# SmartShare – A Ride Sharing Provenance Aware Application

Heather S. Packer [1] and Luc Moreau[1] *

University of Southampton, UK
{hp3, l.moreau}@ecs.soton.ac.uk

## 1 The SmartShare Application and Provenance

The SmartShare application[1] is a "car pooling" application that allows drivers and commuters to offer and request rides. Ride offers and requests include details about required travels, locations, capacity, prices, and other details relevant to car sharing. The application uses an algorithm to match commuters and drivers.

This application is fully provenance-enabled. Concretely, it uses PROV-Template[2] and captures bindings from three components, which can be used to generate provenance of any user decision, matching or rating managed by the application. The main purpose of capturing provenance in SmartShare is to make the application accountable. Specifically, provenance is used to provided end users with descriptions: (1) explaining how a reputation rating was generated; and (2) of a user made from observations from the recorded provenance data.

The SmartShare application was iteratively developed by four organisations, which contributed various aspects of the design and implementation of three components: user interface (UI), a ride matching service (Orchestrator) and a feedback and rating service (Reputation Manager). Each component records provenance using PROV-Template, extended with a service allowing sets of bindings to be submitted by the components distributed across the Web. Specifically, PROV-Template allowed the designers to specify the semantics of the provenance in a template, while the programmers provided the values for the variables in the template. This delineation between the responsibilities of the designers and programmers gave us development and maintenance benefits over the more traditional approach of capturing of provenance documents.

The SmartShare application is being trailed in Italy. It is currently running in one Italian municipality and is planned to be run in two others. It was launched on April $21^{st}$ 2016 to representatives from all three municipalities and local press. The trail aims to collect research data that will be used to:

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[1] SmartShare Project: http://www.smart-society-project.eu/software/smartshare/

[2] PROV-Template: https://provenance.ecs.soton.ac.uk/prov-template/

1. Exemplify how provenance can be used to support algorithms to adapt to users' behaviours.
2. Evaluate provenance summaries to identify behaviour patterns.
3. Investigate how the information from provenance data can be used to inform end users.
4. Advance techniques for provenance analytics.