Enhancing Grid Infrastructures with
Virtualization and Cloud Technologies

Initial Virtual Appliance Repository

Milestone MS10 (V1.2)
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Abstract

The initial Virtual Appliance Repository has been established and is used by StratusLab project members and external users. Work is in progress on a Virtual Appliance Marketplace, which will shift the focus from storage of appliance images to registration of cryptographically-signed appliance metadata that will allow users to search for and share appliances more easily.

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Document History

Version	Date	Comment
0.1	1 Mar. 2011	First draft for internal review.
1.0	3 Mar. 2011	Version after first internal review.
1.1	4 Mar. 2011	Version after further internal review.
1.2	14 Mar. 2011	Final version after review.

1 Introduction

StratusLab provides a complete, open-source solution for deploying an "Infrastructure as a Service" cloud infrastructure. Use of the cloud requires the use of prepared machine and disk images. Although StratusLab provides tools to simplify the creation of these images, the procedure for doing so remains a significant hurdle for use of a cloud. Consequently, StratusLab encourages the sharing and reuse of existing images to reduce this barrier.

The initial virtual appliance repository described in this Milestone report is the first step for StratusLab to share images that will be generally useful to the user community.

A 'virtual appliance' is a virtual machine that has been configured for a particular application (e.g. a specific bioninformatics workflow, or simply a web server). In addition to these 'appliances' the repository also contains 'base' images that provide minimal installations of common operating systems.

Work is in progress on a Virtual Appliance Marketplace, which will shift the focus from storage of appliance images to registration of cryptographically-signed appliance metadata that will allow users to search for and share appliances more easily.

2 Appliance Repository

A first simple implementation of the virtual appliances repository was made available in the first quarter (June–August 2010) at http://appliances.stratuslab.eu. The StratusLab installation tools allow for the installation of a local appliance repository.

2.1 Implementation

The appliance repository is a standard Apache web server accessed using WebDAV (Web-based Distributed Authoring and Versioning), with authentication via the StatusLab LDAP server. Metadata about each appliance is stored in an associated XML manifest file.

The web front-end of the repository matches the look and feel of the main StratusLab web site. Users can find the available images, and also obtain information about them. This information is loaded from the metadata files stored with the images.

A statistics package on the repository provides a means of tracking the downloads of images. This is particularly useful to track the impact of each release of the software. To date, over 840 GB of data has been downloaded from the repository.

2.2 Deployment

The primary appliance repository is hosted by Trinity College Dublin (TCD). A mirror of the appliance repository is installed in GRNET, deployed on a VM running on GRNET's support infrastructure. A total storage of approximately 1 TB has been allocated from the local storage server in order to accommodate VM images. Currently the repository is mirrored from TCD once every day.

2.3 Appliances and Images

The repository already offers appliances and base images. Only images that have been tested, and are known to work with the StratusLab release are included. Currently three reference images are provided for Ubuntu 10.04, CentOS 5.5, and ttylinux 9.7. The procedure for generating these images has also been documented on the StratusLab website as part of the user tutorial. These images can be used to instantiate VMs on the StratusLab reference cloud service.

Five grid appliances are available in the repository containing gLite 3.2 grid

middleware: a Computing Element, a Storage Element, a Worker Node, a User Interface, and an APEL (accounting) service.

3 Appliance Marketplace

With the initial appliance repository deployed, the focus of the task has moved to the design, and initial implementation of the next version of the repository, the 'Marketplace'. The Marketplace serves as a registry for images that can be shared. Rather than providing a centralised storage location, the storage of the actual images is handled by the owners of the images, allowing them to control access to the images if desired. The Marketplace itself contains cryptographically-signed metadata about machine and disk images allowing users to find existing images and allowing system administrators to define policies on trusting those images. Requirements, plans, and technical details are captured in the StratusLab Marketplace Technical Note [1].

A reference deployment of the Marketplace will be made available for testing at the beginning of the fourth quarter (March–May 2011).

References

[1] M. Airaj, M.-E. Bégin, S. Kenny, C. Loomis, and D. O'Callaghan. StratusLab Marketplace, 2011. Technical Note TN-Marketplace V3.0.