

A Software Ecosystem Vision

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Fermilab Scientific Computing



U.S. DEPARTMENT OF
ENERGY

Office of
Science

When do people work well together to produce software?

- In part, when there is a well-defined structure, where people understand their value and they know where they fit in.
- Can working within a *software ecosystem* be a useful way to frame the problem, providing a common understanding of how everything fits together?
- What is an *ecosystem* anyway and how might it help?

A software ecosystem

- What is it according to Wikipedia –

“In the context of software analysis, the term software ecosystem is defined by Lungu [6] as *“a collection of software systems, which are developed and co-evolve in the same environment”*. The environment can be organizational (a company), social (an open-source community), or technical (the Ruby ecosystem). The ecosystem metaphor is used in order to denote an analysis which takes into account multiple software systems...”

 **okay, but a bit fluffy**

“Software Ecosystem is a book written by David G. Messerschmitt and Clemens Szyperski that explains the essence and effects of a "Software Ecosystem", **defined as a set of businesses functioning as a unit and interacting with a shared market for software and services, together with relationships among them. These relationships are frequently underpinned by a common technological platform and operate through the exchange of information, resources, and artifacts...**”

 **This seems to better fit our situation**

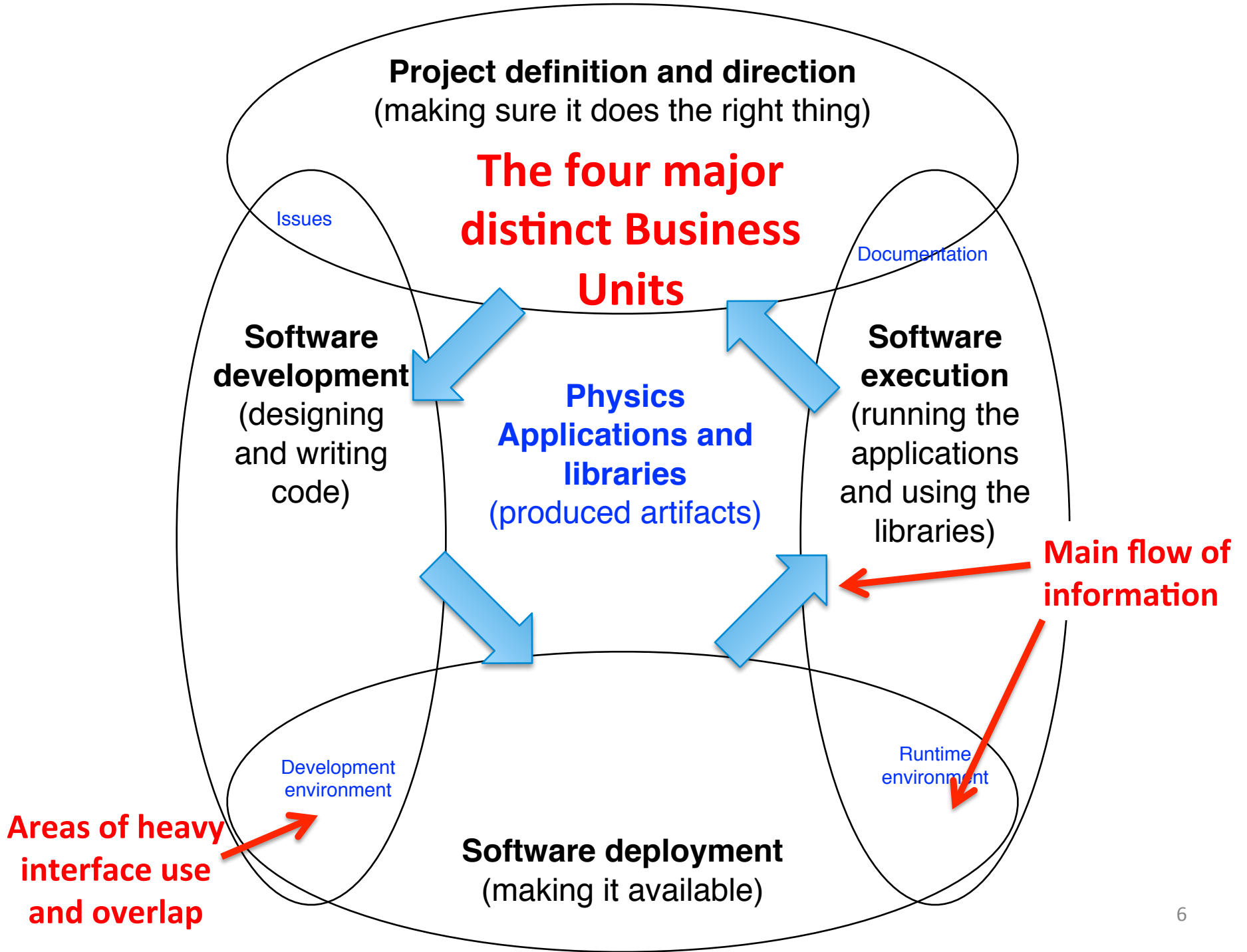
Moving toward the HSF...

