Hydrologic Micro Services (HMS) Architecture

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Abstract: An often-encountered issue in hydrological and water quality modeling is matching the problem statement with available model(s). Workflows can consist of a single model or be composed by linking multiple models to address the problem statement. This often requires custom-written software wrappers and/or the use of modeling frameworks. Modelers often spend significant amounts of time parameterizing the selected model(s) because many were developed before access to environmental databases were available online. The entire model may have to be used even if the problem statement requires only a subset of its functionality. Individual models may not simulate all the physical processes to the detail level required by the problem statement, or may not simulate all the desired water quality constituents, leaving the modeler to simulate proxy constituent(s). A componentized system, Hydrologic Micro Services (HMS), is being developed to address these issues. The HMS architecture contains a collection of inter-operable data and modeling services. The water quantity and quality components can be used to construct workflows tailored to specific problem statements. The primary design objective of HMS is to make the components available as RESTful web services, as well as desktop libraries, so they can be easily integrated within complex workflows. Each component may have multiple implementations ranging from macro (coarse) to micro (detailed) that will allow users to choose the appropriate level of detail for the problem statement.

Keywords: Microservices, RESTful API, water quality, water quantity