Mobile Read Write Access and Intermittent to Semantic Web

(*MoReWAIS, 2016-2018*)

LIRIMA Scientific days, 12-14 September 2017

Outline

- ❑ Nature and history of the collaboration
- ❑ The team
- ❑ Scientific context
- ❑ Objectives
- ❑ Scientific progress

Nature and History of the collaboration (1/4) – Key dates

- 2005 : Post-doc in Wimmics (Acacia) (M. Lo)
- 2006 – 2010 :
  - « Semantic Web » Course in UGB Master of Computer science by Wimmics (F. Gandon)
  - INRIA Internships (2 M2 per year from UGB)
  - Visit UGB researchers at INRIA
- 2011
  - Semantic Web workshop at UGB
  - KOCC (Knowledge, Ontology, Community and Culture) project funded by AUF (50 000 €) and UNESCO-HP initiative (50 000 $US).

Nature and History of the collaboration (2/4) – Joint Ph D

- *A. Basse (defended in 2012)*
  - **Incremental Caracterization for RDF triple store**
  - Supervised by *F. Gandon, I. Mirbel, M. Lo*
- *O. Seye (defended in 2014)*
  - **Sharing and reuse rules for Linked data**
  - Supervised by *F. Gandon, C. Faron-Zucker, O. Corby, M. Lo*
- *P. F. Diallo (defended in 2016)*
  - **Methodology of Community co-construction of ontologies in a limited technological environment**
  - Supervised by *F. Gandon, I. Mirbel, O. Corby, M. Lo, S. Ndiaye*
- *M. Toure (beginned in 2016)*
  - Restricted and local access to the Web of Data
  - Supervised by *F. Gandon, P. Molli, M. Lo*

Nature and History of the collaboration (3/4) – Copublis

- Papa Fary Diallo, Olivier Corby, Isabelle Mirbel, Moussa Lo, and Seydina Moussa Ndiaye (2015). **HuTO: une Ontologie Temporelle Narrative pour les Applications du Web Sémantique**. *In Proc. 26e Journées francophones d'Ingénierie des Connaissances, Rennes, France, July 2015*
- Papa Fary Diallo, Olivier Corby, Moussa Lo, Isabelle Mirbel, and Seydina M. Ndiaye (2014). **Sociocultural Ontology: Upper-level and Domain Ontologies.** *In Proc. JFO - 5èmes Journées Francophones sur les Ontologies, Hammamet, Tunisia, November 2014.*
- P. F. Diallo, O. Corby, I. Mirbel, M. Lo, S. Ndiaye (2016), **Ontologies-Based Platform for Sociocultural Knowledge Management**, *Journal on Data Semantics, pp. 1-23, Juin 2016, Springer.*

Nature and History of the collaboration (4/4) – Copublis

- Oumy Seye, Catherine Faron-Zucker, and Olivier Corby (2014). **Publication, partage et réutilisation de règles sur le Web de données**. *In Proc. 25e Journées francophones d'Ingénierie des Connaissances, May 2014.*
- Oumy Seye, Catherine Faron-Zucker, Olivier Corby, and Corentin Follenfant (2012). **Bridging the Gap between RIF and SPARQL: Implementation of a RIF Dialect with a SPARQL Rule Engine**. *In Artificial Intelligence meets the Web of Data, ECAI Workshop, Montpellier, August 2012.*

Team

Université Gaston Berger / LANI

- *Moussa LO*
- *Cheikh Talibouya DIOP*
- *Seydina Moussa NDIAYE*
- *Fatou KAMARA-SANGARE*

INRIA / WIMMICS

- *Fabien GANDON*
- *Olivier CORBY*
- *Catherine Faron Zucker*

Postdoc : Kaladzavi GUIDEDI (from May 2017)
Papa Fary DIALLO (October-November 2016)