- *Software Ecosystem*: a set of cooperating Business Units organized to achieve a Common Objective
- **Common Objective**: World class physics applications and libraries used to effectively carry out HEP science according to their needs
- **Business Unit**: a set of components forming a core area with unique facilities, services, and software
- **Component**: a group of related activities or functions
- **Underlying facilities and services**: machinery (software and hardware) that is necessary for business units to perform their work.

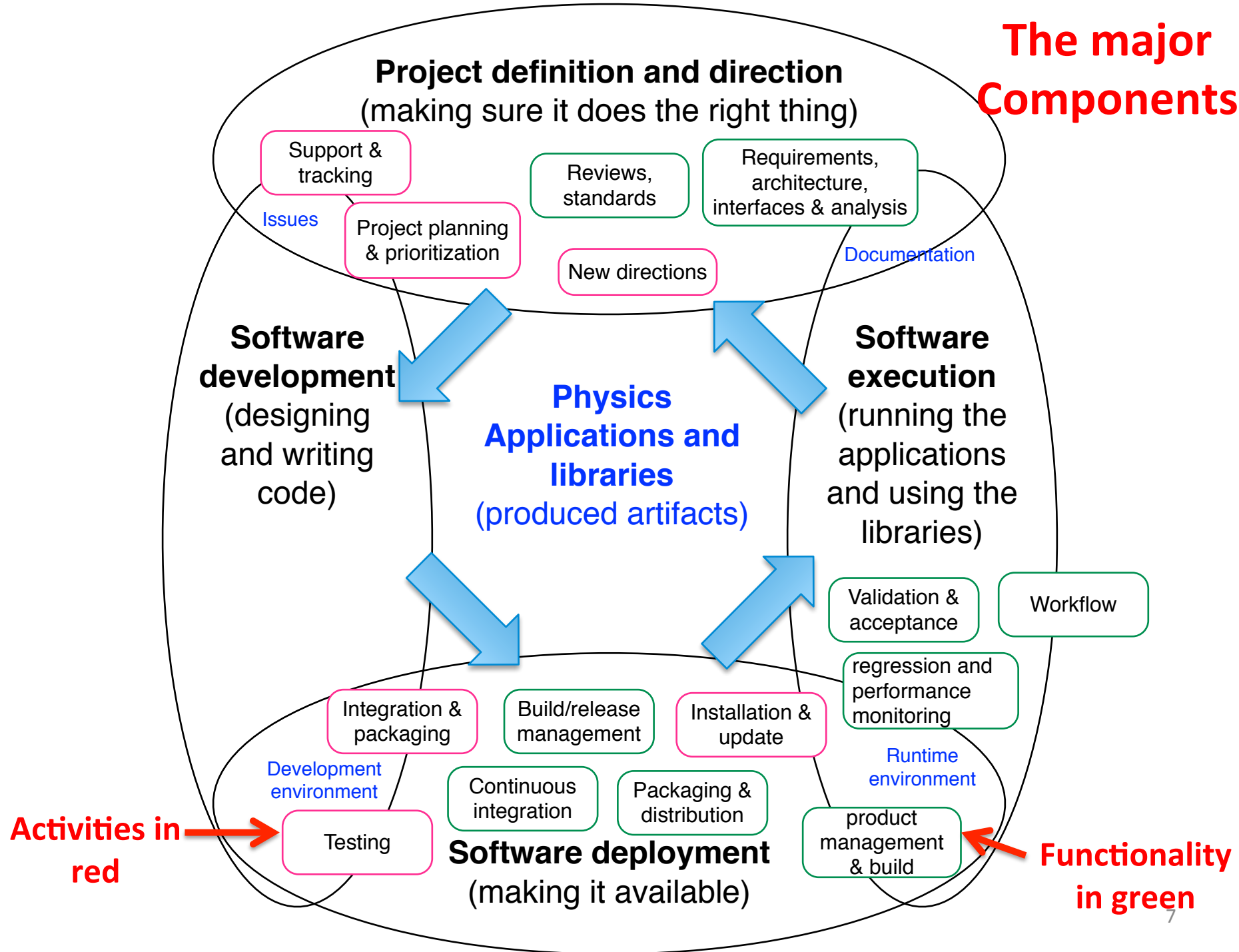
**Physics
Applications and
libraries**
(produced artifacts)

