Me in a nutshell

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Preparing a PhD in Computer Science

* At Inria Lille, France
* To be defended in autumn 2018

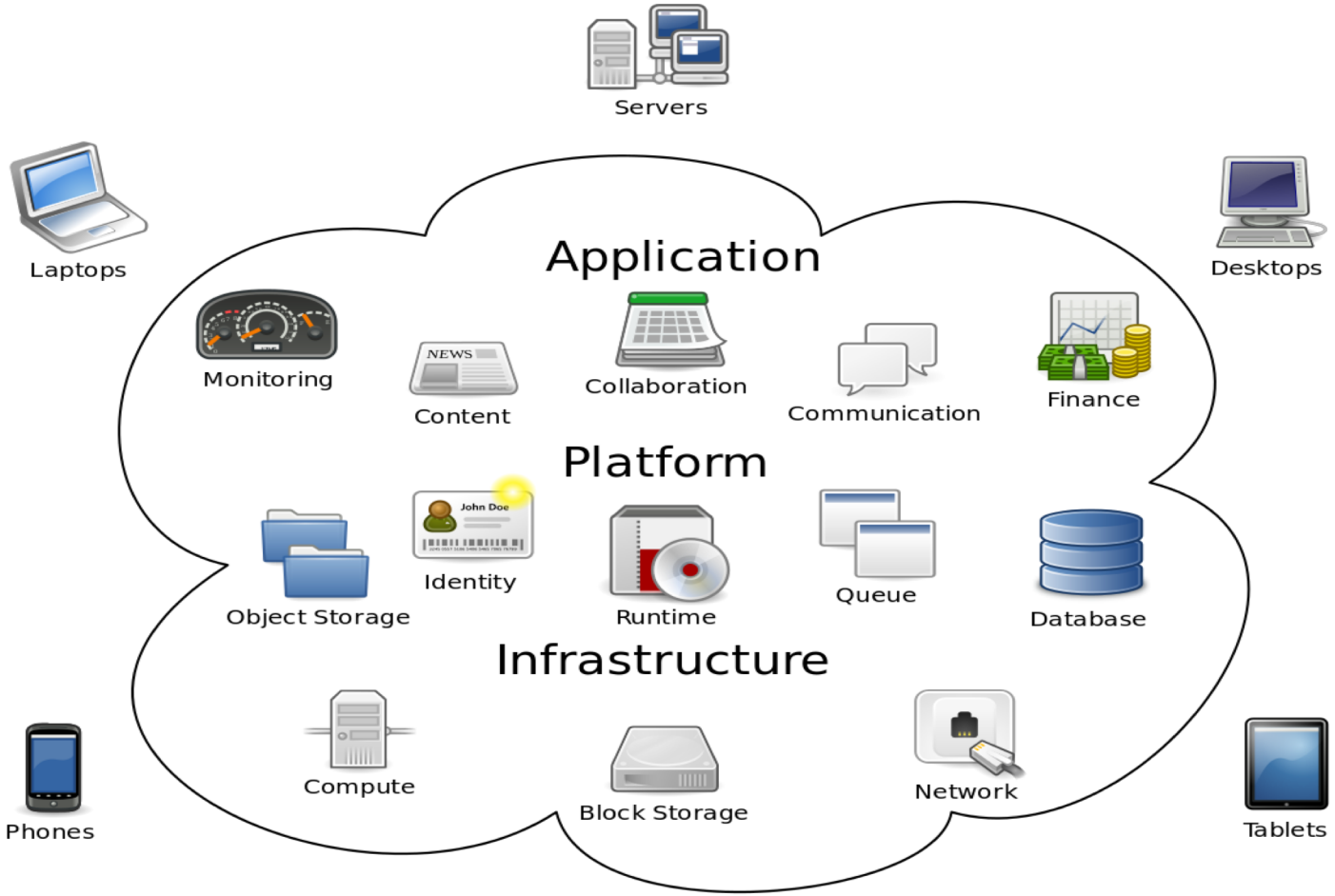
Lecturer at University of Lille, France

Thrill seeker

Foodie

Fitness-conscious

