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The Internet of Things for Environment: Ontology-based Decision Support System (DSS) coupled with a Wireless Sensor Network (WSN)

J. Sun, Gil de Sousa, Catherine Roussey, Jean-Pierre Chanet, K.M. Hou

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The Internet of Things for Environment

Ontology-based Decision Support System (DSS) coupled with a Wireless Sensor Network (WSN)

Agriculture and environment Context-aware System

Design and implementation of a Ontology-based DSS which measurement data are mainly provided by WSN for:

- Context Acquisition, Modeling, Reasoning and Distribution over the whole system (DSS and WSN)
- Heterogeneous data integration
- Regulated energy consumption at the level of the wireless sensors
- Internet of Things (IoT) and Linked Open Data (LOD) paradigms considered

Use Case

Figure 1 : Example of WSN configuration to monitor watershed

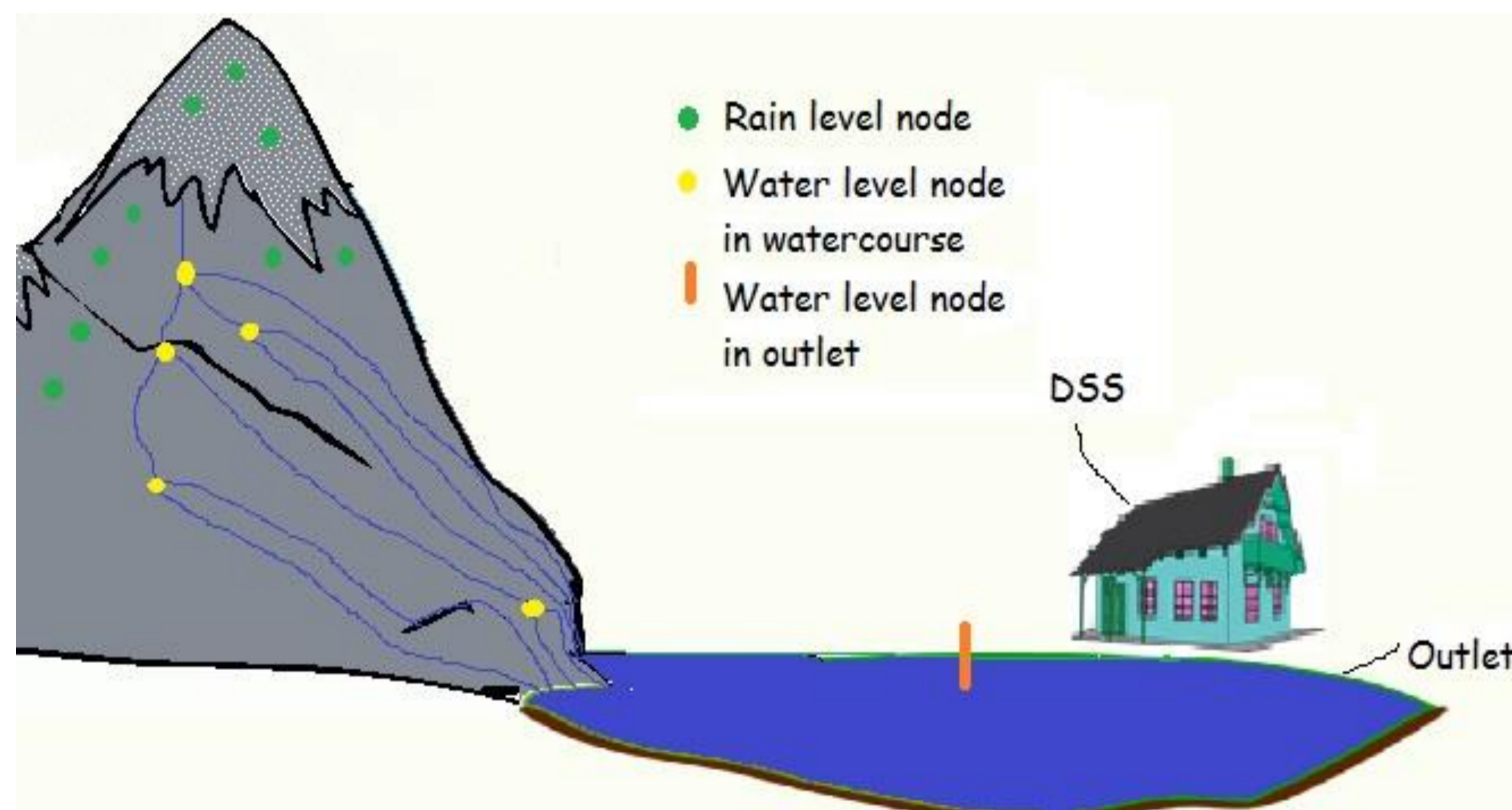


Figure 2 : Data flow Processing of the Context Aware System fed by a WSN

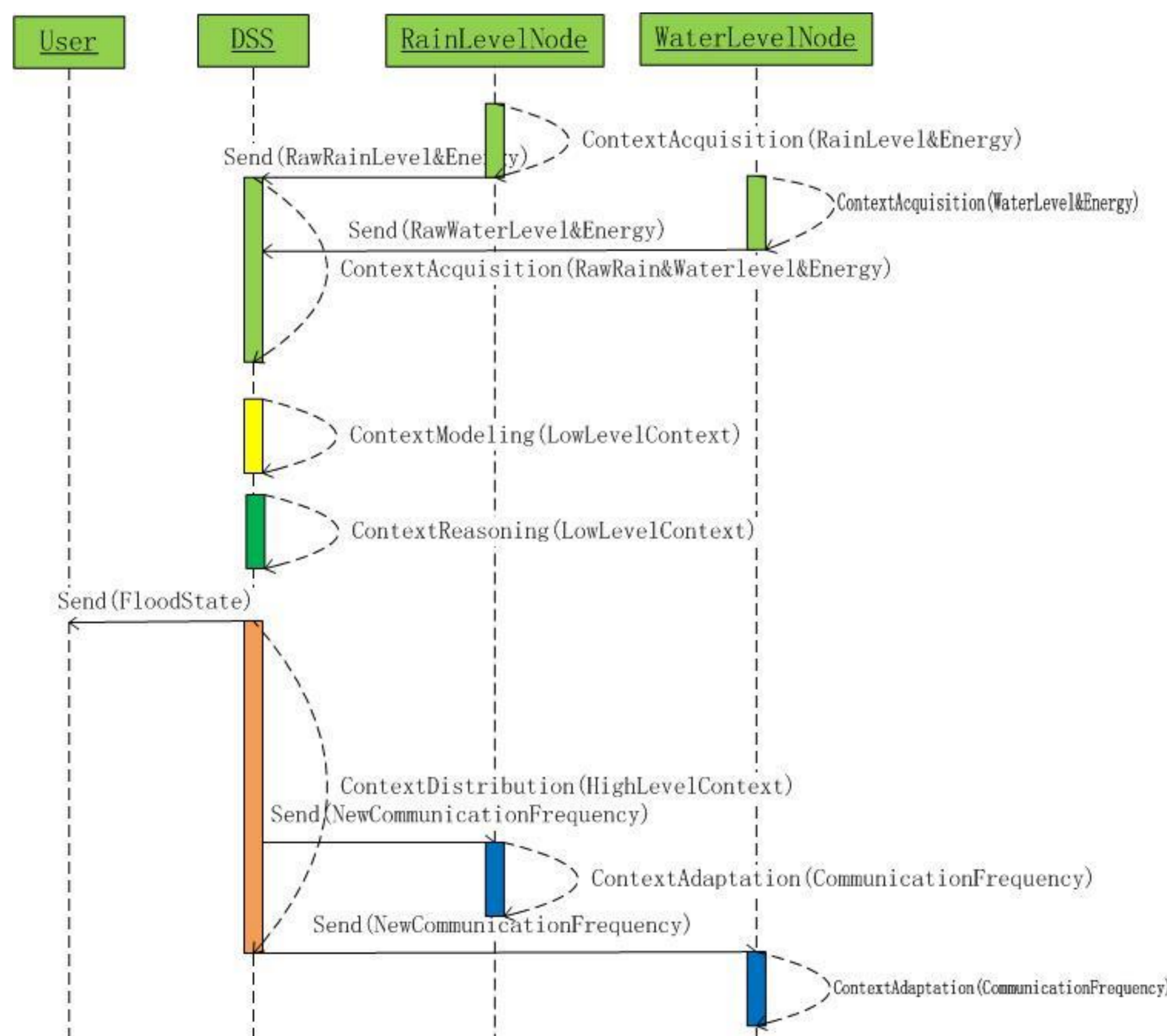
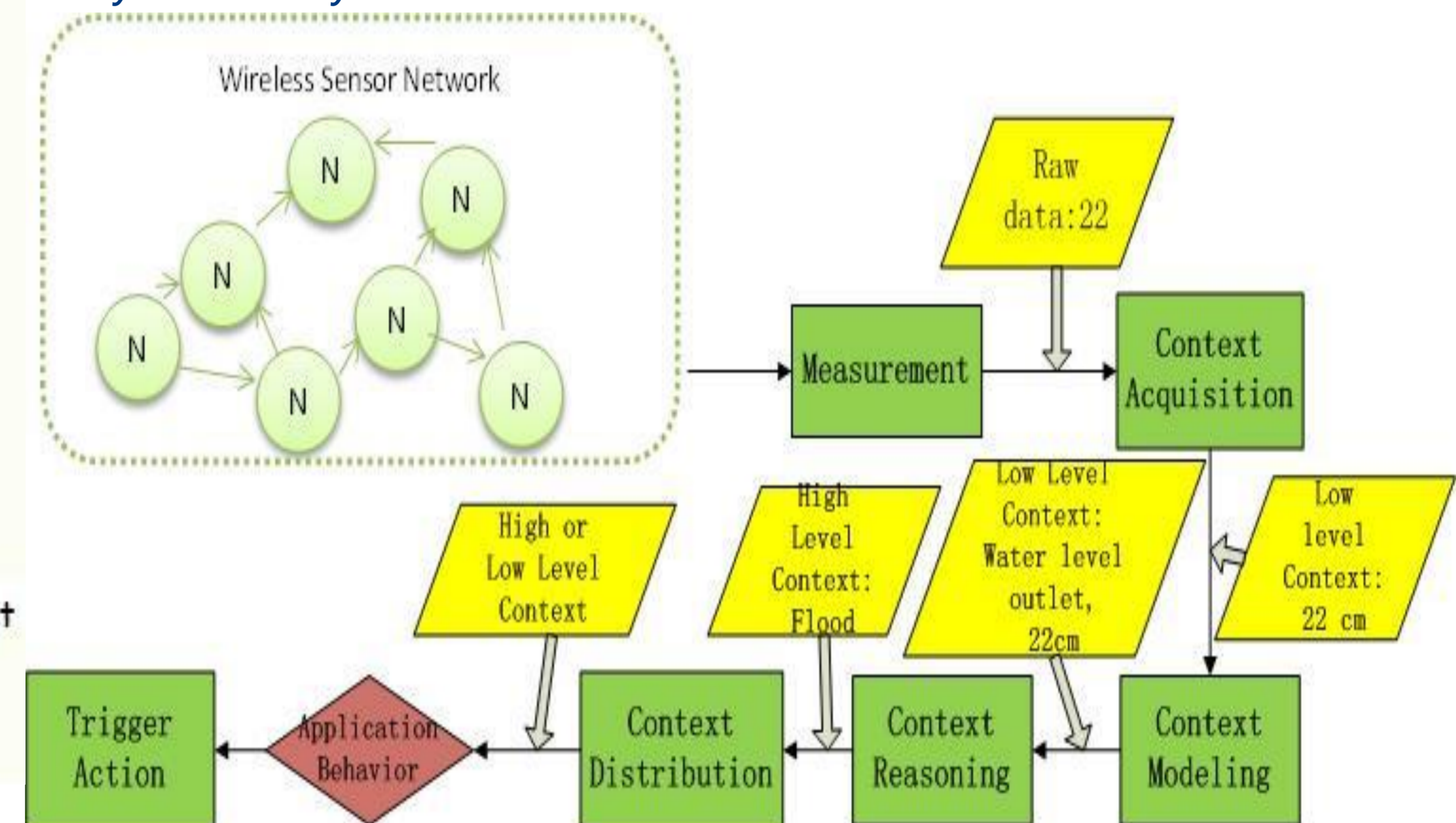


