Automating Local Government Spatial Transactions with State Government

**Introduction**

Geospatial data sharing is becoming more and more important in Spatial Infrastructures (SI) as huge amounts of data are supplied by a variety of organisations, stored in different formats, and managed at different user levels. The increased dependencies on timely spatial data have identified the need to consider improving supply chains for spatial data from local government authorities through to the Commonwealth. Typically spatial data is acquired at the local level and combined to form State/Territory level datasets and finally Commonwealth level datasets which are an aggregation. This research aims to provide a self service mechanism for local government spatial transactions with state government in the spatial industry through the use of Semantic Web and Linked Data technologies. This addresses need for more seamless spatial data supply chain operations.

**Research Issues**

- To improve the supply chain as an integrated component
- To build conceptual supply chain data models and automate the processes.
- How best to minimize the steps in value chains. Thus, promoting human efforts to higher levels.
- How the semantic web and linked data techniques can be used to manage the generation and update of complex multiple level supply chains for spatial data?

**Spatial Data Supply Chain**

**Current Supply Chain**
- Lack of automation
- Restrictive policy
- Inflexible outputs

**Applied Research**
- Transaction-based self service
- Machine readable processes
- Critical path analysis

**Current Spatial Transactions with in Government**

- Current processes are manual
- Humans process rules and make decisions

**This Research**

- Self-Service
- Automation - artificial intelligence for decision making

**Characteristics**
- Phone/fax
- Email
- Delays/backlogs
- Customer Frustration
- Limited human recourses

**Database -v- Ontology**

**Facts/data:** (from DB or RDF/OWL)
- Coolbinia: Existing suburb
- Yokine: Existing suburb
- Bradford St: Existing Road in Coolbinia
- Lonsdale St: Existing Road in Yokine
- A: Proposed Plot
- B: Proposed Plot
- C: Proposed Plot
- D: Proposed Plot

**Rules** (DL from Policies etc.):
- Adopt plot(a):
  - Proposed plot(x)
  - Existing Road(x)
  - Existing Suburb(y)
  - Frontage, Locality(x, y)

**Flow of customer information or backhauls**

**Manual Data Handling**

**Flow of Materials and Information**

**Jurisdiction**

**Final**

**Customer**

**Aggregator**

**Results**:
- **Adopt plot(A):** TRUE
- **Existing Road(Bradford St):** TRUE
- **Existing Suburb(Coolbinia):** TRUE
- **Frontage(A, Bradford St):** TRUE
- **Frontage Locality (Bradford St, Coolbinia):** TRUE
- **Adopt plot(D):** FALSE
- **Existing Road(Lonsdale St):** TRUE
- **Existing Suburb(Coolbinia):** TRUE
- **Frontage(D, Lonsdale St):** TRUE
- **Frontage Locality (Bradford St, Coolbinia):** FALSE

**Summary:** This study uses Semantic Web, Artificial Intelligence and Linked Data Technologies to enable automated spatial transactions on a central database. The case study develops a methodology to enable Local Government Authorities to transact with a State Government Agency (Landgate and DEPI) in an online environment for administrative boundary changes, and road and place name changes. The State Government Agency business rules are encoded using semantic web and artificial intelligence. The code, and thus the evidenced-based decision making process, is transparent to the user. The concept is based on an automated transaction Management (ATM) approach, where the result of a transaction, such as a boundary change, results in an accurate and allowable spatial database transaction. The approach can be universally applied to other spatial transactions within spatial data supply chains in a Spatial Infrastructure.

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