Global Institute for Water Security: Data Management System

Background

Global Institute for Water Security (GIWS) at the University of Saskatchewan is directly involved in the collection of the field data from four different research areas (Boreal Forest, Rocky Mountain Headwaters, Prairie, and Lake Biogeochemistry Research Facilities). In addition to the in-house data, GIWS manages or is in the process or acquiring the measurement records from different organizations including the University of Saskatchewan Centre for Hydrology, Environment Canada, Alberta Environment and others. Also, as an active international member of CUAHSI organization and participant in GEWEX, GEOSS Water, and other international projects, GIWS has data processing and publishing capacity required to serve the large and diverse group of users.

Current status of the system

The data management platform on which GIWS currently operates is the Water Information System Kisters (WISKI). In the first place, WISKI application was chosen because of the supported features to import, process (QA/QC), analyze, and visualize the large quantities of data with the option to use Kisters's or external modelling and scripting tools for further data processing.

At GIWS, WISKI application is used together with Campbell Scientific LoggerNet software and in-house developed .NET modules in the automated tasks that handle data collection, centralized data processing, storing, and reporting.

After processing, the environmental data sets are published and made available to three different groups of users:

   I.   students and researchers that focus on detailed historical records related to a smaller number of measured parameters,

  II.   users that are able to discover GIWS time series data by querying the metadata records stored on servers managed by CUAHSI and other organizations, and

 III.   general public users and shareholders that have access to near real time data and recent historical records managed by GIWS

In order to cover the specific requests from the scientific community (group I data consumers), GIWS uses Kisters WISKI Web Pro module that provides a direct connection to the WISKI Database and a wide range of tools for visualization and analysis of the data. Support for user specific logins ensures controlled access rights to browse and download station, parameter, and time series records. Additional software module - Kisters Web Interoperability Solution (KiWIS) processes the data requests that come from other database systems (group II data consumers). This module is used for sharing hydrological data through the open standards and is able to both consume and publish real-time hydrological data over the Internet using WaterML 2.0 and SOS data encoding. In addition to the Kisters query services, the module provides OGC services as well as CUAHSI WaterOneFlow or ArcGIS-readable formats all based on one publishing mechanism and user based access. Finally, data requests coming from the general public (group III data consumers) are handled by the custom web module that is still being implemented at the GIWS. A beneficial feature of this module will be a simple yet comprehensive front-end web

interface where smaller number of data sets from observations can be easily accessible for the visualization and dissemination purposes. Basic functions such as navigation, identification, and combination of different map layers will be available to the users of this application.

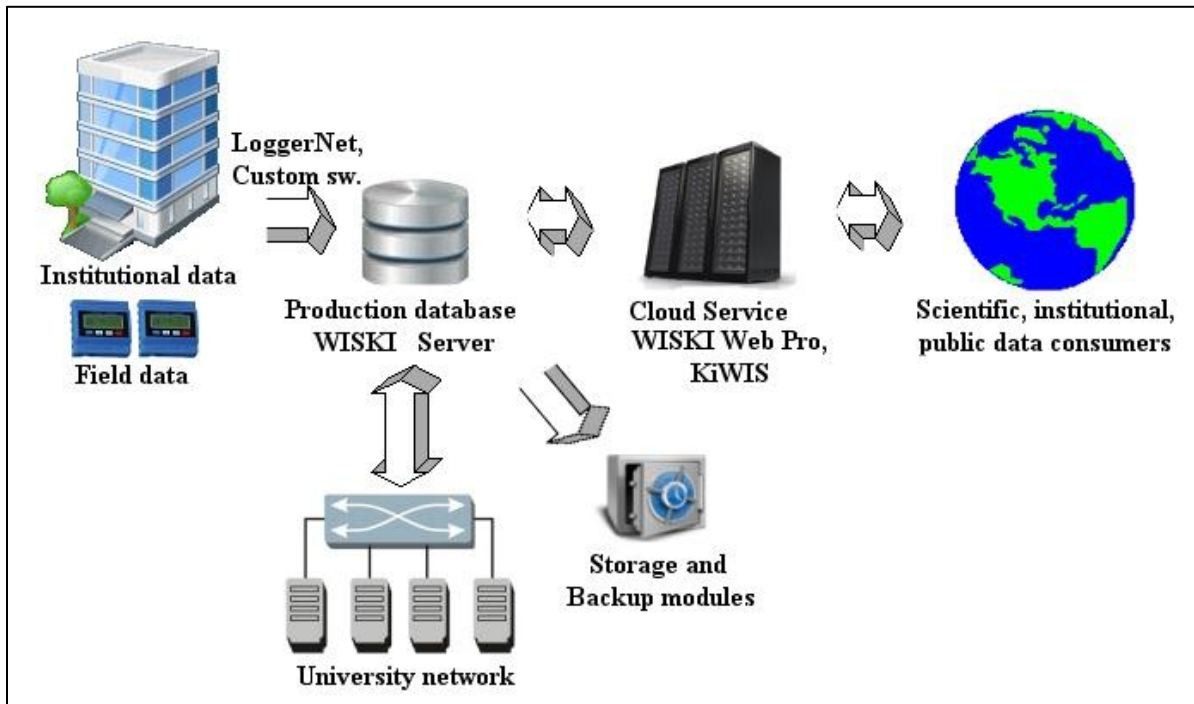Current architecture of the GIWS information system is presented in Figure 1:

Figure 1: GIWS Information System Architecture