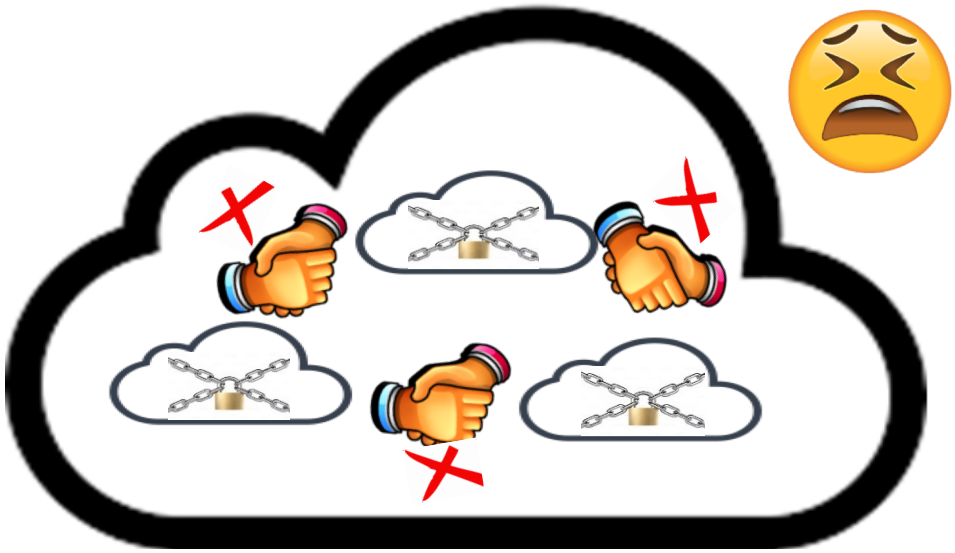
Research Domain



Problem Statement

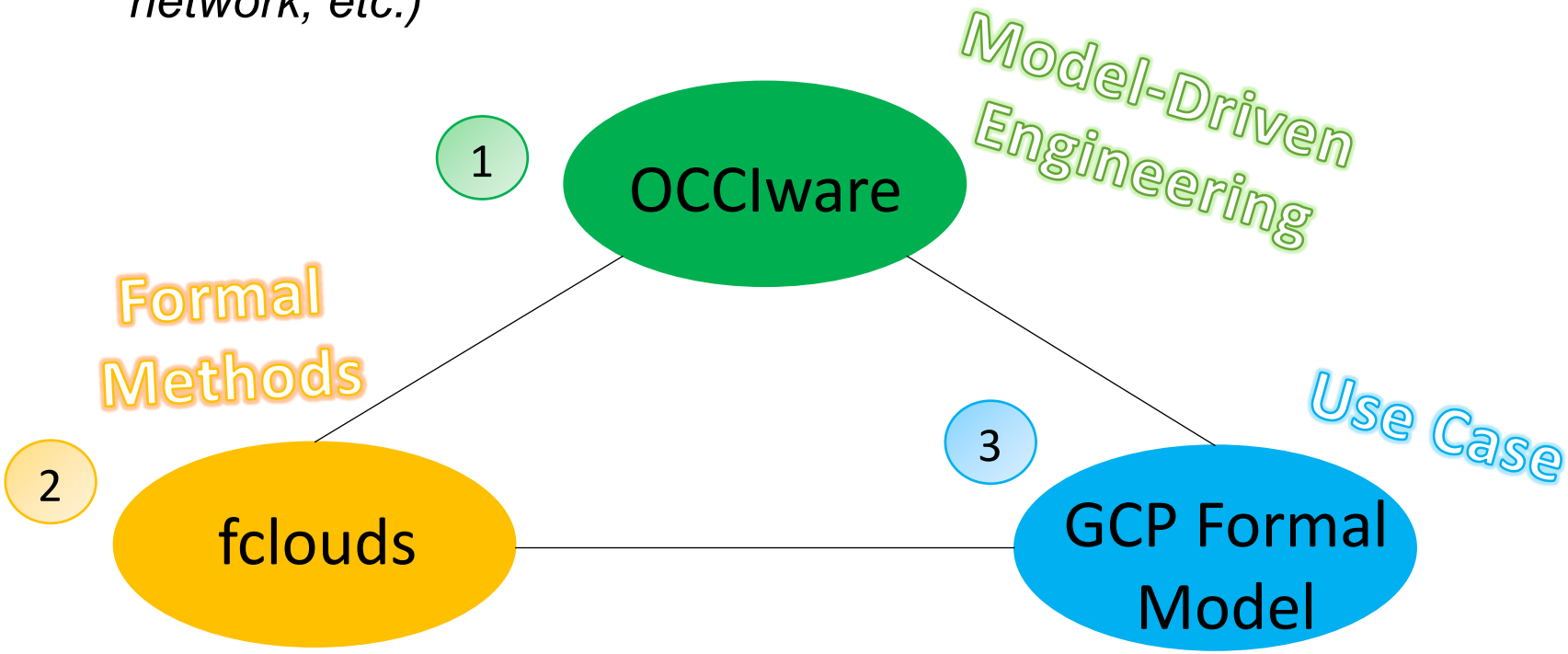
	Deployment Model	Management Interface	Service Model
amazon web services	Public	SOAP	IaaS, PaaS, SaaS
Google Cloud Platform	Public	REST	IaaS, PaaS, SaaS
openstack	Hybrid	REST	IaaS, PaaS
egi	Private	REST	IaaS

