The Digital Delta
A Connected e-Government
for National Water Management

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1953

Delta Program 1.0

- **Brick & Mortar**
- **Binary**
- **Single Purpose**

Context: Water Management in the Netherlands 1/2

An extremely well managed system, but 2 challenges for the near future:

1. *More frequent more extreme weather (severe rain, storm but also droughts)*

2. *Increasing pressure on water systems by industry, transport, agriculture, nature and urbanization*

The system is highly interconnected, high water and droughts impact amongst others:

- *Ships cargo capacity*
- *Salt intrusion from sea and ground water*
- *Energy production (cooling water)*
- *Water production for industry, agriculture and drinking water*
- *Traffic on land (e.g. tunnel floods)*
- *Building and levee stability*

Netherlands water management cost $9B/yr, expected increase ~2B by 2020

Ref: Bestuursakkoord Water / Resolution of the National Water Committee, April 2011

Context: Water Management in the Netherlands 2/2
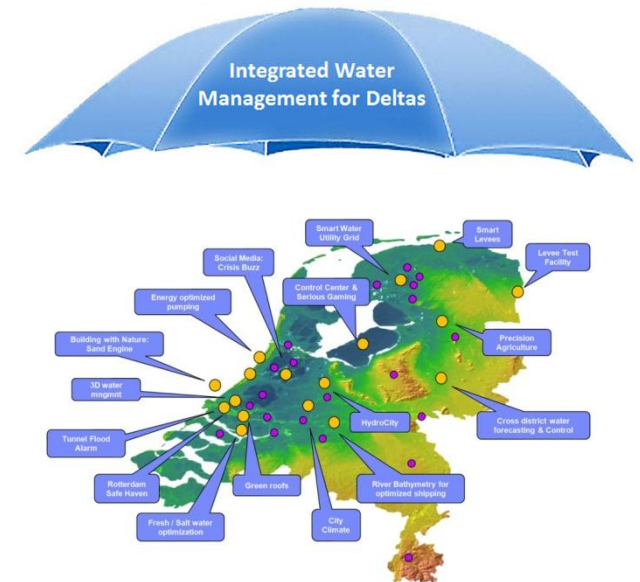
Over 100 projects undertaken:

1. *Each looking at a specific part of the system*
2. *Each addressing its data access and IT needs independently*
3. *Big Data*

Feasibility study amongst scientists and specialists:

- *30-60% of their budgets spend on finding, getting access and validating data and IT environment*
- *Duplication of tools and solutions*
- *Data not available in standard data formats*

Smart Integrated Water Management:

- *Optimization cross multiple disciplines (e.g. flood risk, droughts, asset management, emergency response)*
- *Combination, analytics and insights of data from various domains not limited to water (e.g. energy, logistics, traffic)*
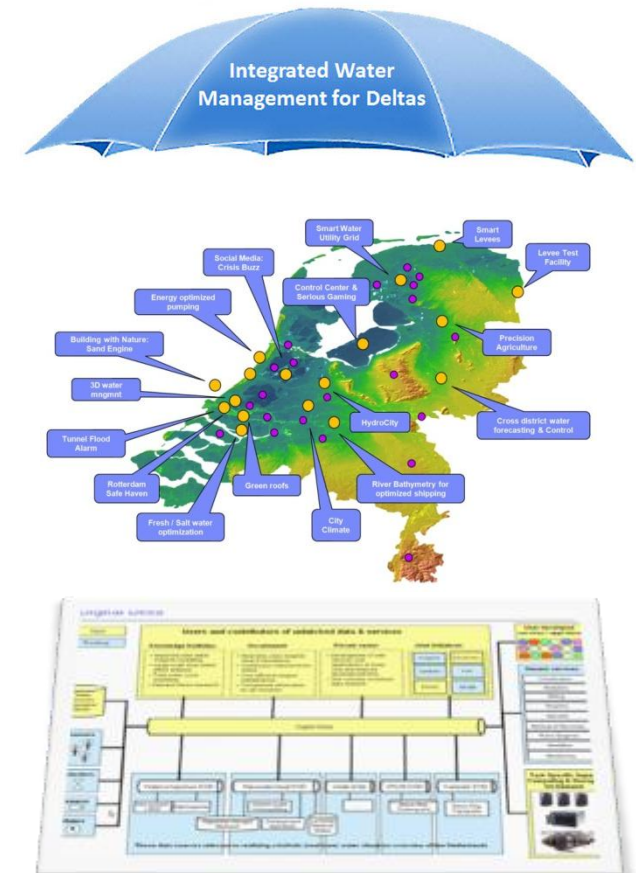- *Leveraging different types of data (e.g. Satellite imaging, in situ sensors, social media, call center data)*

