associate members (anyone and any institution)
- Collaborating with institutions

Data handling

- Everything* is communicated/developed/available in the open GitHub (<https://github.com/HPC-certification-forum>)
- Exception are examination questions :-)

Outline



1 The Forum

2 Competence Standard

3 Conclusions

Classification of Competences == Skills



- A **skill** defines background, objectives, learning outcomes
- The **skill tree** organizes the competences as hierarchical skills
- **Competence standard** is a fixed version of the tree with certificates

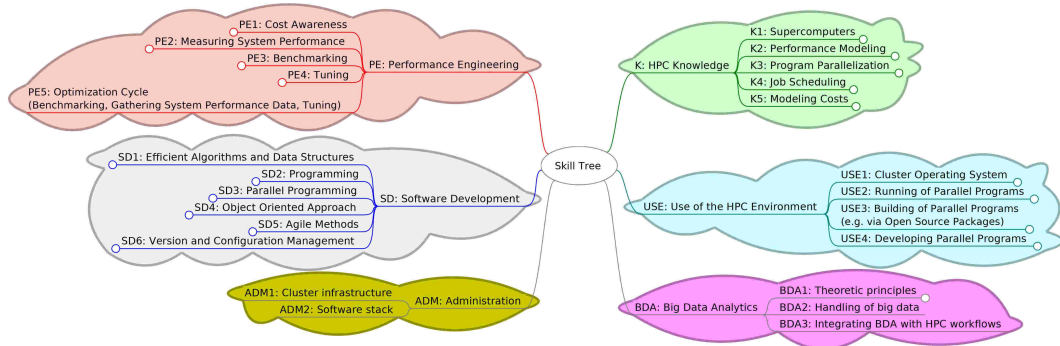


Figure: Top-levels of the skill tree (Initial ADM and BDA branches).
A leaf skill should be coverable in 1-4 hour training

Example High-Level Skill (Excerpt)



- Name: Command Line Interface
- Id: USE1.1-B
- Background: HPC systems are usually accessed via a Linux-based Command Line Interface (CLI) that is provided by a shell. At its core, a shell is ...
- Aim:
 - ▶ describe the key principles of a shell
 - ▶ execute basic programs to query system information and manipulate...

Learning outcomes (these must be examinable)

- Utilize the bash shell to execute individual programs with arguments
- Describe the meaning of the exit code of a program
- Run multiple programs after another depending on the exit code `;`, `&&`, `||`
- List the set of basic programs and their tasks:
 - ▶ `pwd`
 - ▶ ... See <https://www.hpc-certification.org/wiki/skill-tree/use/1/1/b>

Relevance for OSS



- HPC skills require Linux knowledge
- Maybe the concepts for HPC-CF is relevant generally to practitioners?
- Open, free, and fine-grained certification would be great to have for Linux!

New: Experts Adopting Skills

- Enable experts to curate skills that are in their field of expertise
- Similar to code maintainer

Outline



1 The Forum

2 Competence Standard

3 Conclusions

Outlook and Expected Benefits



HPC practitioners

- Increase motivation to participate as the certificates are recognized in a CV
- Validate knowledge via tests
- Browse relevant competences
- Identify recommended and required skills related to certain tasks
- Understand and compare teaching offers across sites

Data centers

- Increase sharing of teaching materials
- Simplifies documentation of taught skills
- Identify missing teaching activities
- Tailor skill-representation specifically to users
- Correlate lack of skills with efficient use



This training covers (partially)
- K1.1 System architectures
- K1.2 Hardware architectures

See <https://hpc-certification.org/c/1.0>

Conclusion



HPC Certification Forum

- Effort to standardize representation/certification of relevant HPC skills
 - ▶ Hierarchical definition of skills for practitioners
 - ▶ Building blocks that can be cherry-picked for different tasks
 - ▶ It's goal is **NOT** to provide content or a linear curriculum
- Customizable representation and navigation for data centers/domains
- Visit us and join our **Slack**/mailing lists: <https://hpc-certification.org>

Are these concepts relevant to OSS?

- Free and open certification
- Ideas and technical concepts