- Different deployment models
- Different management interfaces
- Different service models
- Different semantics
- Vendor lock-in

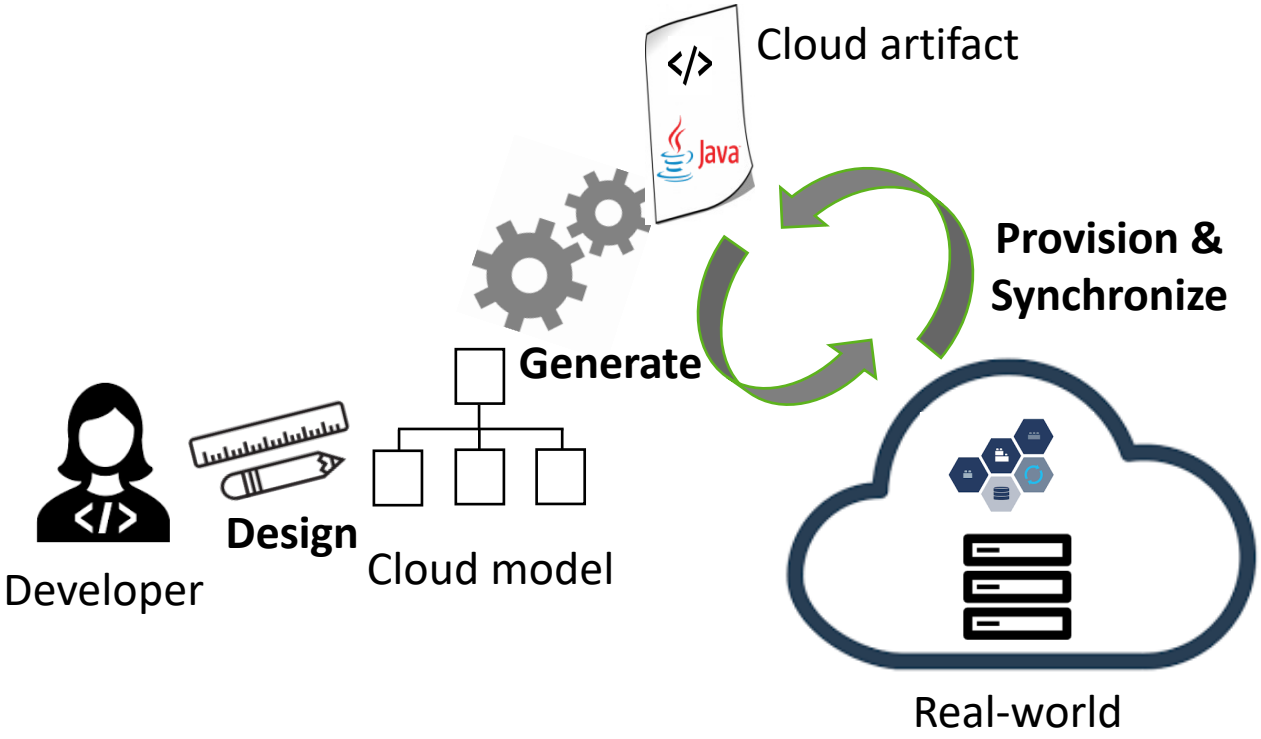


Approach & Main Contributions

- A Formal and Tooled Framework for Managing **Every Kind** of Cloud Resources *(compute, storage, network, etc.)*

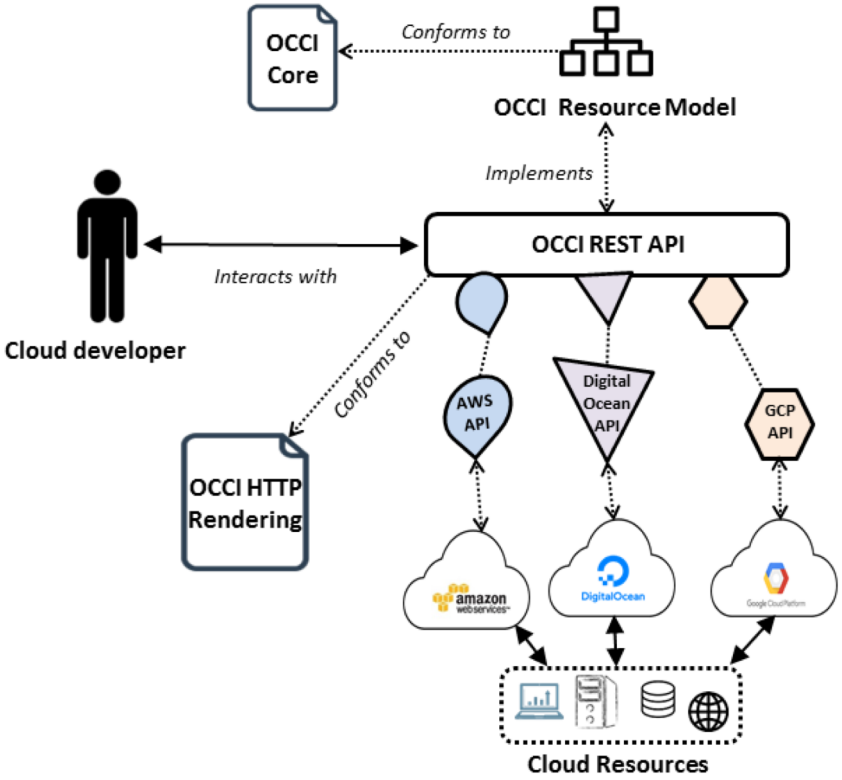


OCCIware – Why?



OCCIware – What?

What is Open Cloud Computing Interface (OCCI)???



OCCIware – How?

- **OCCIware Metamodel**: OCCIware modeling language

Ecore

OCL

- **OCCIware Studio**: a model-driven environment for **designing**, **validating**, **generating** and **managing** OCCI resources

OCCIware – Publication

For more information see:

Faiez Zalila, **Stéphanie Challita**, Philippe Merle.

"A Model-Driven Tool Chain for OCCI."

