
7TH REGIONAL
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african water
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Stellenbosch Drought Management:
Telemetry data application
Presented by:
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Participating and supporting organisations :


Word of thanks
STELLENBOSCH
STELLENBOSCH • PNIEL • FRANSCHHOEK
MUNISIPALITEIT • UMASIPALA • MUNICIPALITY
Adriaan Kurtz
Stellenbosch Municipality
Zednet
an EQH company
MyCity
UTILITY MONITOR
Adroit
Technologies
gls
consulting
an EQH company
SSE
IT4INDUSTRY
iMQS
an EQH company

## Overview

- GLS was approached by Stellenbosch Municipality for a pilot study to integrate their various sources of Telemetry data
- Main aim is to extract value from the data resources to better plan for and manage water resources during the current drought situation

- Presentation will focus on two parts:
  - Technology status quo and implementation approach
  - Stellenbosch case study

## Diverse systems to integrated on one platform

- Telemetry/SCADA
  - MyCity
  - Zednet (WRP)
  - Adroid (implemented by SSE)
  - GeoTel (Geoss)
- Water Demand Management
  - Swift (GLS)
- Hydraulic Models / Schematic
  - Wadiso (GLS)

## Addition functionality

- Highlight and summarize key information
  - Highlight sensors that have stale information
  - Show critical meter status and historic graphs
- Link data
  - From hydraulic model or system schematic based on GIS
  - Water demand information
- Perform advanced post-processing
  - Accurate dam volume calculation
  - Per bulk metering zone or city-wide
    - Display water balance information based on average period demand
    - Predict number of days reserve left
    - Calculate current per capita demand for zones
- Provide results to other systems

## Technology overview

- SCADA vs Telemetry
  - Supervisory Control & Data Acquisition
  - vs Technology that allows remote measurement & reporting of information
- Sensors
  - Becoming more smart:
- IOT (Internet of Things)
  - Sensor with own IP address
  - Soon might have their own web service
  - Can be accessed over public or private internet
  - Security important

## Data transfer

- **REST services**
  - **Representational state transfer** (**REST**) is a way of providing interoperability between computer systems on the Internet. REST-compliant Web services allow requesting systems to access and manipulate textual representations of Web resources using a uniform and predefined set of stateless operations.
- **Message Queuing (MQ) technology**
  - Asynchronous Messaging
  - Guaranteed delivery
  - Lightweight
  - Transfer meter data to central database
- **Intermediary Data Store (if required)**
  - Open source, multi-user, scalable server
  - Host own REST services on top of data store for conforming access

## Data transfer - implemented

- **REST services**
  - Request data from service providers directly (e.g. MyCity, Zednet) where possible
- **Message Queuing (MQ) technology**
  - Use RabbitMQ open source message broker where source data only lives in offline database (e.g. older Adroid data living in MS Access), to synchronize data to own store
- **Intermediary Data store and own web services**
  - Typically PostgreSQL DB already on client's GIS (IMQS8)
  - GLS Telemetry REST services
- **App (GLS Telemetry) or web clients (IMQS8)**
  - Accessing all data through REST services

## Pilot implementation

- GLS Telemetry App
  - Pilot implementation
  - Developed on top of Albion CAD/GIS engine
- Two components:
  - Scheduled downloader
    - Performs all post processing, including generation/updating of Smart Points™
  - Model viewer
    - Schematic View
    - GIS accurate View

## Smart Points™

- Wide range of post processing functions
  - Sensor data integrity
    - Sensor data age
  - Accurate calculation of dam storage volumes from levels
    - Using power function or non-linear interpolation
  - Multiple aggregation of sensors
    - Near real-time water balance for zones or whole city
  - Interaction with Water Demand Model (Swift)
    - Average consumption per consumer or land use
    - Near real-time ILI calculations etc
  - Interaction with Hydraulic model
    - Calculation of remaining number of days of water storage
    - Simulate model with near real-time demand data

