Cloudware and Beyond: Engineering Methods and Tools

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The Double Link between CC and SS

utility computing concept defined by technology
Technological Irrelevance in Numbers

Transatlantic travel times

Hours

Year

1800 1850 1900 1950 2000

sailing ships
SS Sirius
SS Europa (average)
SS United States
Boeing 707
Boeing 787 Dreamliner
And now to: Cloud Computing
What the **** is Cloud Computing? (And how do we write software for it?)

Let us ask some smart people...

[edujobscanada.com]
Cloudware and Cloud-Native Apps

ODCA:
- virtualised
- loosely coupled
- abstracted
- adaptive

legacy
cloud-enabled
technological fit to cloud hosting
cloud-aware
integration with cloud services
cloud-native
fully self-managed exploitation of cloud facilities

Provider- or platform-managed scope
- Cloud environment concerns (infrastructure, platform)

Self-managed scope
- Core application logic (awareness & integration)
  - cloud-aware application: selective self-management
  - cloud-native application: adaptive self-management
Beyond Clouds: The Post-Cloud Era

“THE CLOUD REVOLUTION IS DEAD”
[Wired, 2013]
**Computing Trends: Systematic View**

Paradigm: *Computing*

- Autonomic
- Cloud
- Complete
- Cluster
- Crowd
- Dew
- Distributed
- Edge
- Fog
- Green
- Grid
- Heterogeneous
- High Perform.
- Internet
- Jungle
- Mobile
- Natural
- Osmotic
- Parallel
- Serverless
- Services
- Stealth
- Utility
- Volunteer

Platform

- Dew Platform ?
- Internet of X
- Cloud IaaS/PaaS

*-ware*

- Design, Architecture, Deployment, Configuration
- Cloudware
- Internetware
- Fogware ?

Engineering Methodology

- Prototyping
- Model-to-Code
- Decomposition
- Self-Adaption

(Platform Simulation)
*-ware Engineering Trends

Model of concerns

- Heavy-weight: formal models
  - Light-weight: annotations
  - Convention over configuration

Code transformation

Environment metamodel

Executable unit

Technologies:
- VMs, containers, functions, unikernels, ...

Properties:
- discrete vs. stochastic execution
- stealthy: wholly/partially replicated + homomorphic
- ...
Our Contributions for Switzerland

Service Prototyping Lab @ ZHAW
Independent and neutral unit for succeeding in the cloudware business
Advanced cloud-native application designs and architectures

Gift Voucher

To: Your company
From: SPLab
For: Innovate with us through joint work!

Value: infinite
Ecosystem Tracking
Ecosystem Participation

SPLab’s Function Hub Prototype

http://functionhub-zhaw-test1.appuioapp.ch/
Ecosystem Quality Assurance

![Diagram of ecosystem components and file structure]

**Artifact Repository**

- **5.10.1**
- **stable**

**File Structure**

- **templates**
  - NOTES.txt: 1.5 KiB
  - _helpers.tpl: 2.1 KiB
  - artifactory-deployment.yaml: 2.0 KiB
  - artifactory-pvc.yaml: 757 B
  - artifactory-service.yaml: 633 B
  - nginx-deployment.yaml: 1.7 KiB
  - nginx-pvc.yaml: 715 B
  - nginx-service.yaml: 769 B
  - postgresql-deployment.yaml: 1.9 KiB
  - postgresql-pvc.yaml: 736 B
  - postgresql-secret.yaml: 475 B
  - postgresql-service.yaml: 615 B
- .helmignore: 333 B
- Chart.yaml: 553 B
- README.md: 6.4 KiB
- values.yaml: 2.8 KiB
Software Tools for Swiss Companies

- **Snafu**: manage & run your cloud functions
- **Helm QA**: improve your Helm charts
- **Sentinel**: monitor your cloud applications
- **Transducer**: turn OpenAPI specs into prototypes
- **Podilizer**: turn OpenAPI specs into prototypes
- **Termite**: migrate your OpenShift/Kubernetes apps
- **Lambada**: transform legacy code into cloud functions
- **Volume2Volume**: migrate your OpenShift/Kubernetes apps
- **OS2OS**: migrate your OpenShift/Kubernetes apps
- **CNDBbench**: benchmark cloud database options for your apps
- **ARKIS Microservices**: some best practices reference code for containerised + serverless microservices
- **Functions Collection**: some best practices reference code for containerised + serverless microservices
Attention: Cool Demos Outside!
Cloudware Action in Zurich

December 17-20

December 21

Bookmark: ucc-conference.org & essca2018.servicelaboratory.ch