Design of an Intelligently Irrigated Agriculture Decision Support Service System

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ABSTRACT

Decisions on efficient irrigation in agriculture depend on sufficient information from different sources. The source of information may come in different form and different scale. Properly delivering them to farmers in field is required to make the decisions on spot where internet access may be intermittent. Requirements are of supporting diverse data products, reactive, responsive, and progressive. The design of a geospatially capable service system needs to adapt fit technologies in both server and client. This study reviews relevant geospatial information technologies to meet the requirements: data integration, responsive Web design, and progressive Web application. A full stack design of Web geospatial information service system is developed to efficiently serve farmers in irrigated agriculture up to fields.

OBJECTIVES

Goal:

-Provide irrigation decision support to farmers

Actors/stakeholders

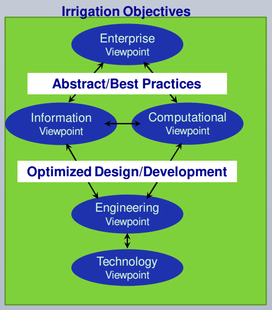
- Farmers who uses irrigation
- Information producer
- Modelers/Researchers
- Decision makers in agricultural sectors

METHEDOLOGY

Adopt the software engineering design framework using the reference model of open distributed processing (RM-ODP)

• Analyze the requirements from five different views that representing different aspects and details of the software design.

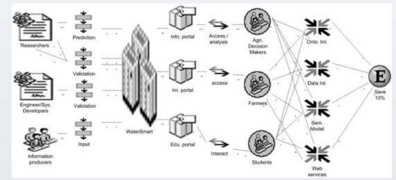
- Enterprise View: Analyze the conceptual operation at an abstract level. The step will define the purpose, scope and policies of the system. The design should answer four W's (What for? Why? Who? When?)
- Information View: Define information sources and models. Analyze the flow of data and information through the service chains.
- Computational View: Defines types of services and protocols. How do components work together?
- Engineering View: Define use cases.
- Technology View: Technology and infrastructure to develop and implement the services and system.



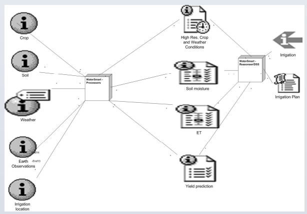
RESULTS

A design from five views:

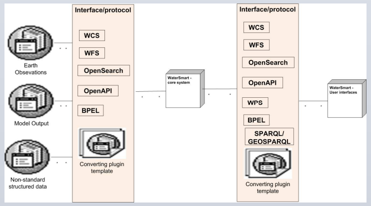
• Enterprise: Increased efficiency as the goal for users to use the irrigation system by individual farmers to manage irrigation up to the levels of fields.



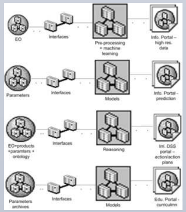
• Information: Earth Observation data goes through the service chain to deliver actionable products.



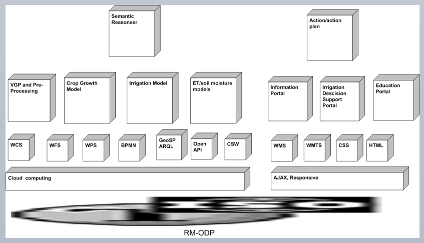
• Computational: Web-Service-oriented and semantic-Web to integrate diverse sources of information in decision support.



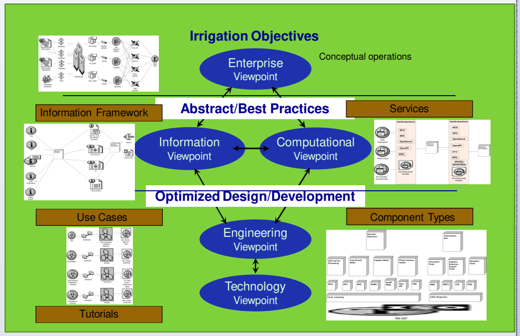
• Engineering: Use cases of informational discovery, decision support app, and educational infrastructure.



• Technology: REST, Progressive Web App, cloud computing, and Internet of Things to enable the collection, analytics, and dissemination of information.



CNCLUSIONS



The design of the service system to improve decision on irrigation up to the levels of fields:

• Connect data to models: Earth Observations to information.

• Integration of diverse sources of information in supporting decision.

• Service and system integration blueprint.

REFERENCES

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ISO/IEC 10746-2:2009

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