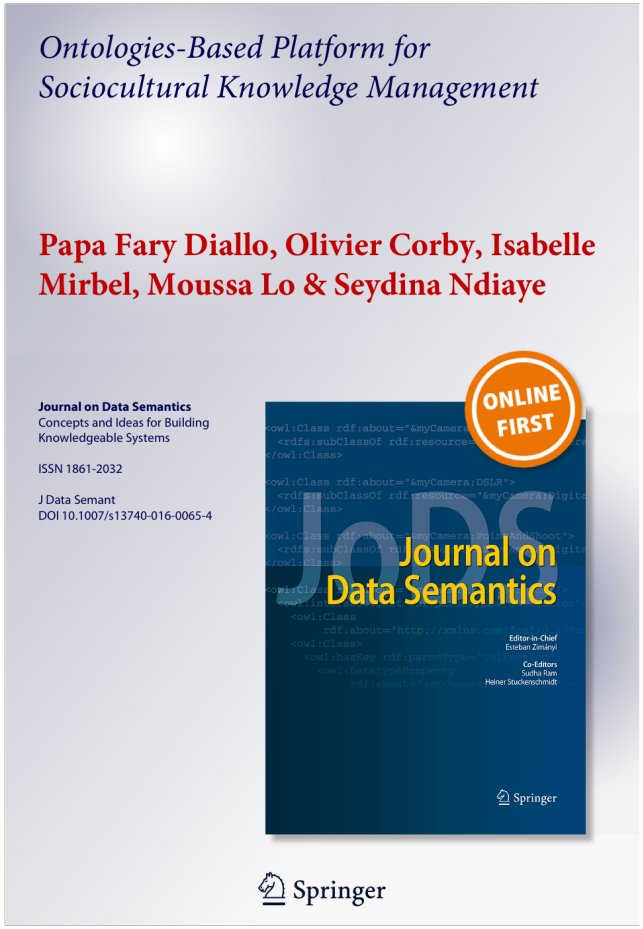
PhD Student : Mahamadou TOURE (from 2016)

Collaborations :

Université de Ouagadougou : Yaya TRAORE
Université de Nantes : Pascal MOLLI
Université de Nice
Université de Maroua

Scientific context : social and semantic web platform for sharing knowledge about communities

Papa Fary's thesis : set a sociocultural sharing platform allowing Senegalese communities to share and to co-construct their cultural heritage.



Limite nord	

Warning: Category:ServicesPublic is not allowed

Coki est un Villages du Sénégal du Sénégal, situé au nord-ouest dans la région historique du Cayor et connue de longue date pour son centre d'ensei

Contents [hide]

Histoire

Vers 1730, Mukhtar Ndumbé Diop fonde l'école coranique de Coki. Ce *daara* qui accueille élèves de tous âges et de plusieurs pays, est aujourd'hui le historiques classés.

Lors de la bataille de Coki en 1862, les partisans de Lat Dior l'emportent sur ceux de Madiodio et les Français.

Administration

Coki est l'une des quatre sous-préfectures du département de Louga dans la région de Louga. Chef-lieu de l'arrondissement de Coki, c'est aussi celui

Géographie

À vol d'oiseau, les localités les plus proches sont Kanene Al, Ndiakhar, Tiourour, Keur Ngoura, Loumene, Tiourene, Keur Ousmane, Mbelegne et Keur M

Population

En 2003, Coki comptait 7124 habitants et 685 ménages

Personnalités liées à Coki

Le village de Coki est le berceau de la lignée à laquelle appartient la famille de Cheikh Anta Diop.

L'homme politique Madieng Khary Dieng, ancien ministre, est né à Coki.