Figure 3 : Sequence Diagram of scenario 3 of use case in a watershed

Case of study "Flood risk detection in a Watershed"

- Monitoring a watershed with two kind of wireless nodes:
 - .Rain level.
 - .Water level in water courses and outlet
- Several parameters to take into account:
 - .State: A qualitative data which change over time representing a set of quantitative data acquired.
 - .Context: Low level context or high level context depending on the different entities.
- Aim of DSS:
 - .Deduce high level context (e.g. flood risk, etc.) and send alert if necessary
- 4 scenarios in case of study.
 - .Scenario1: Sensors send only measurements to DSS; DSS sends alert to users if flood is detected; Sensors don't change their communication frequency.
 - .Scenario4: Sensors send only measurements to DSS; DSS sends alert to users if flood is detected; DSS sends phenomenon state to sensors; Sensors can adapt communication frequency based on phenomenon and energy states.

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Contacts :

1. Jie Sun
 1 Gil De Sousa, Catherine Roussey, Jean-Pierre Chanet
 2 Kun-Mean Hou

- 1 IRSTEA, UR TSCF, {Firstname.Lastname}@irstea.fr – 9 avenue Blaise Pascal, CS 20085, 63178 Aubière, France
 2 LIMOS UMR 6158, {Firstname.Lastname}@isima.fr – Campus Universitaire des Cézeaux, 1 rue de la Chebarde, TSA 60125, CS 60026, 63178 Aubière cedex, France