BIG DATA: A WATER COMPANY PERSPECTIVE
BEN TAM
INNOVATION PROGRAMME MANAGER
Challenges in AMP 6

Population & demand for water will rise but available water won’t

SIM Customers expectations continue to rise

Efficiency Challenging ourselves to be more efficient

ENERGY As a low-lying region there is a high use of energy to pump water around the region

Supply Interruptions Step change in performance

Climate change impacts and uncertainty

38,000 Km Water Mains
139 WTW
Source to Tap Opportunities

...that's why from now on our WASTEWATER SERVICES will be called WATER RECYCLING SERVICES.

We collect and recycle water from 2.44 million households and over 110,000 businesses.

We collect it

We clean it

We store it

You use it

Here's the best bit

We do it all again

We commit to making sure everyone in our area has clean water.

We're committed to making sure everyone has clean water. If you need help, please contact us.

Why 'WATER RECYCLING'?

We're making this small but important change – referring to 'water recycling' rather than 'waste water' – to lead the way in changing perceptions about water and how we use it.

No water is 'wasted' water. It's a precious resource that we borrow, use, clean and carefully recycle to use again and again.

It's the latest part of our Love Every Drop strategy to change the relationship we all have with water – encouraging all of us to use it more responsibly and efficiently.

That's why wastewater services will now be known as water recycling services.

Every day, 927 million litres of water is pumped through 200km of pipes to 1.3 million water recycling facilities.
Rainfall impact on Sewer Networks
Smart Networks Architecture

6. Asset Intervention

So what does it all mean and what are we going to do about it?

5. Data Fusion and analysis

ILPM, Asset +

4. Data Management and Display

- Data eg. consumption, cost, asset, weather, soil, DI
- Display – eg. IRIS, ILPM, SAP, BO reports, spreadsheets

3. Collection and Communication

Tough books, Smart Meters, Alarms, PREMIS MM3P, Microwave, Bluetooth, analogue white space, GPRS

2. Sensing and Control

Smart Meters, Miser, PREMIS, characterisers, PRV / pump controllers, loggers, radar

1. Physical layer

People, WTW, Pipes, Pumps, Reservoirs, Fittings, DMA Meters, Domestic Meters,
Weather Radar – Rainfall impact on Sewer Networks
Integration of rainfall data

- Screenshot of level sensor locations vs. rainfall list/dashboard in OMC
Operational dashboard—monitor & analyse
Where next? Anomaly Detection

Next Generation anomaly analysis

• Analysis and categorise any time series data
  e.g. Mass Spectrometers, Vibration sensors, Water Contaminant Sensors

• Advance techniques
  – Filter
  – Validate
  – Classify
  – Compare
  – Location aware

• Unique selling points
  – Early warning vibration damage
  – Real time categorisation from real time series data
  – Prevent environmental discharge
  – Highlight the abnormal
Leakage and Optimisation
Leakage and Optimisation
The plan – to 2040

AW Leakage Since Privatisation

- Meets customers’ expectation
- In line with our Water Resources Management Plan (WRMP)

Performance to Date

193ML/d

172ML/d

Extreme Wet Weather
Strategic Pressure Mgmt
Winter 10/11
Drought 11/12

Financial Year
Optimised Networks

- Transient Monitors
- Remote control and configuration
- Advanced control and optimisation
- Continual automatic optimisation (learning networks)
- Power harvesting
- e-FlowMeter
- Intelligent Inlet control valves

DRIP: Data Rich Information Poor
Enterprise Information Management
Data quality

**Data Quality Dashboard**
Dashboard will present the count of known data issue occurrences over time, allowing drill-down to an actionable level.

**Dashboard Enables Management Intervention**
Dashboard enables management intervention to drive down impact of missing and invalid elements.

**Analytical Capability**
Analytical capability to identify main sources of poor data capture.

**View of Missing and Invalid Elements**
View of missing and invalid elements as well as non-reportable elements that should not be included in final figure.

*Image taken from black & white wireframes*
User Experience

**User Experience Analysis of Current Form**

- **Navigation buttons and function to submit are identical.** Most prominent button on the form is ‘cancel’ which is in its own row, taking up 9% of the screen.

- **Form allows the user to include missing, invalid, or incomplete information.**

- **Certain functions such as attaching photos or obtaining traffic management data require FT to leave the form, losing context and flow.**

- **Inconsistent use of language across the form, makes it a more time intensive process to gauge at a glance what information is required.**

- **Certain drop downs contain hundreds of options (e.g. material & size of main) making it difficult and frustrating to locate the correct option.**

- **Members of the same team use the form differently - no clear process and ambiguous questions are asked.**

- **Redundant information is required - for example the FT’s name multiple times, or needing to input the colour of the surface (‘green’ for ‘grass’).**
User Experience

A common & consistent visual methodology is being produced across all forms - this includes functionality, look & feel, navigation and language.

Survey work is the most common usage of the form (65-70%), so that is now defaulted, enabling the FT to complete a survey with 4 mouse clicks.

Progress indicator lets the FT where they are within the process and what is remaining to complete at a glance.

New forms are designed to work across devices including desktops, toughbooks, mobile phones and tablets.
Challenges
I don't have the skills or knowledge

We are already doing it

I don't know how I can bring ideas forward

It's complicated!

It's something Information Services (IS) does

What do you think of 'Big Data'?
3 Challenges for data projects
Where next?

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Any Questions?

Let’s solve this problem by using the big data none of us have the slightest idea what to do with.