



**HAL**  
open science

## Interoperability with Boutiques and CARMIN

Sorina Camarasu-Pop, Axel Bonnet, Camille Maumet, Michael Kain,  
Christian Barillot, Tristan Glatard

► **To cite this version:**

Sorina Camarasu-Pop, Axel Bonnet, Camille Maumet, Michael Kain, Christian Barillot, et al.. Interoperability with Boutiques and CARMIN. DI4R 2018 - Digital Infrastructures for Research, Oct 2018, Lisbon, Portugal. pp.1. inserm-01846997

**HAL Id: inserm-01846997**

**<https://inserm.hal.science/inserm-01846997v1>**

Submitted on 23 Jul 2018

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

## Interoperability with Boutiques and CARMIN

Sorina Pop, Axel Bonnet, Camille Maumet, Michael Kain, Christian Barillot, Tristan Glatard

### 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

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 providing cross-platform interoperability for scientific applications, data sharing and processing.

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.