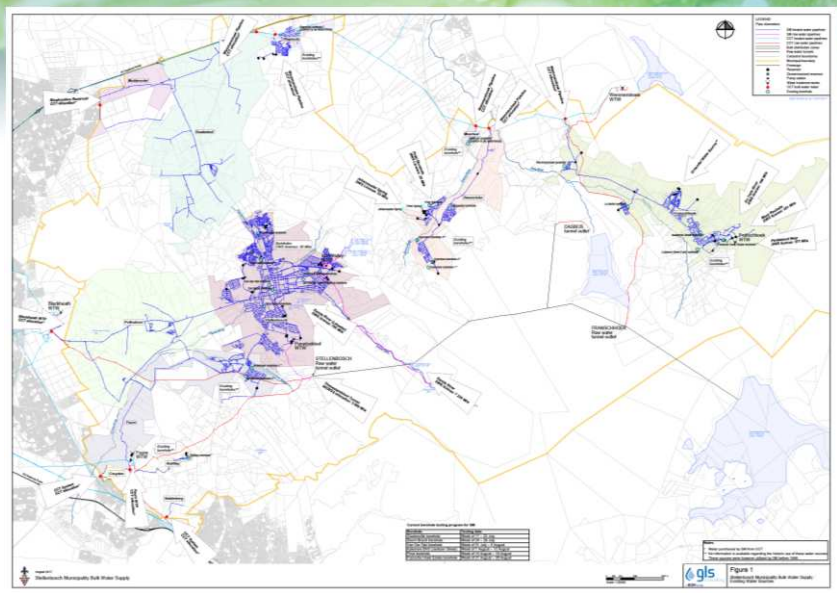
## Demo

- GLS Telemetry in Wadiso®
  - Overview of system
  - Data from three different service providers
  - Display of old sensors in red
  - Display of aggregated data for zones
  - Display of Smart Points™
- IMQS8 Telemetry module
  - Overview of system
  - Data points
  - Links to other systems

## Stellenbosch Municipality water sources – 2016/17 Case Study

- Own sources (37%)
  - Stellenbosch town (Jonkershoek Valley - 48%)
  - Franschhoek (Mountains - 22%)
- Western Cape Water Supply System (WCWSS - 37%)
  - Stellenbosch town (Paradyskloof - 52%)
- City of Cape Town (CCT - 26%)
  - Franschhoek (78%)
  - Dwars River (100%)
  - Klapmuts (100%)
  - Raithby (100%)
  - 4 rural supply schemes (100%)