Categories: Localite | ErrorSyntax | ServicesPublic

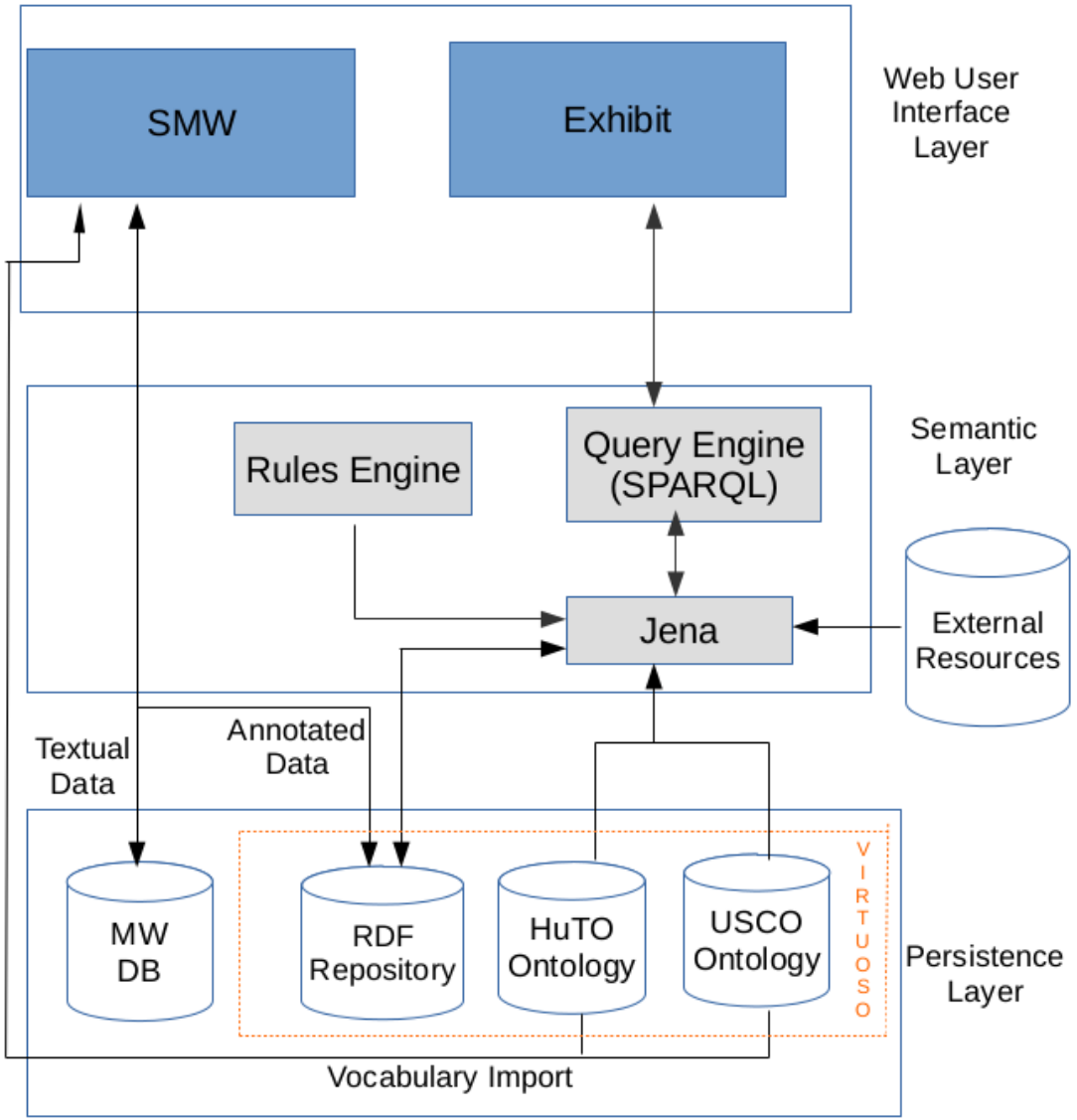
Facts about Coki

Langues dominante	Wolof
LatitudeLongitude	15.5, -15.98333
Nom	Coki , Koki and Kokki
Partie de	Louga
Population	7,124
PropertyError	Category:ServicesPublic
Relief	Sableux , Caillouteux and Plat
Type	Village

Scientific context

- A **knowledge platform** using social and semantic web technologies and allowing to communities to share their cultural knowledge.
- Allows Senegalese communities to share and co-construct their sociocultural knowledge by annotating socio cultural domain ontology.
- 2 objectives: to provide
  - a user-friendly framework for communities to collaborate and update data
  - tools enabling the querying and visualization of these data.

Scientific context : social and semantic web platform for sharing knowledge about communities



- **Proliferation of mobile devices**
- **Mobile connection** is more and more available *but the quality differs from one zone to another.*

How to allow anyone from his mobile to access or contribute to this data even with very limited Web access ?