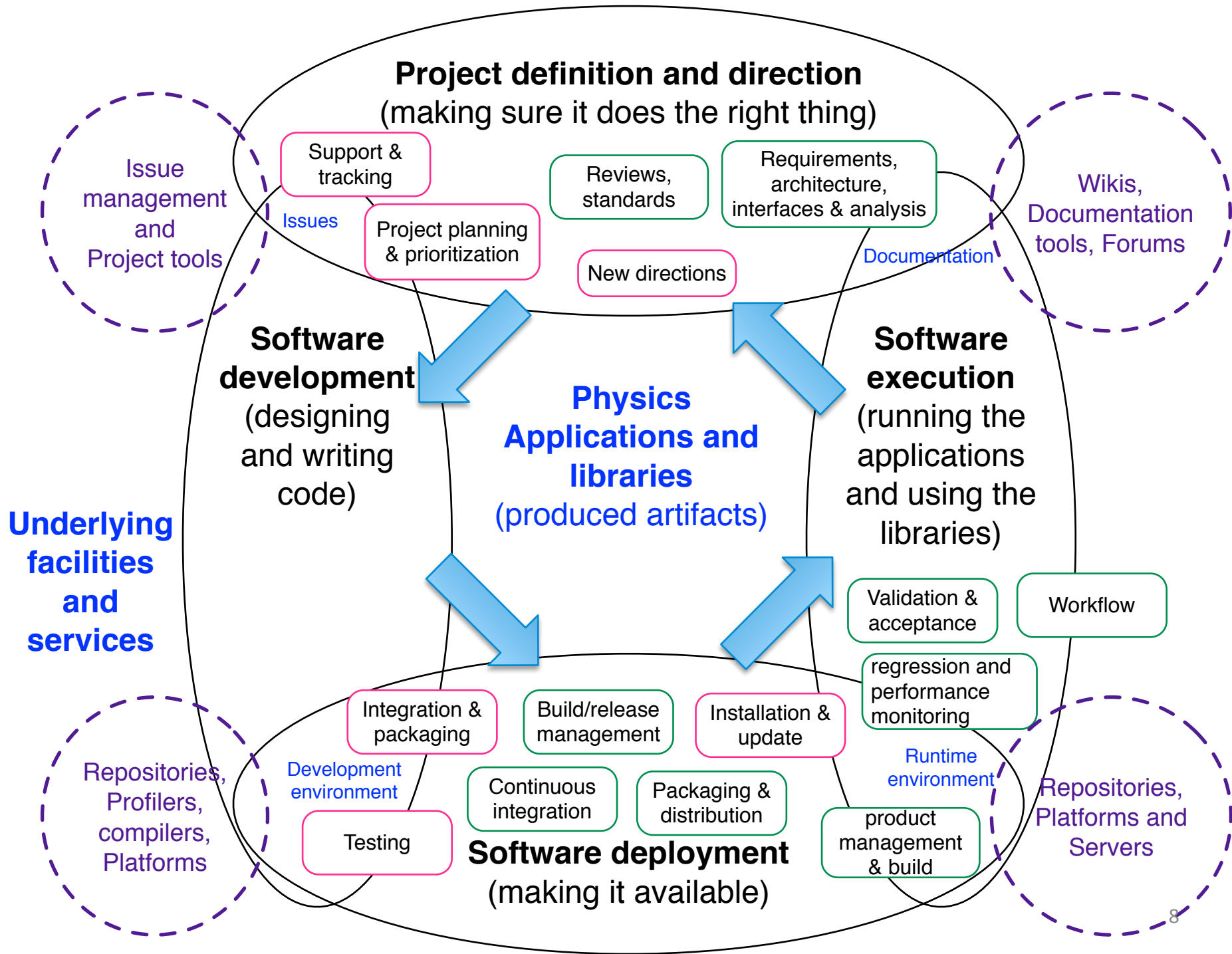


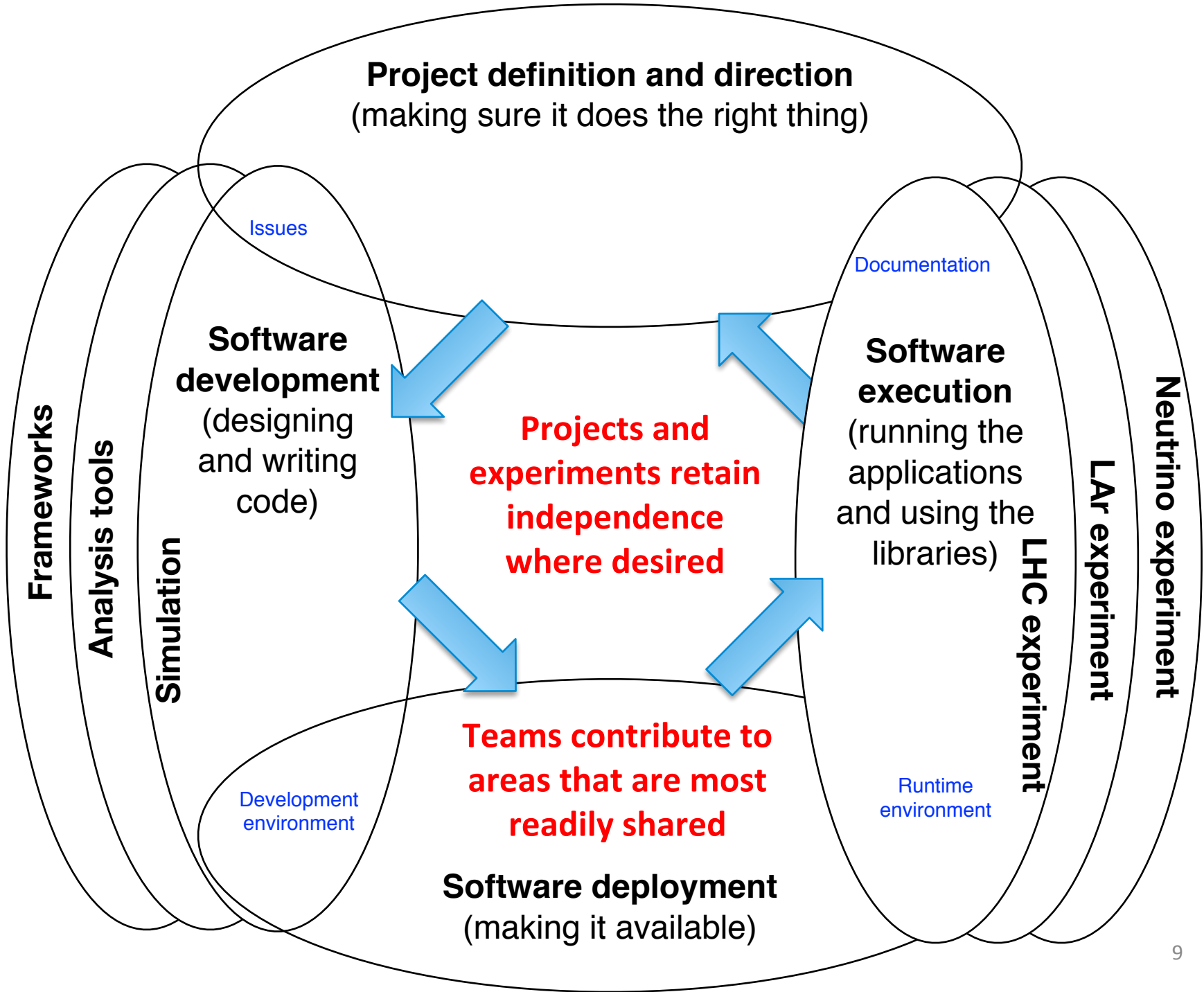
**The Common
Objective, needed
by our scientists**



The major Components







End goals

- Organize HSF contributions according to the ecosystem introduced here, to facilitate sharing and collaboration given our diverse community and resources
- Move towards US contributions within this ecosystem organized through the *HEP Forum for Computational Excellence* (HEP-FCE)

Final thoughts: Can this help?

- Makes potential areas for sharing and collaboration more apparent
 - **Purple items:** not necessarily directly in line with what should be supported and maintained within a business unit.
 - **Deployment activities and services** looks like good starting candidates, along with aspects of project definition and planning
- Provides a structure for people doing similar things to work together
- Provides framework for thinking about how core areas (business units) can be *distinguished and substituted where appropriate*.
- Provides framework that identifies *interfaces and relationships*, allowing multiple ways for the components to be implemented, perhaps within a business unit.