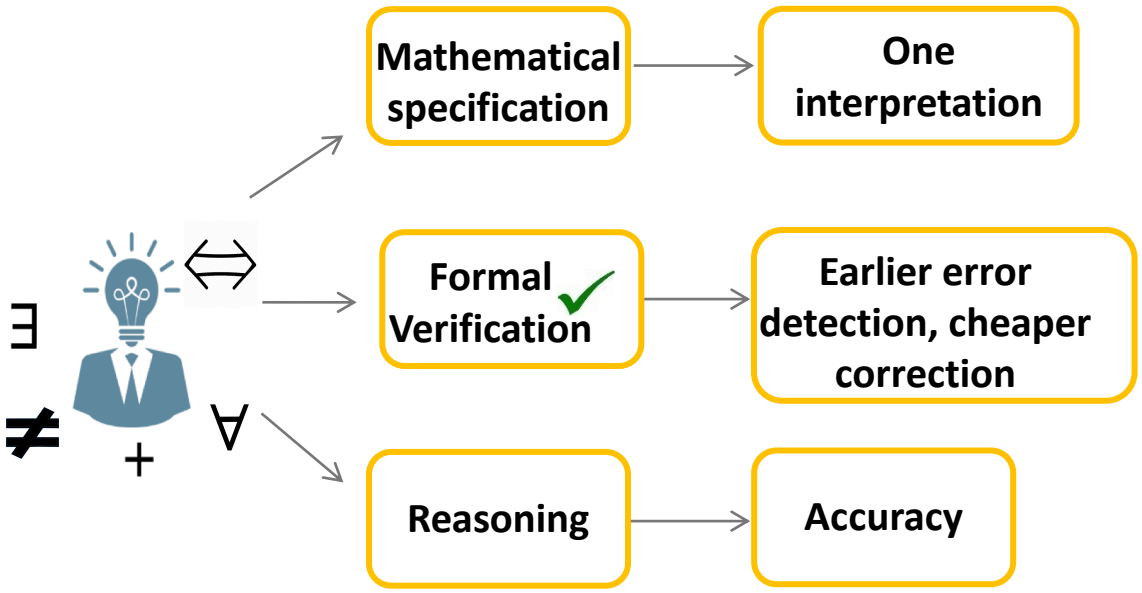
25th International Conference on Cooperative Information Systems (CoopIS).

DOI: 10.1007/978-3-319-69462-7_26

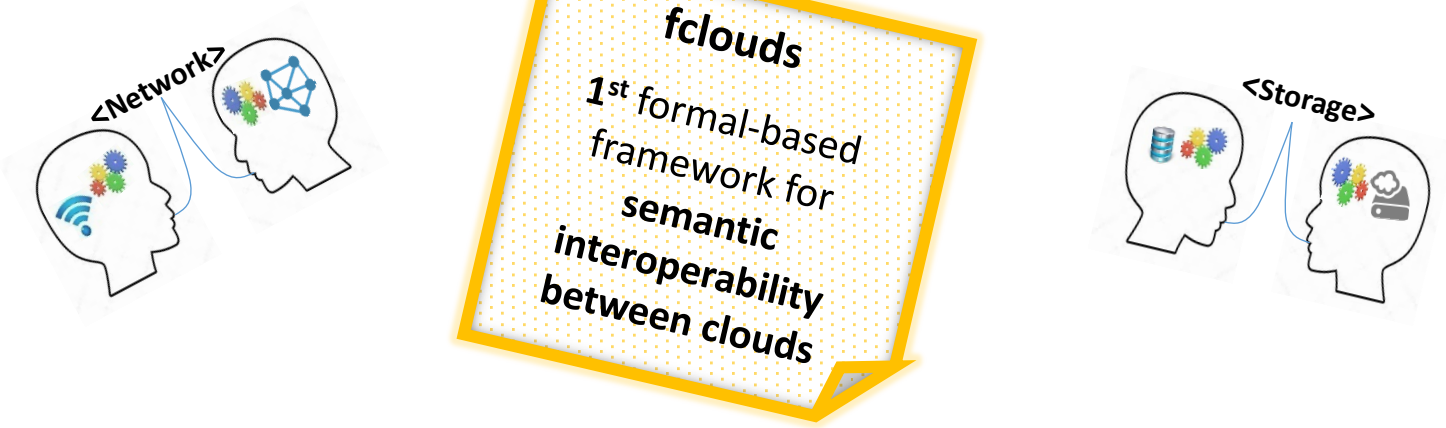
https://github.com/occiware/OCCI-Studio

Fclouds – Why?