Scientific context

- To *ease the use* of the platform, MoReWAIS proposes to **explore the advantages and constraints of mobile-enabled knowledge sharing** platform.
- MoReWAIS will *increase the use of the platform*.

Objectives (1/2)

- Design a mobile application which empower communities and their users to enrich and access more easily the knowledge base
  - using the user's context with its richness *(e.g. location, other users close-by)* and
  - addressing its limitations *(e.g. intermittent access, limited resources, constrained interfaces and interactions).*

Objectives (2/2)

- Design and develop algorithms, methods and tools for mobile devices allowing users to:
  - co-construct locally and on the road linked data representing the sociocultural shared knowledge
  - access and visualize in context relevant sociocultural shared knowledge
  - collect, host and make available sociocultural shared knowledge even in technological degraded contexts.

Requirements / Objectives

- This requires:
  - a complete rethinking of RDF storage and SPARQL querying in a mobile and unreliable network environment.
  - a dedicated interaction design to ease and encourage access and contribution.

Scientific progress (*M. Toure / Ph D thesis*)

- **General context**
  - ✓ Access to data
  - ✓ Mobility
  - ✓ Unreliable Internet access
  - ✓ Limited Resources
- **Scenario**
  - ✓ Information Exchange about sporting events, cultural events or local shops & services, in a constrained area.

Scientific progress

- State of the art on "*Mobile access to Web of Data*" to identify challenges and solutions in ensuring a coherent access in an unreliable environment and with limited resources and constrained interaction means.

- We had identified three relevant fields and bibliographic domains for the first stage of this project:

Scientific progress

- **Caching data in client-side and Federation**: as we are working with limited technological environment, caching data in client-side and creating federations of caches could reduce the time access to the Web and the down-time of a knowledge sharing platform.
- **Querying and Sharing data**: the problem then is to define algorithms and procedures to exchange data in that environment data. We are survey the state of the art to identify the best approach to use the caching and the federation to query and share data.
- **Linked Open Data and Privacy data**: the two previous points immediately raise the concern of privacy and the need to define and enforce policies to access/share data between neighbors.

Scientific progress : review of related works

- **Gossip protocols:**
  - Basic membership mechanisms
  - Hierarchical membership mechanisms
- **Alignment of ontologies:**
  - Pure architecture
  - Hybrid architecture
- **Local data replication:**
  - Indexing of relevant sources;
  - Automatic synchronization of local and remote sources
- **Intelligent Caching:**
  - Customer Cache
  - Distributed cooperative cache
- **Geolocation:**
  - Initialization of views
  - Choice of neighbor

INRIA

Modèles et Architectures pour un Accès Mobile Restreint et Local au Web de Données

Un état de l'art des architectures et solutions envisageables.

