Environmental Information exchange Network

EN2015

Interoperable Watershed Projects

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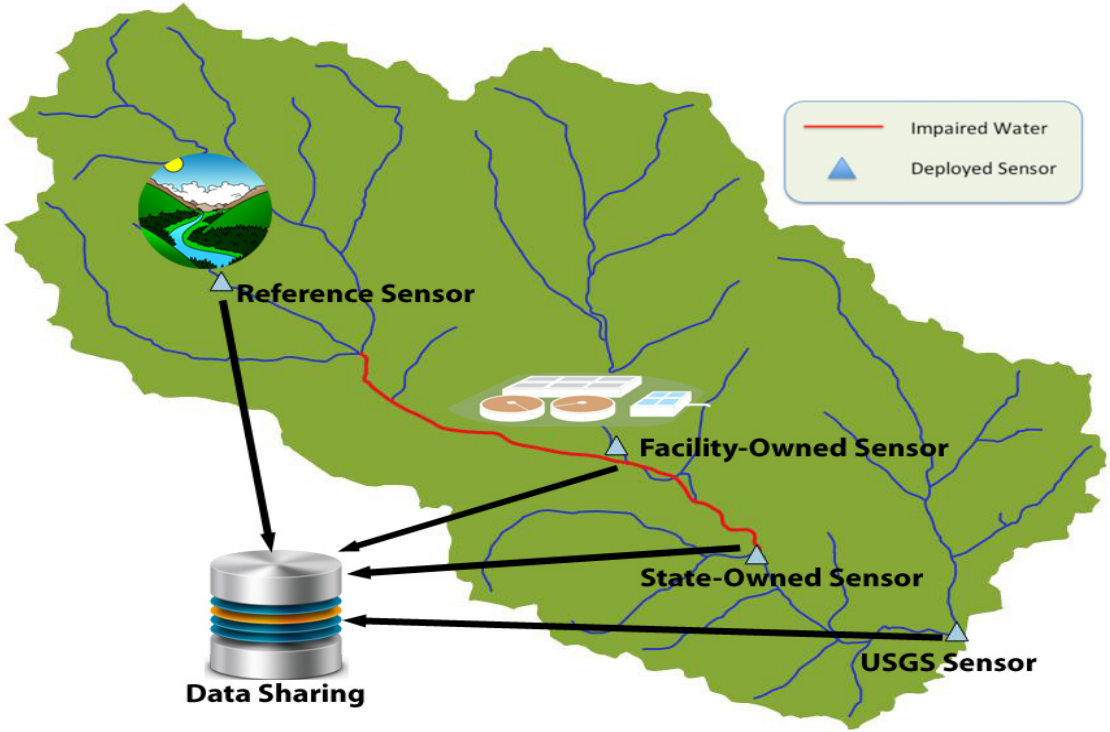
ABSTRACT

The Interoperable Watersheds Project is an E-Enterprise scoping project that focuses on making water sensor data more discoverable and accessible. This presentation gives an overview of the project, the return on investment that was conducted, and a discussion of current activities.

Outline

- Water Quality Monitoring Data – a Primer
- A National Sensor Data Sharing Network
- Return on Investment Review
- Next Steps
- Challenges
- Possibilities

An Interoperable Sensor Network



- Sensors are owned/operated by diverse organizations
- Use data standards to promote data interoperability
- Data can be available real-time, and also archived for future reference

Water Quality Monitoring Approaches

Sensors

What do you do with all the data?

