



Rapid prototyping of cloud applications with open source tools

(A research perspective)

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Cloudification Approaches

Approach 1: 'Medieval Cloudification' (alias: Virtual Machines)





Source: annor.de]

the cloud

Cloudification Approaches

Approach 2: 'Guru Cloudification' (alias: Containers)





[Source: bobbuskirk.com]

Cloudification Approaches

Approach 3: 'Back to the Future Cloudification' (alias: Functions and Unikernels)





Approach Comparison

Highly scientific, interdisciplinary, 10 person minutes effort.

Approach	Technology	Where to Run	How to Build
Medieval	VMs	OpenStack, CloudStack,	vmdebootstrap, Packer
Guru	Containers	Kubernetes, OpenShift, CF,	Dockerfiles, Packer
Back to the Future	Functions, Unikernels	OpenWhisk, Funktion, Snafu	Podilizer, Termite, Lambada
Hybrid	all combined!	???	???

Mission of the SPLab: Make it easier to get your apps running in the cloud as successful services, independent of technology, economically viable, through rapid prototyping.



Service Prototyping Lab

Our team (including fellow ICCLabbers)





Lab Competencies



Lab Research Initiatives



Research: Cloud-Native Applications

Why cloud-native?



- leveraging microservice advantages
- fully exploiting capabilities of cloud computing environment
- aiming for high resilience, elasticity and cost effectiveness
- using adaptivity to maintain vendor independence



Cloud Native Computing Switzerland







Cloud-Native Applications Spotlight

Challenge of Swiss company:

«Migrate document management into the cloud»

Our research contribution:

- identification of legacy structure \rightarrow in-house development / consulting
- outlining modernisation steps
- critical verification of vendor claims (microservice compositions, DBaaS)
- extension with new features: microbilling, advanced multi-tenancy
- experiments to confirm prototypical direction

Outcome:

Confidence that product will be successful in the next decade



Research: Service Tooling

Today's tooling is inadequate

- ancient IDEs and toolchains
- newer developments: all-cloud, but aimed at replacing, rather than extending
- more tools are needed to make cost-effective production of cloud apps viable



Swagger/ RAML → dockerised mockup service



Cost-Saving Tools for App Engineers

The Service Tooling research initiative of the Service Prototyping Lab explores novel tools which assist in the launch of new cloud applications and services. The initiative identifias tools and platform services which are straightforward to deploy, easy to use and generic enough to be re-usable in many service asomarics. We cover the entire app lifecycle.

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Service Tooling Spotlight

Challenge of Swiss company:

«Complement our portfolio with a serverless offering»

Our research contribution:

- review and comparison of state of the art
- architecture for multi-tenant isolated function execution
- migration tools for functions currently deployed in other cloud providers

Outcome:

Serverless offering is actively marketed and will be piloted



Research: Cloud Accounting & Billing

How cloud billing evolved...

1997	months	resources
2007	hours	resources
2017	milliseconds	resources
2027	milliseconds	biz metric

How to assess the business value of code...

- rules specifications
- iterative refinement
- differentiated rating and charging







Cloud Accounting & Billing Spotlight

Challenge of Swiss company:

«Lack of flexible automated billing solution for cloud services»

Our research contribution:

- architecting a cloud-native, microservice-driven framework
- scalable rule engine capable of modelling complex billing models
- stress tests to benchmark the created framework processing capacity
- · real world use case studies validating the flexibility claims

Outcome:

Several known community deployments, growing and active community around our solution



Service Prototyping Lab

How to partner with us



How to get the best results

- identify your challenges & pain points
- let us do the rest (dividing research/innovation/engineering work)
- data point: after about 21 months \rightarrow 24 code repositories @ GitHub

