



CloudButton

# CloudButton WP6

## Dissemination + Exploitation

Tristan Tarrant

Senior Principal Software Engineer @ Red Hat



# Dissemination

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# Numbers

- 120 Conferences, Meetings and Workshops
- 33 Conference papers, journal articles and preprints
- 28 Open Source repositories
- 5 web sites
- 22 blog posts

# Open Source repositories

- Infinispan: 168 contributors, 990 stars, 570 forks, 90 watchers, 14958 commits,
- Lithops: 33 contributors, 222 stars, 74 forks, 10 watchers, 3399 commits
- Faasm: 11 contributors, 649 stars, 57 forks, 15 watchers, 1042 commits

# Innovations

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# Lithops

Lithops is a framework to massively scale the execution of Python code and its dependencies on serverless computing platforms and monitor the results. Lithops delivers the user's code into the serverless platform without requiring knowledge of how functions are invoked and run. Lithops provides great value for a variety of use cases, like processing data in object storage, running embarrassingly parallel compute jobs (e.g. Monte-Carlo simulations), and enriching data with additional attributes. Lithops is being used in real settings to parallelize the execution of Big Data analytics processes over OMICS and geospatial data in the Cloud.

# Infinispan Anchored keys

Infinispan is an in-memory data grid which can be scaled horizontally by provisioning additional storage nodes. For high-availability and balancing purposes, adding new nodes to a cluster has always required moving data around to ensure the required number of copies of each item, thus temporarily decreasing throughput until the state transfer is complete. Anchored keys is an alternative implementation which avoids costly state transfer when adding new nodes so that throughput is maintained.

# Serverless METASPACE

METASPACE is an open-source cloud software for spatial metabolomics (an emerging field of research and technology focused on small molecules, metabolites, drugs, and lipids). EMBL has developed a serverless version of METASPACE that uses a novel type of cloud computing, namely “serverless computing” to execute METASPACE without installation, with minimal infrastructure maintenance effort and development pain, yet with almost unlimited scalability.

# Faasm

Faasm is a runtime that can run WebAssembly application components in a serverless cloud context, acting as an execution mechanism for functions in function-as-a-service environments. Compared to existing execution engines, which are container-based, Faasm provides higher efficiency by allowing a high density of isolated functions to run on the same hardware. In addition, Faasm avoids the cold-start problem, and enables functions to efficiently share state without serialization overheads.

# Business Exploitation

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# Exploitation: Red Hat

- Work done on Infinispan in the context of CloudButton is already included in the Red Hat Data Grid product
- Kubernetes Operator: provisioning, autoscaling, metrics integration
- Low footprint/fast startup
- New memory autoscaling algorithm to be used in the context of Red Hat OpenShift Serverless Eventing and Serving.

# Exploitation: IBM

- Lithops is officially listed as an API for IBM Cloud Code Engine.
- Some customer PoCs already operational.
- Engagement with Red Hat to include Lithops as a tool to deploy user workloads against Red Hat OpenShift clusters.

# Exploitation: Atos

- Huge potential on SLA commercialization, based on dynamic information and infrastructure monitoring for data intensive applications.
- Internal architecture draft for inclusion of SLA Manager within the ARI research unit to become part of the the Atos enhanced commercial offering

# Exploitation: EMBL

- SpaceM startup, currently incubated at the BioInnovation institute, including the use of Lithops-METASPACE
- The major customers of METASPACE-using startup SpaceM will be large pharmaceutical companies, including Sanofi, Novo Nordisk, AstraZeneca, Merck, BoeringerIngelheim, and Novartis. The market will include preclinical workflows for drug discovery and development, toxicology, target identification, and Drug Metabolism and Pharmacokinetics (DMPK).

# Exploitation: URV

- URV is in the process of creating a startup focused on Cloud-based OMICs Data Analytics. Funding already secured.
- Offer a web-based solution for OMICs data analysts to run complex analytic pipelines in the Cloud with no effort, based on Lithops
- Target for exploitation is second half of 2023



CloudButton



Imperial College  
London



Atos



# THANK YOU!



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