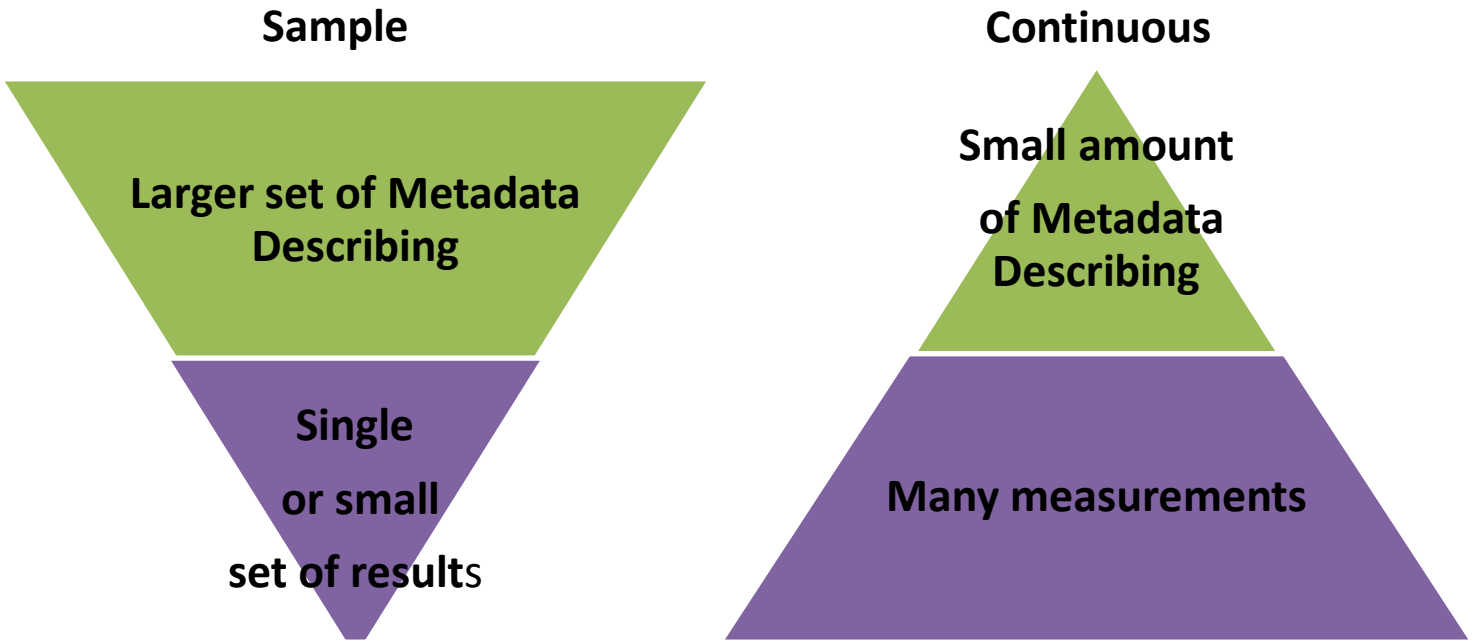
Discrete

Broad Categories of Water Observations

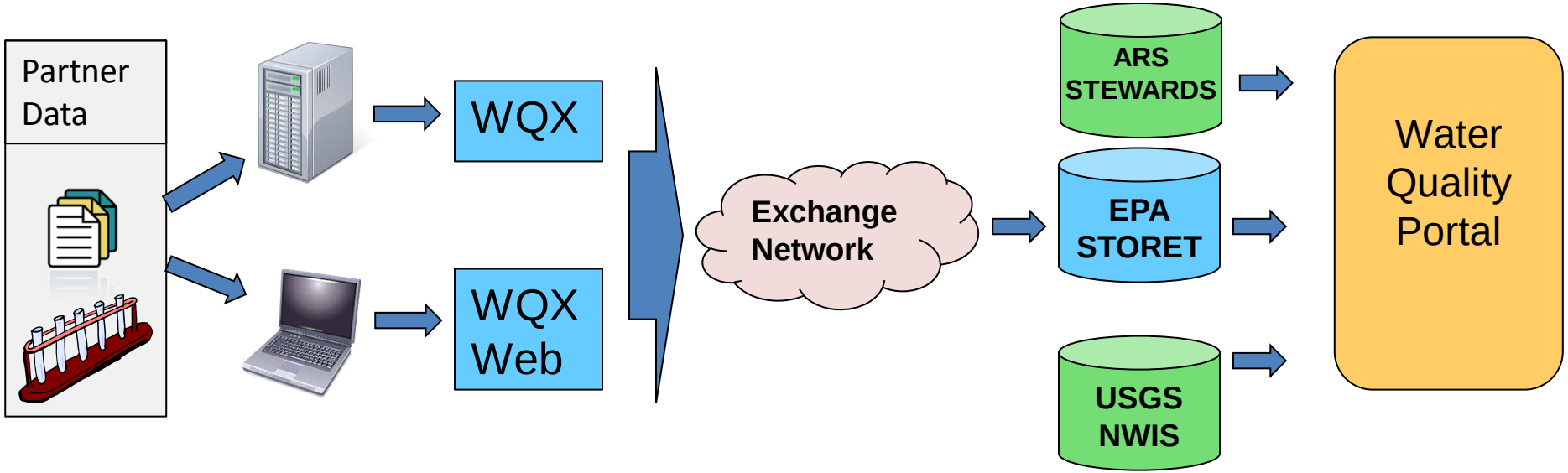
#	Observation Style	Description
1	In-situ, fixed observation	Generally temporally dense, spatially sparse, small number of observed phenomena. Examples: river level or stage, river discharge, etc.
2	In-situ, manual observation	Temporally sparse (eg, site visits) but potentially spatially dense. Examples: groundwater observations made during pump tests at well sites.
3	Ex-situ, complex processing observations	Temporally sparse, spatially sparse, many observed phenomena. Examples: nutrients (N, P, etc), pesticides, biological, etc.
4	Remote-sensed observations	Observations collected by a sensor not in direct contact with the property being observed. These results can be spatially & temporally dense.
5	Complex data products	Processed or synthesized observational data. Examples: outputs from models, calculation of complex physics-chemistry, biological indices, etc.

