Experiences with open standards
KISTERS Customer base

Mapping the KISTERS international Community

KISTERS experiences with open standards | Author: Michael Natschke | Creation date: 12-06-2016
KISTERS Company Profile

Business Unit Water: Solution areas and Markets

Hydrology & Water Management

Maritime

Groundwater

Urban Drainage & Waste Water Treatment

Water Quality & Ecology

Meteorology & Climatology

Hydro Power & Reservoirs

Cloud Services & Data-Centres

Measuring & Telemetry

Aquaculture, Agriculture & Irrigation

WATER
KISTERS experiences with open standards

Standards, formats and protocols for time series transfer

Intra-process communication
- communication between modules within a single server
- mass data streaming (industry standard)
- development standards (e.g. OSGi framework)

Inter-process communication
- communication between two server
- mass data transfer/streaming (industry standard)
- high performing API based client-server or server-server communication (e.g. REST)

Inter-system communication
- communication between two systems (and business logics)
- data exchange (domain standard such as WaterML2.0 part1 for time series)
- open protocol (such as SOS)
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Standards, formats and protocols for time series exchange

OGC

WaterML2.0 part 1 part 2
GML WFS WMS CSW

Surface Water
UK-TS-XML xHydro WDTF
KISTERS community standard

Σ Data Products
Meta data Time Series Gaugings

OGC

WaterML part ?

Water Quality
US WQX LAB CSV SUI WQM
KISTERS community standard

Σ Data Products
Meta data Time Series Samples

OGC

GroundwaterML
GML WFS WMS CSW

Groundwater Service
CSV Local ascii
KISTERS community standard

Σ Data Products
Meta data Time Series Observations

OGC-ML OGC-JSON

Domain solution/product

REST

WOF SOS(Hydro) REST
KISTERS Water Interoperability Service (KiWIS)

REST WOF SOS(Hydro)

REST

REST

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Standards, formats and protocols for web app development

SOS(Hydro) WOF REST  KISTERS Water Interoperability Service (KiWIS)  REST WOF SOS(Hydro)

Surface Water  Water Quality  Groundwater Service

Σ Data Products  Σ Data Products  Σ Data Products

Meta data  Time Series  Gaugings  Meta data  Time Series  Samples  Meta data  Time Series  Observations

Groundwater Service

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KISTERS Projects supporting open standards

Australian Water Resource Information System: Water Data Online for Australia

Fact Sheet

- **Water Data Online** is a lighthouse project in Australia (BoM) to centrally manage Australia’s Water Resource Information.
- Data from more than 260 data providers are integrated into a central access point at BOM.
- Producing the core data products to inform Australia about the current water conditions.
- Climbing Rob Vertessy’s value ladder another step by making data publically accessible.
- Enabling the Geo-Fabric integration of in-situ data.
KISTERS Projects supporting open standards

World Water Online: global in-situ network for Hydrology

Fact Sheet

- **World Water Online** is an initiative from UT-Texas (Prof. David Maidment), esri and KISTERS
- Making core hydrological variables available on global level
- Stream discharges, precipitation and soil moisture
- Groundwater is pending
- Decentral solution based upon open standards and webservice technology
- Demonstrator at AIP 6/7 GEOSS Summit in Geneva
KISTERS Projects supporting open standards

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US: National Flood Forecast Interoperability Experiment

- NFIE: National Flood Forecast Interoperability Experiment
- Support of the architecture team
- NFIE Flow Modeling for the entire US, based upon NHDplus geospatial data set
- Demonstrator Summer School 2015
- 2.7 Million river reaches, 6,600 basins
- Models: WRF Hydro and RAPID
- Modern information services based upon web services (incl. open standards)
- and many others
The Water Data Infrastructure (WDI) project has been initiated by Vlaamse Milieu Maatschappij (VMM)

Avoid vendor login and silo processing of relevant data in hydrological forecast processes

Open interfaces, open standards (WML2.0, WPS, CSW, WMS) are used to build a decentral cloud based modeling infrastructure

Foster innovation in modeling community by specifically engaging the scientific sector
KISTERS Projects supporting open standards

WDI: Water Data Infrastructure for Flanders

Fact Sheet

- The Water Data Infrastructure (WDI) project has been initiated by Vlaamse Milieu Maatschappij (VMM)
- Avoid vendor login and silo processing of relevant data in hydrological forecast processes
- Open interfaces, open standards (WML2.0, WPS, CSW, WMS) are used to build a decentral cloud based modeling infrastructure
- Foster innovation in modeling community by specifically engaging the scientific sector
KISTERS Projects supporting open standards

European Flood Awareness System: Meteo Data Collection Centre

Fact Sheet

- **EFAS MDCC**: meteorological data collection and validation for the European Flood Awareness System
- Collecting data for 20,000 meteorological stations (historic and real time) of the member states
- **Single meteo endpoint** for dissemination through open standards
- **Real time spatial/temporal validation** and delivery of gridded precipitation, wind speed and air temperature data product to the computational center (every 6 hours)
- Regular **anomaly reporting**
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Open Standard Candidate: GEMStat; UNEP Global Water Quality Portal

Fact Sheet

- **GEMStat** is component of the UNEP GEMS/Water
- 35 years operated by Environment Canada
- Now hosted by the German Federal Institute for Hydrology (BfG)
- Designed to share surface and ground water quality data sets collected from the GEMS/Water Global Network of more than 3,700 stations world-wide.
- The GEMStat database comprises approx. 4.3 million records representing more than 100 quality parameter types.
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KISTERS Service enablement by countries

- Australia
- Austria
- Belgium
- Canada
- France
- Germany
- Ireland
- Italy
- Netherlands
- New Zealand
- Scotland
- Switzerland
- USA

KISTERS Community

- KISTERS Service enablement by countries
- KISTERS Water Interoperability Service installed and activated
- Open accessible data endpoints depend on the implementation of open data policy
- However open standards play an important role (common domain logic)
- HydroProfile must stay compliant to the community and must be managed by the HydroDWG
KISTERS Projects supporting open standards

KISTERS Service enablement by sector

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KISTERS Projects supporting open standards

KISTERS Service enablement by continent

- Open data policy largely integrated into the business model and procedures
- Open data policy partly integrated into the business model and procedures

KISTERS Community

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Australia
Europe
North America

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Summary

OGC standards

- are established within the Hydro community
- are extended (e.g. by Ratings Gaugings & Cross Section)
- should revisit the forecast use case (IE2) and extend standard to ensemble and forecasts
- should be looking at standardization of Water Quality Sampling data
- provide service/data to fulfill publishing requirements (more JSON representation wanted)
- provide service/data as input or output in modelling processes

- should not be primarily used as server for a dynamic web page (format too verbose, functionality limited)
- should not be primarily used as data storage format (format too verbose and inefficient to read/write)

- are not fully utilised yet due to open data policy implementation process
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Summary

KISTERS contributions

- KISTERS technology stack is 100% compatible with open standards
- KISTERS projects do support open standards and combine them with the latest technology stack
- KISTERS continues working closely with the industry including the open source domain and scientific sector
- KISTERS World Water Online is the ideal technology stack for international/inter-institutional platforms (such as WMO Whycos, WIS, etc)