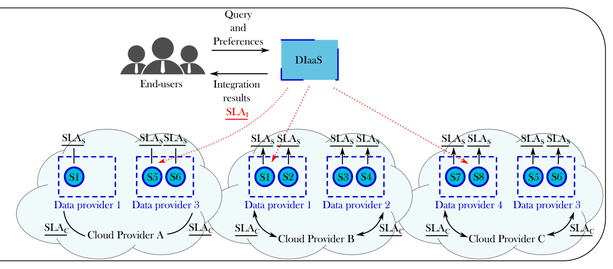
ARC 6 : Technologies de l'Information et de la Communication et Usages Informatiques Innovants

Mondes numériques pour l'humain et la société : conception, comportements et usages

Trusted SLA-Guided Data Integration on Multi-cloud Environment

The emergence of cloud environments redefined the data integration as service matching and composition problem. Furthermore, new constraints imposed by multi-cloud environments bring new challenges to data integration systems.

Thus, general objective of this research is **to propose a data integration approach in a multi-cloud environment taking into account data quality properties and service level agreements (SLA).**



POINTS CLES

- Model quality measures linked to data and to cloud resources
- Use Service Level Agreement (SLA) for guiding the data integration process performed on a multi-cloud
- Match data providers (services) to queries for integrating data according to the user requirements and the SLAs.

PROBLEMATIQUE

Efficiently obtain results for queries addressing services deployed in a multi-cloud environment by: *(a)* Fulfilling user QoS requirements; *(b)* Respecting subscribed contracts with the involved cloud provider(s); and *(c)* Respecting services contracts (constraints).

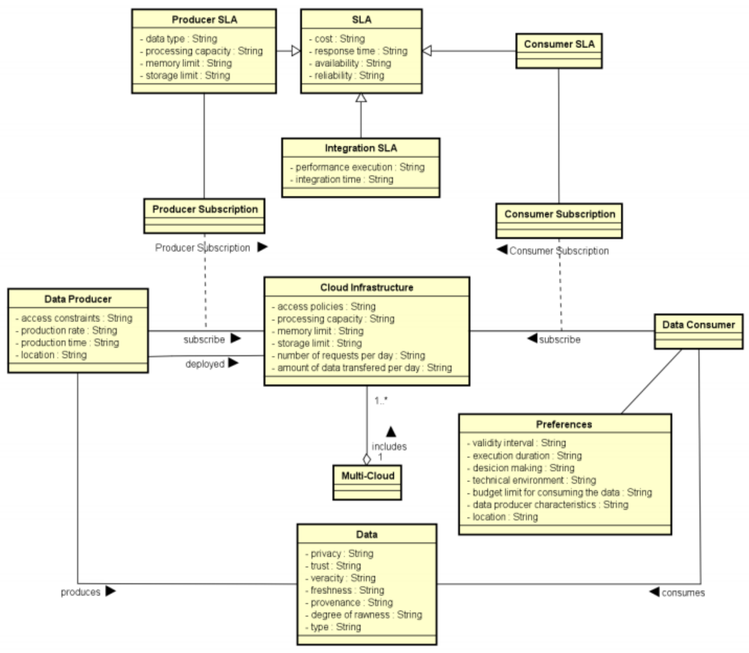


Figure 1: Data integration metamodel

Challenges:

- How to be sure that all the agreed SLAs are respected while satisfying the user?
- Can my constraints be satisfied? Which services shall I ask for?
- How can resources be saved for next query?
- How to perform the query rewriting matching services that answer the query and satisfy the quality preferences?
- How to integrate different SLA associated to services involved with user's quality preferences?

TRAVAUX ENGAGES / RESULTATS

Problem statement and state of the art by applying a systematic mapping process.

Rhône algorithm: formalization and implementation of a quality-based query rewriting considering user preferences and quality aspects expressed as SLA contracts (Figure 2).

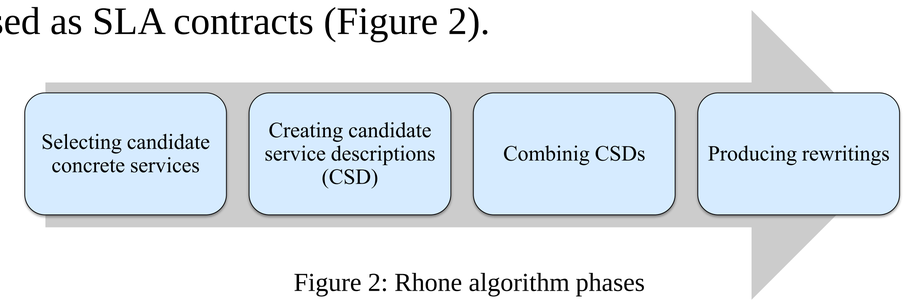


Figure 2: Rhone algorithm phases

Experimentation: lessons learned (Figure 3)

Complexity:

- Selecting candidate concrete services: O (n^2)
- Creating candidate service descriptions: O (n^3)
- Combining CSDs: O $(n^k)^m$

Performance increased reducing

- The number of rewriting solutions
- Integration execution time

Rewritings quality enhanced

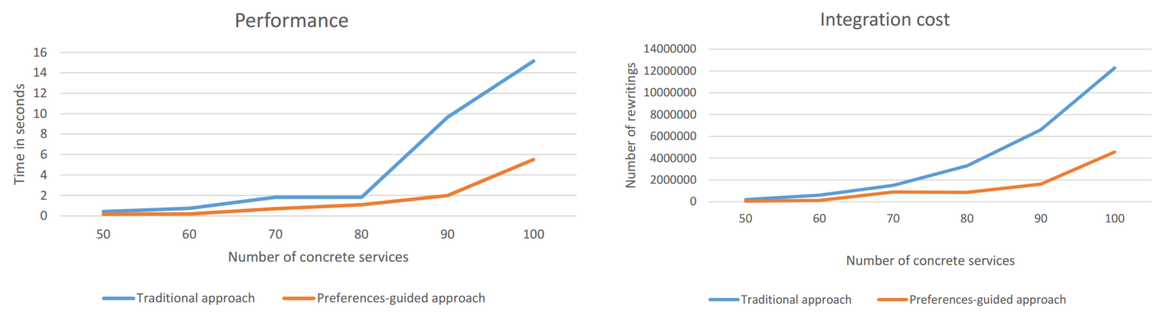


Figure 3: Evaluation results

Data integration metamodel: a metamodel and metaprocess to address data integration adapted to the multi-cloud context (Figure 1).

Ongoing work:

Designing models for the *cloud SLA*, *service SLA* and *integration SLA*.

Reducing the overhead caused by query rewriting:

- Taxonomy of query variations for promoting **reusability** of rewriting results.
- **Heuristics for optimizing** the rewriting approach adapted to the multi-cloud context.

Evaluation of the overall data integration approach adapted to the multi-cloud context.

*** Publications at** «https://sites.google.com/site/danielaguiardasilvacarvalho/».

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