Integrated Water Management for Deltas

The Digital Delta

A Public-Private R&D Initiative of:

- *Rijkswaterstaat (Ministry of Infrastructure & Environment)*

- *Local Water Authority Delfland (District of the cities of Rotterdam, Delft and the Hague)*

- *University of Delft & Applied Sciences Institute Deltares*

- *IBM*

Scope & Duration:

- *Initially 12 months €5.5M budget while exploring (inter)national expansion and extention*

- *Started 19th June 2013*

- *Public partners provide business challenges and access to data for scientists, high tech starters, SMBs and industry*

- *Will initially focus on 5 use cases that each by itself will improve the efficiency and effectiveness of the Dutch Water System*

- *The use cases will provide the live experiment environment for answering the research questions*

Objective: show the potential for **>10% cost savings, and develop new smart water science and solutions 4x quicker** by reuse of data, tools and IT services

Overview of high level research questions 1/2

During the program these questions will guide the activities and implementation of the use cases. Defined questions might turn out to be irrelevant and new ones could be added.

1. Innovate water management

- How can smart combinations and analytics of data from different sources and domains across different organizations lead to a more efficient and effective water management and improve the scalability of solutions from a regional to a national and international scale?
- How can smart combination/analytics of data reduce the life cycle cost of assets owned and maintained by water managing organizations (dikes, sluices, pumps, and so on)
- How can smart combination/analytics of data improve the quality of operational decision making in managing water

2. Innovate within the Dutch and EU legislation

- How can the Digital Delta be realized in an operational environment taking into account relevant Dutch and EU legislation and policies (e.g. archive legislation and Patriot Act concerning location of data streams and data storage)
- How can the Digital Delta fulfill part of the Open Data policy of the Dutch government and EU?
- What are potential business models for the Digital Delta and how do they connect with public sector interests?
- What are potential consequences for privacy or liability of opening up or combining data sets?

Overview of high level research questions 2/2

3. Innovate in IT

- Wat needs to be done to improve maintenance, management and quality of required data, models, algorithms and tools
- What IT developments are needed to enable dealing with large heterogeneous data streams?
- How can data be visualized effectively, what intuitive user interfaces will have to be developed for this?
- How can such an infrastructure be realized in a robust, secure and scalable way yet stay as accessible and open for other stakeholders and participants?
- When are what architecture patterns relevant? What are the arguments for the various scenarios?
- What ambition level is feasible for the registry? Manual version, automated or possibly machine to machine communication? Only service oriented services or also datasets and files?
- To what degree are semantic models and ontology's relevant for realizing the 'business' objectives of the program?
- Which standards and architectures are relevant and how should they evolve?

4 .Innovation in governance, maintenance and IT management

- What are potential governance models for the operational phase?
- Which additional questions need to be answered for tendering the operational phase?
- How to deal with data management principles e.g. data stays at the source in relation to performance requirements or cost considerations in a distributed environment?
- How can the Digital Delta environment be open, scalable but at the same time manageable and user and developer friendly?
- Which services and what quality level should an operational phase offer and what is the role of the owning organization? E.g. pure data exchange or also support for interested stakeholders and organizations in connecting their data sources and solutions or possibly even consultancy in improving data quality of such an organization?

What functionality should a common platform deliver?

The Digital Delta Use Cases

Definition of a use case in this context:

- *Needs to have business or science impact relevant to managing an aspect of the water system*

- *Requires access to data, tools, algorithms, models, services or solutions from other stakeholders*

- *Realizing a use case should lead to reusable data or functionality by other scientists or developers (develop once, reuse often)*

- *Each use case is an integration of a larger existing project/program expanded with new functionality or data access with the Digital Delta IT platform*
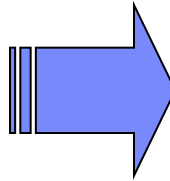
5 initial use cases:

- *Rijkswaterstaat:*   ***Cross district water level coordination*** *(real time data exchange between 4 organizations)*
- *Delfland:*   *Innovation Playground for SMBs and high tech starters*
- *University of Delft:*   ***Plug & Play sensors*** *(EU Climate KIC)*
- *Deltares:*   *Next Generation Hydrosoftware (global real time modelling)*
- *IBM:*   ***City of Rotterdam****; status based asset management*

Insights & Challenges

1. Setting up the Public Private Partnership

2. ' Use Case' thinking not common

3. 'Open Data' often not yet so open

4. Cross organization collaboration

5. 'Value' of water often in adjacent domains / departments

Q1 2014: International Roundtable to discuss progress and learn from other leading projects in the world

From this...   ...to this

While saving costs and driving innovation

Thank you

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