

## **Managing Virtual Appliance Lifecycle in IaaS and PaaS Clouds**

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Both the IaaS (Infrastructure as a Service) and PaaS (Platform as a Service) models of providing cloud services rely on virtual appliances. In popular terms, they are “images” of either bare operating systems, typically entailing popular Linux distributions, which can be further contextualized once users instantiate their own virtual resources, or operating systems with applications pre-installed for use in the given platform, which may often consist of a number of complimentary appliances. Such appliances must be offered to users of any cloud service – they are the basic units the users see and select from when they decide to procure resources in the cloud. Understandably, cloud service providers are often expected to offer a variety of appliances. Even in a simple IaaS scenario, users expect to see a range of OS distributions and flavours. With PaaS, the variety is even greater. Obviously a range of appliances can be obtained from cloud marketplaces, but that only offsets rather than solves the problem since the challenges of maintaining their appliances are the same for local cloud site administrators and marketplace maintainers alike. This, inevitably, means that cloud site or marketplace administrators must not only offer a selection of appliances, but also manage them throughout their life cycle, keep them secured and updated, and eventually discontinue them when the time comes. It is not only cumbersome but also inherently insecure to leave updates to the user instantiating the given appliance. On top of that, the ability to always offer “fresh” appliances to its users is a competitive advantage a cloud site may wish to exploit. This paper introduces a concept of automated periodic appliance updates in a federated cloud environment, alongside actual tools developed to perform that task. It also sums up up-to-date experience with operating such tools in the European Grid Initiative’s Federated Cloud.

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