## SM water sources:

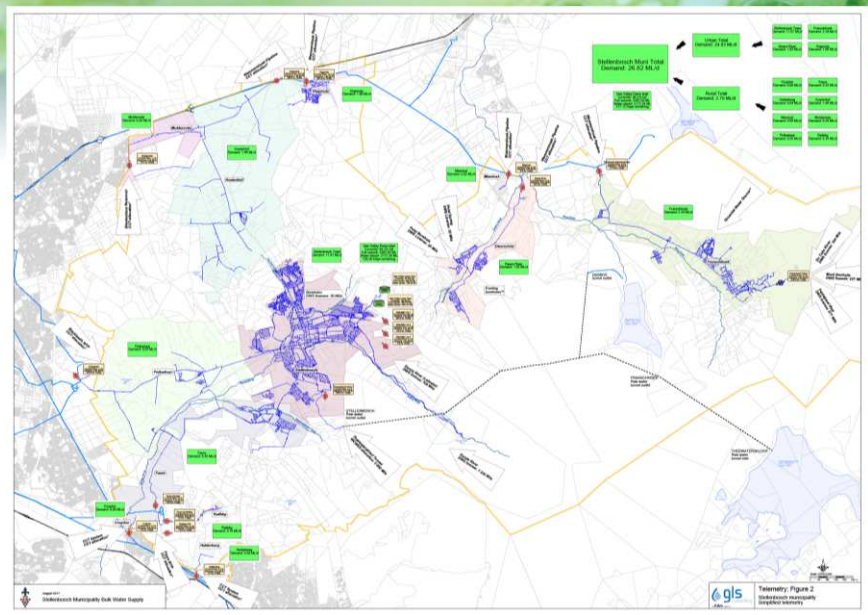


## Stellenbosch Municipality current water demand (30-08-2017):

- Stellenbosch: 17,9 ML/d
- Franschhoek: 2,3 ML/d
- Dwars River: 1,9 ML/d
- Klapmuts: 1,9 ML/d
- Rural areas: 2,8 ML/d

- TOTAL = 26,8 ML/d

## Stellenbosch Municipality current demand:



## Stellenbosch town required water sources (based on existing demand):

- **Stellenbosch: Demand = 17,9 ML/d**
- **Storage capacity available = 2 172 ML (30-08-2017)**
- **Days storage available = 128 days (based on current demand)**

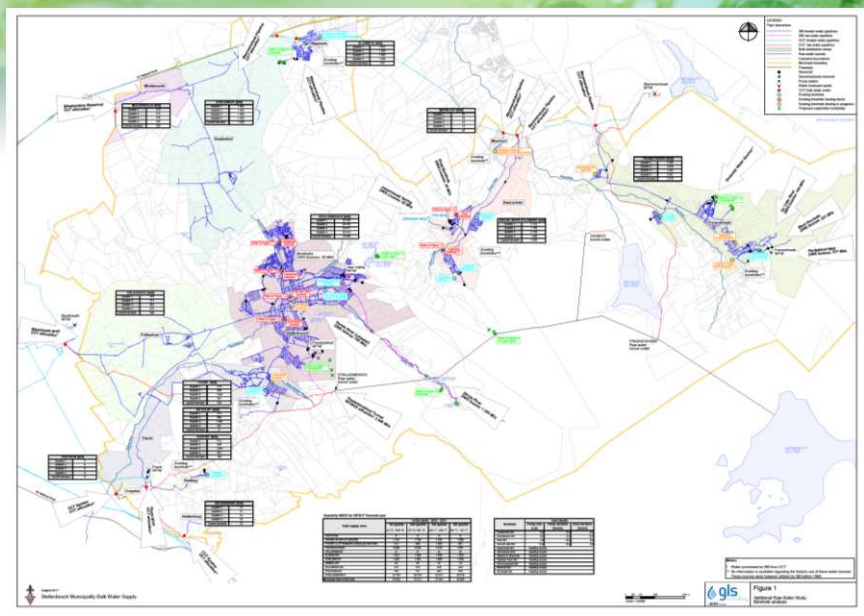
- **Additional ground water sources:**
  - **9 Existing boreholes (6 high yielding)**
  - **Safe yield tests and water quality performed on 4 boreholes (total demand = ± 4,0 ML/d**
  - **Safe yield tests currently performed on 2 more boreholes**
  - **12 Exploration boreholes to be drilled (3 areas)**

## Franschhoek, Dwars River & Klapmuts required resources (based on existing demand):

- Franschhoek: Demand = 2,3 ML/d
- Dwars River: Demand = 1,9 ML/d
- Klapmuts: Demand = 1,9 ML/d

- Ground water resources
  - 12 Existing boreholes (6 high yielding)
  - Safe yield tests and water quality performed on 2 boreholes (total demand = ± 1,2 ML/d
  - Safe yield tests currently performed on 4 more boreholes
  - 14 Exploration boreholes to be drilled (5 areas)

## Stellenbosch Municipality borehole project:



## Future work

- Integrate GeoTel telemetry for ground water
- Host Smart Points™ as web service, so results also accessible in IMQS8
- Make Smart Points™ even smarter
- Effectively manage this and the next drought

# THANK YOU

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