

Contextualization in Practice: The Clemson Experience

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Dynamic virtual organization clusters with user-supplied virtual machines (VMs) have advantages over generic environments. These advantages include the ability for the user to have a priori knowledge of the scientific tools and libraries available to programs executing in the virtualized environment well as the other details of the environment. The user can also perform small-scale testing locally, thus saving time and conserving computational resources.

However, user-supplied VMs require contextualization in order to operate properly in a given cluster environment. Two types of contextualization are necessary per-environment and per-session. Examples of per-environment contextualization include one-time configuration tasks such as ensuring availability of ephemeral storage, mounting of a cluster-provided shared filesystem, integration with the cluster's batch scheduler, etc. Also necessary is per-session contextualization such as the assignment of MAC and IP addresses.

This paper discusses the challenges and techniques used to overcome those challenges in the contextualization of the STAR VM for the Clemson University cluster environment. Also included are suggestions to VM authors to allow for efficient contextualization of their VMs.

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