Towards a Replication Service for Data-Intensive Fog Applications
Jonathan Hasenburg, Martin Grambow, David Bermbach
Mobile Cloud Computing Research Group
TU Berlin & ECDF, Germany

PROBLEM
Fog computing promises significant benefits for applications but is hard to use:
• Existing storage systems are poorly suited for Fog environments
• Data distribution across systems needs to be implemented inside the application
• Data-intensive Fog applications often need data streams with distributed persistence

APPROACH
• Application-controlled data placement and movement using a declarative programming style
• A replication service handles actual data distribution across Fog nodes
• Groups of data that should be handled in the same way are part of the same keygroup
• Machines at the same location are exposed as a single fog node to other nodes

Application Scenarios

Carsharing Fleet Management
• Vehicle sensors collect information for the carsharing provider
• Keygroup “Vehicle” defines that this data is stored for 24 hours inside the vehicle
• A preprocessor aggregates the data and transmits it to the Cloud when possible
• Keygroup “Buffer” defines that data is transmitted to a trigger node which here acts as an event-based connector to the fleet manager software

Mobile App Scenario
• A mobile device runs an app that uses the cloud for persistence
• Data is also available at the edge to speed up data retrieval
• Upon user movement the keygroup configuration is updated and the service migrates the application data.

Software Prototype
Technical report
https://github.com/OpenFogStack/FBase