- Cloud solutions must adhere to a precise set of principles

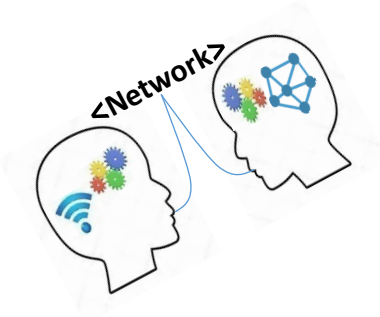


Fclouds – What?



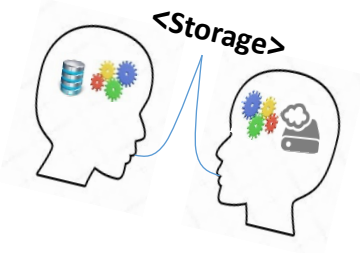
Fclouds – What?

fclouds = catalogue of formal models + transformation rules



fclouds

1st formal-based framework for **semantic interoperability between clouds**



Fclouds – How?

- Fclouds language → OCCI in **Alloy formal language**

Static semantics

OCCI core concepts in Alloy

Dynamic semantics

OCCI REST operations in Alloy: CREATE, RETRIEVE, UPDATE, DELETE

Fclouds – How?

- Fclouds structural and behavioural properties on OCCI operations

Consistency

No contradictory constraints

Reversibility

Create & ***Delete*** Resource contain **inverse mathematical logic**

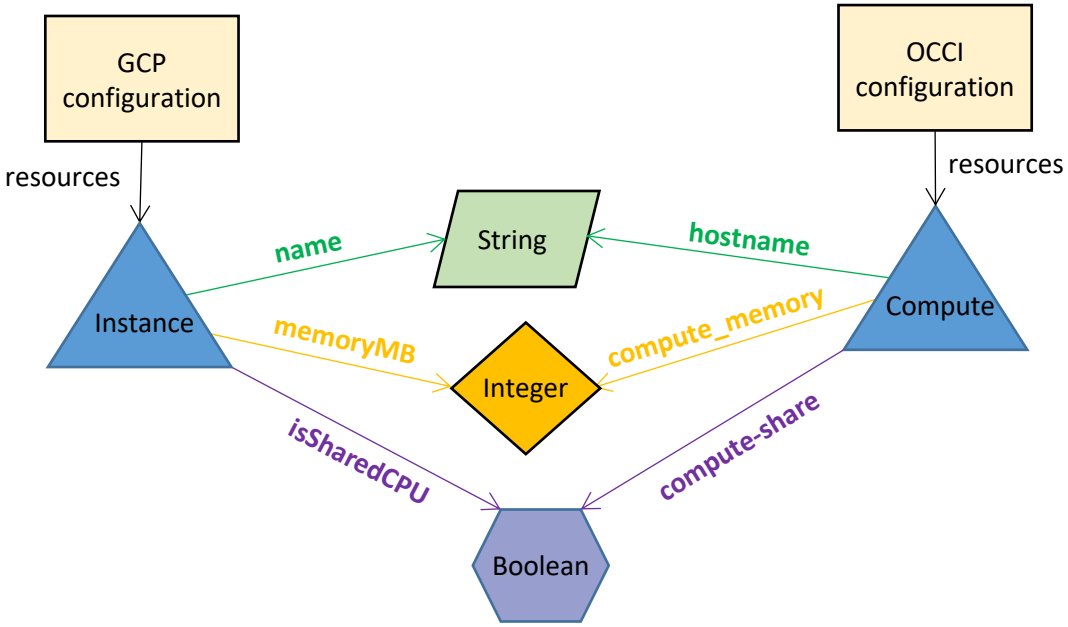
Sequentiality

Update Resource cannot happen if ***Create*** did not happen before

Fclouds – How?

