

Project number:	317871
Project acronym:	BIOBANKCLOUD

<p>WORK PACKAGE 2 :</p> <p>SCALABLE STORAGE</p>

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PROJECT DELIVERABLE

D2.1: Highly Available HDFS

Deliverable Due date (and month since project start): 2013-11-30, m12

Document history

Version	Date	Changes	By	Reviewed
0.1	2013-11-20	First version	Salman Niazi Kamal Hakimzadeh Alberto Lorente Mahmoud Ismail Jim Dowling	Ali Gholami
0.2	2013-11-29	Incorporated comments from Ali G.	Jim Dowling Salman Niazi	Alberto Lorente

BiobankCloud D2.1

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Executive Summary

This deliverable is a software deliverable of a highly available implementation of the Hadoop Filesystem (HDFS). In this document, there a description of the system's architecture, Platform-as-a-Service support for HDFS, and a userguide for the software.

Our new version of HDFS contributes a new high availability model for HDFS' metadata, based on storing the metadata in MySQL Cluster. MySQL Cluster is a distributed, in-memory, highly available, high performance database. The main contribution of our new architecture is a strengthening of the replication model from the Apache's HDFS, which is based on eventually consistent primary-secondary replication. In our model, a set of stateless NameNodes read and write metadata from shared transactional memory in MySQL Cluster. This enables us to simplify some of HDFS' internal protocols as well as enabling a larger number of NameNodes (as opposed to only a primary and secondary NameNode in HDFS). Our implementation also maintains the consistency semantics of HDFS, and we validate this by ensuring that 300+ unit tests pass for HDFS.

We also describe the Platform-as-a-Service (PaaS) support we provide for our HDFS implementation. HDFS is the storage layer of the Hadoop ecosystem, and we automate the installation of both HDFS and Apache YARN, enabling our platform to be installed by unsophisticated users by just clicking options and entering user credentials from our portal website. We support automated deployment for the following platforms: Amazon Web Services (AWS), OpenStack or a standard cluster of (bare-metal) hosts. We also provide a Dashboard web application to administer and monitor deployed Hadoop clusters.

This document also includes a userguide for installing and managing our platform, that we call Hop (Hadoop Open Platform-as-a-service). It is *open*, as it can be extended to support any existing cloud platform, even though we currently only support AWS and OpenStack. The code is available for download now, although it is still very much beta and under heavy development.