Source: OGC 10-126r4 WaterML 2.0 Part 1 - Timeseries, p.14

Data Models are Different for Sensor and Discrete Data



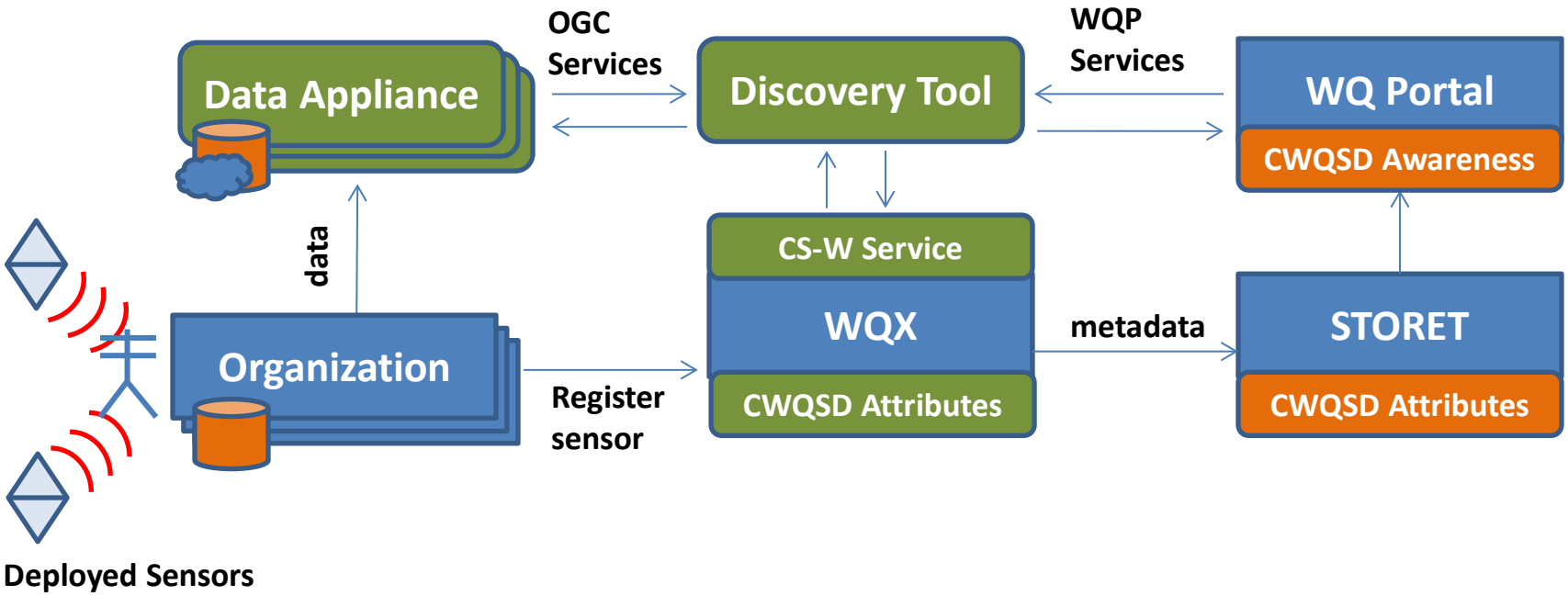
WQX Works Great for Discrete Data



- The water quality data portal (an EPA/USGS partnership) provides access to over 266 million water quality results
- These data are all available via web services which can be incorporated into any other third party application
- For more information on the portal see: www.waterqualitydata.us

The Interoperable Watersheds Project proposes the development of an interoperable national data sharing network for sensors integrated with the Water Quality Portal.

How Would it Work?