- Fclouds transformation rules

An *instance* at GCP is a *compute* at OCCI



Fclouds – Publications

For more information see:

Stéphanie Challita, Faiez Zalila, Philippe Merle.

"Specifying Semantic Interoperability between Heterogeneous Cloud Resources with the FCLOUDS Formal Language."

11th IEEE International Conference on Cloud Computing (CLOUD).

Preprint: https://hal.inria.fr/hal-01790629

Stéphanie Challita, Fawaz Paraiso, Philippe Merle.

"Towards Formal-based Semantic Interoperability in Multi-Clouds: The fclouds Framework."

10th IEEE International Conference on Cloud Computing (CLOUD).

DOI: 10.1109/CLOUD.2017.98

https://github.com/occiware/fclouds-Framework

Google Cloud Platform

GCP Formal Model – Why?

Informal Documentation

Imprecise Types

`selfLink`	1	`string`	[Output Only] Server-defined URL for the resource.

Available at
https://cloud.google.com/compute/docs/reference/latest/targetHttpsProxies

`email`	2	`string`	The email address of the service account. Note: This field is used in responses only. Any value specified here in a request is ignored.

Available at
https://cloud.google.com/iam/reference/rest/v1/projects.serviceAccounts

`instanceClass`	3	`string`	Instance class that is used to run this version. Valid values are: • AutomaticScaling: F1, F2, F4, F4_1G • ManualScaling or BasicScaling: B1, B2, B4, B8, B4_1G Defaults to F1 for AutomaticScaling and B1 for ManualScaling or BasicScaling.

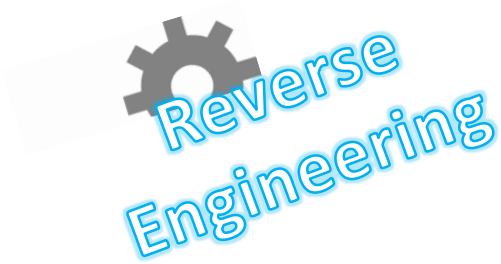
Available at
https://cloud.google.com/appengine/docs/admin-api/reference/rest/v1beta5/apps.services.versions

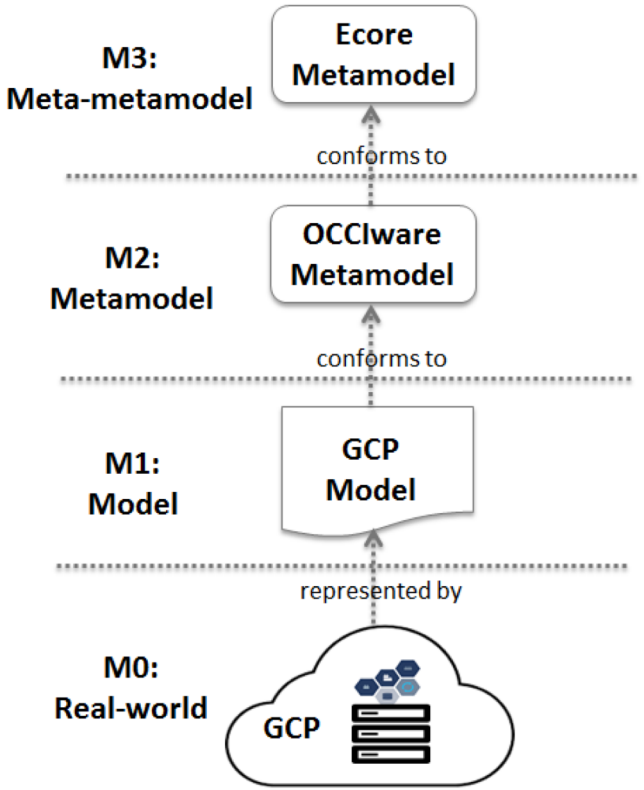
`locations[]`	4	`string`	The list of Google Compute Engine locations in which the cluster's nodes should be located.

