Science Gateways in the Cloud with R

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A Science Gateway is a "community-development set of tools, applications, and data that is integrated via a portal or a suite of applications, usually in a graphical user interface, that is further customized to meet the needs of a specific community". The technology used for building and publishing Science Gateways has been too complex and scientists have had to rely on software developers to build and maintain those interfaces. We propose to dramatically simplify the Science Gateways production and publishing process so that it becomes accessible to data scientists without the concourse of IT professionals: We make Science Gateways R-scriptable and hence easy to create, publish and update on the fly from the R command line, their use becomes an intrinsic part of the process of programming with Data. In order to achieve this:

- We wrapped the cloud SDKs with R functions to make the provisioning and control of the storage and compute virtual resources required by the Science Gateways accessible from the R command line.
- We created an abstraction for R workers on the cloud that can be configured and controlled from the R command line.
- We created frameworks of HTML5 widgets for data manipulation, data visualization and collaboration that can be assembled within HTML5 panels interactively (and collaboratively) or programatically from the R command line. Those panels constitute a highly flexible new type of science gateways.
- We created a descriptive framework for the panels, their data manipulation logic and their back-end Web Services purely based on the R language: A Science Gateway becomes entirely defined by sharable R scripts, R packages and Data Sets.
- We provided SDKs allowing to produce and integrate the new type of Science Gateways within Web and desktop applications written in Java, PHP, python and C#.

References


[4] sciencegateways.org