## Architecture for an Open Source IOT (Internet of Things) Based Solution for Water Quality Monitoring and Prediction of Natural Water Sources in Sri Lanka

## W. N. Sandeepani<sup>1(\*)</sup>, R. L. Dangalla<sup>1</sup>, S. K. L. S. Rupasinghe<sup>2</sup>, K. D. Delgolla<sup>3</sup>

<sup>1</sup>Department of Computing and Information Systems, Faculty of Applied Sciences, Sabaragamuwa University of Sri Lanka, Sri Lanka, <sup>2</sup>Research and Development Division, National Water Supply and Drainage Board, Rathmalana, Sri Lanka, 3SLT Muve Head O ce, SLT OPMC Build-ing, Elvitigala Mawatha, Colombo 05, Sri Lanka

(\*) Email:wnsandeepani@std.appsc.sab.ac.lk

Unavailability of a proper water quality monitoring and prediction mechanism has impacted negatively towards water quality management in Sri Lanka. The available Supervisory Control and Data Acquisition (SCADA) systems contain drawbacks such as high cost, low interoperability and flexibility. Hence, a proper architecture is proposed through this study to support efficient water quality management. The workflow was designed after a proper requirement analysis. The components, tools and technologies to be used were selected separately for a device to obtain water quality measurements, optimized backend server architecture, and a model for future predictions. The connectivity diagram was designed to provide architecture for water quality monitoring and prediction. The validation was conducted through implementation through proof of concept. The Arduino Uno based device obtains measurements in pH, conductivity, turbidity, temperature and dissolved oxygen. A separate device named ANDalyze obtains heavy metal readings of raw water. Then sensor data is transmitted to Mosquito Message Queuing Telemetry Transport (MQTT) Broker. Next to NiFi, which manages the flow of data and transmits to Kafka and Hive servers where real time streaming and predictions happens. Prediction model is designed using ARIMA Time Series prediction. Data was visualized through Spark. The proof of concept was implemented excluding dissolved oxygen and heavy metal sensing due to budgetary limitations. The model architecture is applicable to be implemented to monitor and predict raw water quality in natural water sources in Sri Lanka that has direct impact on water safety of the nation.

Keywords: Water Quality, Internet of Things (IOT), Architecture

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