Available at
https://cloud.google.com/container-engine/reference/rest/v1/projects.zones.clusters

Google Cloud Platform

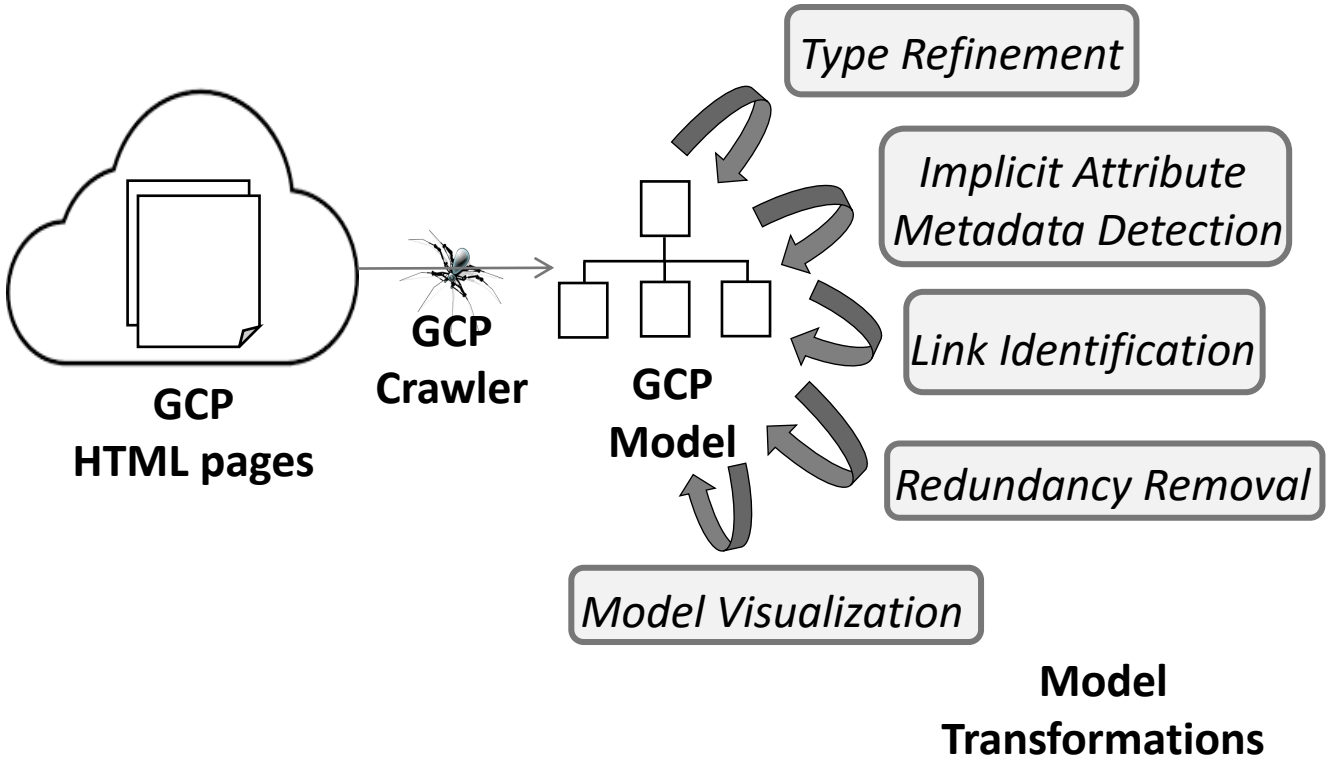
GCP Formal Model – What?





Google Cloud Platform

GCP Formal Model – How?



Google Cloud Platform

GCP Formal Model – Publication

For more information see:

Stéphanie Challita, Faiez Zalila, Christophe Gourdin, Philippe Merle.

"A Precise Model for Google Cloud Platform."

6th IEEE International Conference on Cloud Engineering (IC2E).

DOI: 10.1109/IC2E.2018.00041

https://github.com/occiware/GCP-Model

Summary

- Cloud heterogeneity


Tooling


Synchronization

OCCIware


Reasoning


Verification

fclouds

Application

GCP Formal Model

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