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# Software Packaging and Deployment in HEP

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The process of building software for High Energy Physics is a problem that all experiments must face. It is also an aspect of the technical management of HEP software that is highly suited to sharing knowledge and tools. For this reason the HEP Software Foundation established a working group in 2015 to look at packaging and deployment solutions in the HEP community. The group has examined in some detail the experience and requirements of a number of experiments. From this input a set of use cases for building software, deploying it and setting up a runtime environment were established. This has captured some of the unique aspects of managing software in our community, such as the need to support multiple build types (e.g., optimised for different architectures or using different compilers) and parallel deployments (e.g., different production releases) that make our community different from other projects. In addition the size of some of our software stacks poses some problems when lower layers of the software may come from a common source. The necessity of reproducibility is also challenge when any external packages are used. The group looked at a wide range of packaging tools, from the HEP community itself and from the wider open source world. We defined a small test software stack in order to evaluate how well they met our use cases, how easy they were to use, and how easy it was for multiple users to share build recipes. For deployment scenarios CVMFS and installation into containers were considered as critical to support.

From all of these considerations the group has produced an HSF technical report that describes the work we have done and makes recommendations for the best tools to use and the best practices to adopt. Our ultimate goal is to provide simple packaging solutions that experiments can use that are as much as possible 'off the shelf' and in which the community can collectively contribute its considerable experience for everyone's benefit.

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