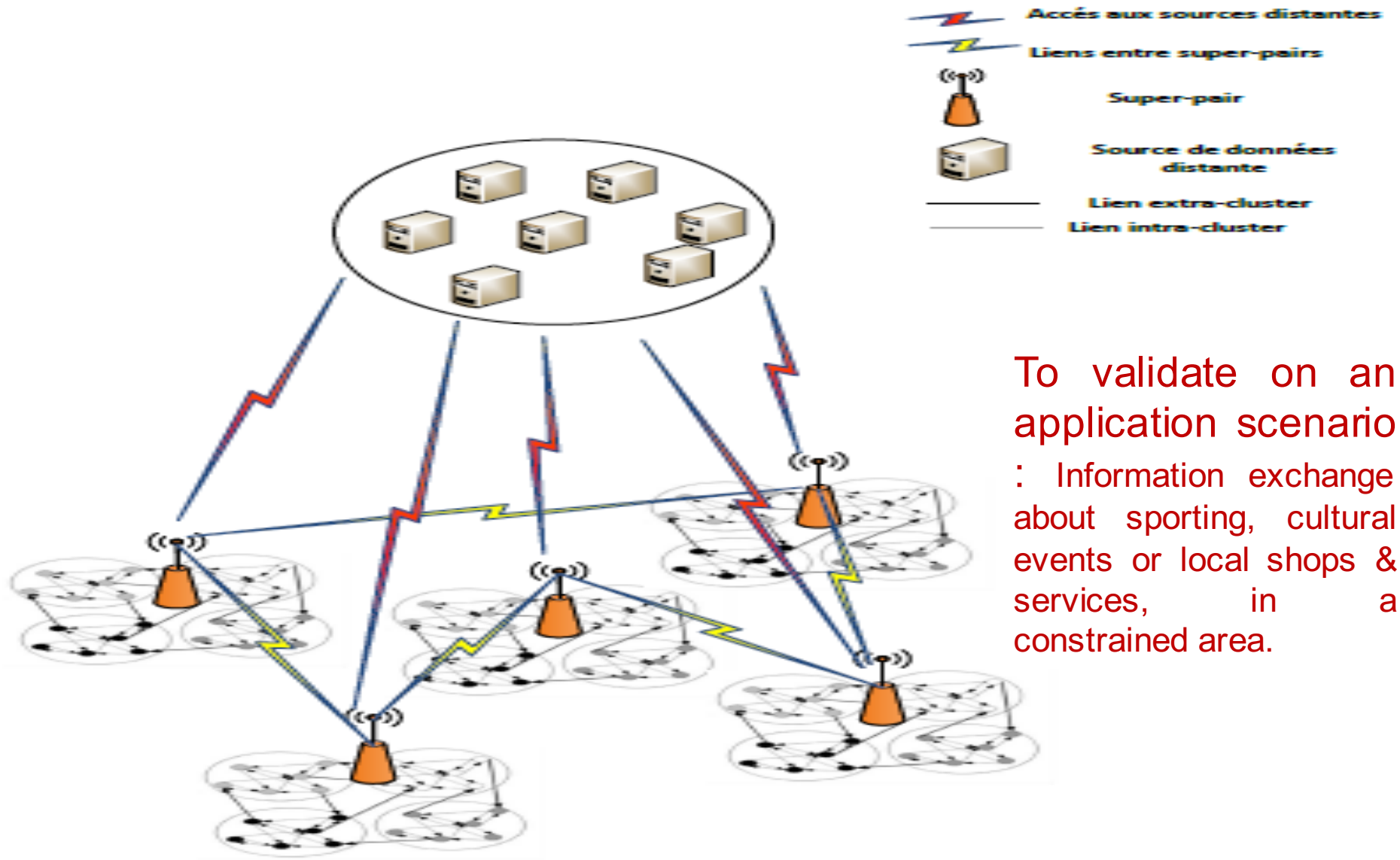
Mahamadou Toure, Fabien Gandon, Moussa Lo, Pascal Molli

16/05/2017

Scientific progress : architecture proposal

- a **peer-to-peer architecture**:
  - Based on a gossip protocol with hierarchical membership mechanism taking into account the location of the peers
  - Having an efficient and consistent mechanism of data replication
  - And a model for the automatic construction of a decentralized cooperative cache for fast and efficient query processing.

Scientific progress : architecture proposal



To validate on an application scenario : Information exchange about sporting, cultural events or local shops & services, in a constrained area.

Scientific progress : Next steps (1/2)

- **Caching data in client-side and Federation**
  - design an algorithm or a method to create a cache data on client-side.
  - define criteria to build a neighbor using the user profile.

Scientific progress : Next steps (2/2)

- **Querying and sharing data**
  - define the procedures to query data on the neighborhood-side before to access to the server.
  - design two types of algorithms:
    - to decide how to propagate and store contributions though the local network and
    - to query and access data though the local network.

❑ use of STTL in mobile

Activities and Financial aspects

- Visits, Local face2face meetings, video conf
- *Budget* :
  - ✓ INRIA : living expenses from UGB visitors
  - ✓ UGB : Ph D scholarship (400 €/month) and Postdoc scholarship (1000 €/month).

Thank you …

Email :
moussa.lo@ugb.edu.sn
fabien.gandon@inria.fr

Web :
https://project.inria.fr/morewais/
http://lirima.inria.fr/fr/research-teams/morewais/