Interoperability with Boutiques and CARMIN

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Summary

A growing number of platforms and tools have lately been developed to meet the needs of various scientific communities. Most of these solutions are optimized to specific requirements from different user groups, leading to technological fragmentation and lack of interoperability. In our quest of open and reproducible science, we propose two complementary tools, Boutiques and CARMIN, providing cross-platform interoperability for scientific applications, data sharing and processing.

Content

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The first tool, Boutiques (http://boutiques.github.io), is a system to describe, publish, integrate and execute command-line applications across platforms. It relies on Linux containers to facilitate the application installation and sharing, and it uses a versatile JSON format to describe the command-line template, inputs and outputs. Boutiques descriptors are intended to be produced by scientific application developers, stored alongside their application, indexed by common repositories, and consumed by execution platforms. Boutiques can thus (i) facilitate application porting, (ii) allow for automatic import and exchange of applications and (iii) enable open and reproducible science.

In addition to application integration, interoperability among data and computing platforms are also key factors for open and reproducible science. Our second tool is thus the CARMIN (Common API for Research Medical Imaging Network, https://github.com/CARMIN-org/CARMIN-API) API, which enables remote pipeline execution and data exchange. It allows the interoperability between computational tools executed through Boutiques framework and data management solutions (as implemented with Shanoir) within the France Life Imaging computational infrastructure (see companion abstract).

BIDS apps (http://bids-apps.neuroimaging.io) provide a good illustration of the potential of these tools used together. Boutiques provides an importer for BIDS apps, so users can use their BIDS app in the platforms that support Boutiques (e.g., VIP or CBRAIN). Moreover, you can expose BIDS apps through the platforms implementing the CARMIN API.

To conclude with, the use of Boutiques and CARMIN provide cross-platform interoperability for scientific applications, data sharing and processing. Their wider adoption can greatly contribute to a world of open and reproducible science.