

## RSE use-case description: Draft for a community recommendation

### How to describe a use case

1. Title/name of the use case;
2. Name, type, and contact data of the person or institution that is responsible for the use case, *i.e.*, the potential collaborator, employer, or funding agency;
3. Brief summary (two/three sentences) as free text;
4. Associated **use-case category**, identified by selection of fields in the **use-case matrix**;
5. Formal qualifications needed/desired from RSE institutions, groups, or individual RSEs; indicate in each case specifically whether it is a strict requirement or if it is only desired
6. Required **competencies** and/or informal qualifications from the **RSE profile map**;<sup>1</sup> indicate in each case specifically whether it is a strict requirement or if it is only desired
7. Category of work to be done (employment, grant, academic collaboration, *etc.*);
8. Details on the contractual and other conditions of the work/collaboration;
9. Deadline for responses;
10. Literature references on relevant previous work, if any (*e.g.*, to be cited by DOI).

### Use-case matrix: Horizontal axis – source: “Sammlung von RSE-Arbeitsvorgängen”<sup>2</sup>

- I. Research and development
  - A) Software development
  - B) Data and other infrastructure development
  - C) Scientific research (possibly with subordinate development aspects)
  - D) Maintenance
  - E) Any other R&D
- II. Management, support, and administration
  - A) Project management and/or acquisition
  - B) Support to users of a specific software or infrastructure
  - C) Support to communities, research groups, or academic organizations
  - D) Any other management, support, and administration
- III. Education, teaching, and training
  - A) University/academic education
  - B) Professional/continuing education
  - C) Open educational resources and digitalization of education
  - D) Any other education, teaching, and training
- IV. Advocacy
  - A) Representation of disciplinary/domain-specific interests
  - B) Representation of industrial interests
  - C) Support of collective bargaining/organizing
  - D) Any other advocacy

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1 Work in progress as a separate document, see also [https://hackmd.io/2z\\_rAEBR8S9iV1Wv9a9UQ?both](https://hackmd.io/2z_rAEBR8S9iV1Wv9a9UQ?both)

2 <https://pad.gwdg.de/dKcY6QmRS4yCnKCFVOgIng?view#>

## Use-case matrix: Vertical axis – source: CCS (ACM)

1. Applied mathematics and numerical modelling/simulation (including, e.g., data-driven modelling, CFD, molecular simulation, quantum mechanics, process simulation, and discrete event systems)
  2. Data management and repositories (including e.g., information storage systems, DB design and models, data/metadata schemas and data structures, query languages, DB administration, and data stewardship)
  3. Distributed systems (including, e.g., cloud/grid computing and client-server architectures)
  4. Formal methods and theory of computation (including, e.g., formal languages and automata theory, computational complexity, cryptography, logic, design and analysis of algorithms, randomness, geometry and discrete structures, semantics and reasoning)
  5. Embedded, real-time, and reactive systems software
  6. High-performance computing
  7. Information retrieval, data mining, data analysis, and visualization
  8. Software/infrastructure capabilities that are “extra-functional,” i.e., go beyond the elementary functionality (including, e.g., interoperability, computational performance, reliability, resiliency/fault tolerance, safety, usability)
  9. Software/infrastructure documentation and administration
  10. Web applications/services
- (0. Unspecific/without dedicated topic)

## List of example use cases

**Remark:** The present example use cases from indeed.com have a strong focus on horizontal category I; in particular, there are no positions advertised in education/training (category III) even though this is a major activity that research software engineers do engage in. Hence, these are **not representative** use cases, also because the concept of an RSE use case is not at all limited to job postings. It includes calls for funding, indications of interest in academic collaborations, and any other reason for getting in touch with one or multiple RSEs.

- <https://www.indeed.com/viewjob?jk=cf195f54bfb68d1a&tk=1ejagpbsh34t8000&from=serp&vjs=3>: Predominantly IB-2
- <https://www.indeed.com/viewjob?jk=0405639589f5a213&tk=1ejagpbsh34t8000&from=serp&vjs=3>: Predominantly IA-1
- <https://www.indeed.com/viewjob?jk=c53c9870e00a5163&tk=1ejagpbsh34t8000&from=serp&vjs=3>: Predominantly IIA-5
- <https://www.media.mit.edu/about/job-opportunities/research-software-engineer-laboratory-for-social-machines-1/>: Predominantly IIA-2
- <https://www.indeed.com/viewjob?jk=d924227387514873&tk=1ejagpbsh34t8000&from=serp&vjs=3>: Predominantly IIC-7

- <https://www.indeed.com/viewjob?jk=8e61800e5365577a&tk=1ejagpbsh34t8000&from=serp&vjs=3>: Predominantly IC-3
- <https://www.indeed.com/viewjob?jk=d863e26eb03ffb21&tk=1ejafndrp0ggi000&from=serp&vjs=3>: Predominantly IA-7
- <https://www.indeed.com/viewjob?jk=91974d82e1a52077&tk=1ejafndrp0ggi000&from=serp&vjs=3>: Predominantly IIC-6
- <https://www.indeed.com/viewjob?jk=3943247beb19f6ba&tk=1ejafndrp0ggi000&from=serp&vjs=3>: Predominantly IB-1
- <https://www.indeed.com/viewjob?jk=f58b163a5bb1ebbe&tk=1ejai6s4u34op001&from=serp&vjs=3>: Predominantly IA-3
- <https://www.indeed.com/viewjob?jk=2bdebd7d89a467a4&tk=1ejai6s4u34op001&from=serp&vjs=3>: Predominantly IB-7
- <https://www.indeed.com/viewjob?jk=242e6569f06aa28a&tk=1ejai6s4u34op001&from=serp&vjs=3>: Predominantly IB-10
- <https://www.indeed.com/viewjob?jk=f163a82468bfd488&tk=1ejaj14do34mi000&from=serp&vjs=3>: Predominantly IC-1
- <https://www.indeed.com/viewjob?jk=50294c9845c56233&tk=1ejaj8b8r34mi001&from=serp&vjs=3>: Predominantly IA-7
- <https://www.indeed.com/viewjob?jk=e65f1c5355907c41&tk=1ejajohursa2k800&from=serp&vjs=3>: Predominantly IA-3
- <https://www.indeed.com/viewjob?jk=d227ea4a2b10d896&tk=1ejajohursa2k800&from=serp&vjs=3>: Predominantly IIB-4

## Landscape/matrix of example use cases

		I: Research/development				II: Management/support				III: Education/training				IV: Advocacy				
		IA	IB	IC	ID	(IE)	IIA	IIB	IIC	(IID)	IIIA	IIIB	IIIC	(IIID)	IVA	IVB	IVC	(IVD)
<i>applied mathematics</i>	1	X	X	X														
<i>data management</i>	2		X			X												
<i>distributed systems</i>	3	XX		X														
<i>formal methods</i>	4						X											
<i>real-time systems</i>	5					X												
<i>HPC</i>	6							X										
<i>data analysis</i>	7	XX	X					X										
<i>extra-functional</i>	8																	
<i>administration</i>	9																	
<i>web applications</i>	10		X															
<i>unspecific</i>	0																	