Data Standards

Water Quality Exchange (WQX)

www.epa.gov/storet/wqx

- Works great for discrete data
- Backbone of the Water Quality Portal
- Based upon data elements developed by the NWQMC

Water Markup Language 2 (WaterML2)

http://www.opengeospatial.org/standards/waterml

- Open Geospatial Consortium Standard
- Works great for sensor data
- Based upon WaterML 1.0 which was developed by CUAHSI

Return on Investment

- A ‘Return on Investment’ was conducted to evaluate the benefit of enabling a standards-based sensor data sharing network

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Investment	$200K	$500K	$425K	$100K	$100K	**$1.325M**
Cost Savings	$0	$0	$629K	$1.258M	$1.887M	**$3.774M**

Next Steps

How do we get there from here?

Next Steps: Continued

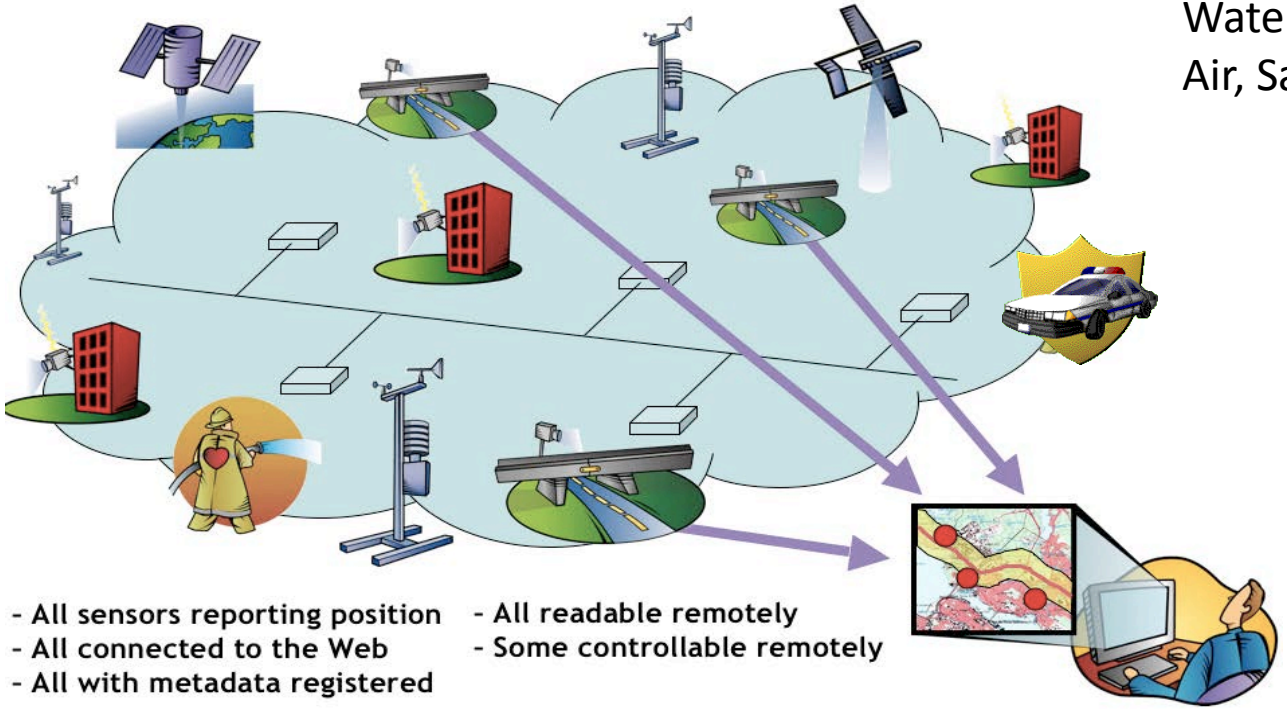
- EPA has completed a Sensor Data Strategy to guide our efforts moving forward.
- EPA has initiated two demonstration projects to test possible approaches.
- These efforts will be tied to the Open Water Data Initiative that you just heard about.

Challenges

- This effort needs to be a public/private partnership in order to succeed.
- This will be a good test of the ‘distributed’ publishing model.
- The demonstration projects will help test some of these approaches.

But wait, there's more….

Water Quality, Quantity,
Air, Satellite, and so on



Source: OGC Observations & Measurement (O&M) ISO 19156
Sensor Model Language (SensorML), Sensor Observation Service, Sensor Planning Service

“If you can dream it, you can do it.”

-Walt Disney

Have further questions, comments, or ideas contact:

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