# Vara's Solution in Water Networks

SMART WATER networks are an integral part of any smart city programs due to the sensitivity associated with Water and human lives, and also the availability of the same. The objectives of any SMART WATER program is to use the resource optimally, enhancing customer satisfaction and improving efficiency of the operations.

ICT stands as the key backbone of the SMART WATER program and the first step towards the ICT implementation in a water network is to create

A. A digital representation of the entire water network with all objects and datapoints related to such objects, on the spatial map overlaid on earth surface.

B. Connect the spatial system to a database for connecting it with all tools and softwares required to run a water utility

C. Connect real time data emanating from sensors to the central spatial visualization system, for real time monitoring and action items for the 24X7 up network

D. Connect field crew to the central spatial system, through GNSS enabled Mobile computing devices for accessing and updating the central system from field

E. Allowing access to Planning and Analysis wings to review data and simulate the same on spatial planes to arrive at more informed decisions.

Globally, all water reforms program are now aggressively adopting spatial ICT as the integration tool between all disparate systems to better control and optimize the water resources of a city through an Industrial IOT framework.

Representative view of Spatial ICT backbone for a SMART NETWORK
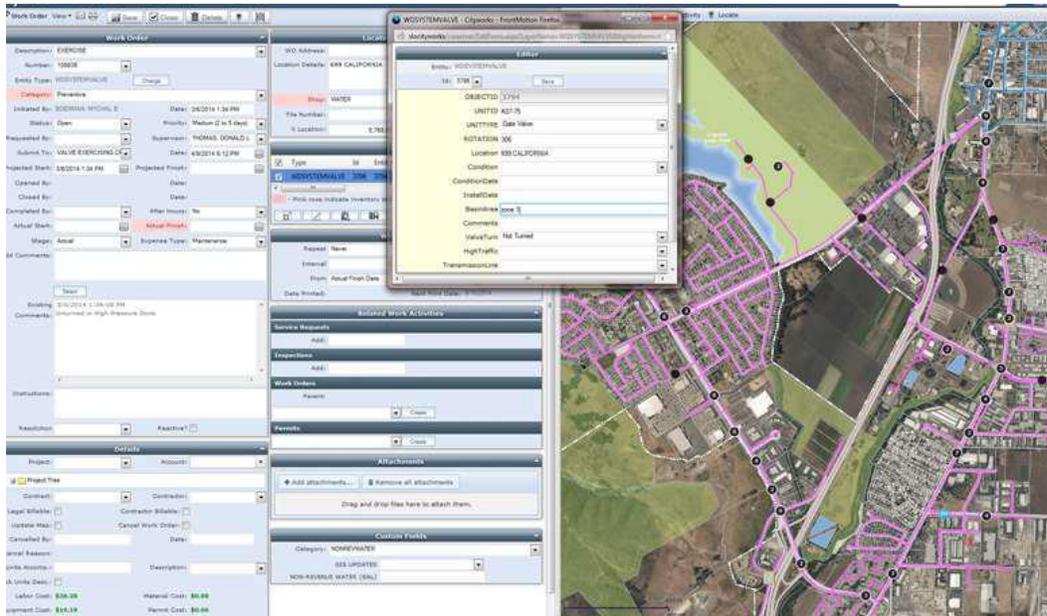
What is unique about Vara's technology in this space?

Vara has built up an affordable Rugged Handheld Computer with high precision GNSS capabilities incorporating its own Location Intelligence algorithms, allowing the user to access Central spatial databases on offline mode, in a robust mobile computing platform.

The handheld device integrates GNSS, Barcode Scanners, RFID Readers and Sensors for Smart Water to integrate and deploy an IIOT infrastructure.

Vara's IIOT platform brings the visualization on spatial layer with sensor signals and real time data feeds of all objects on network, for quick decision and analysis.
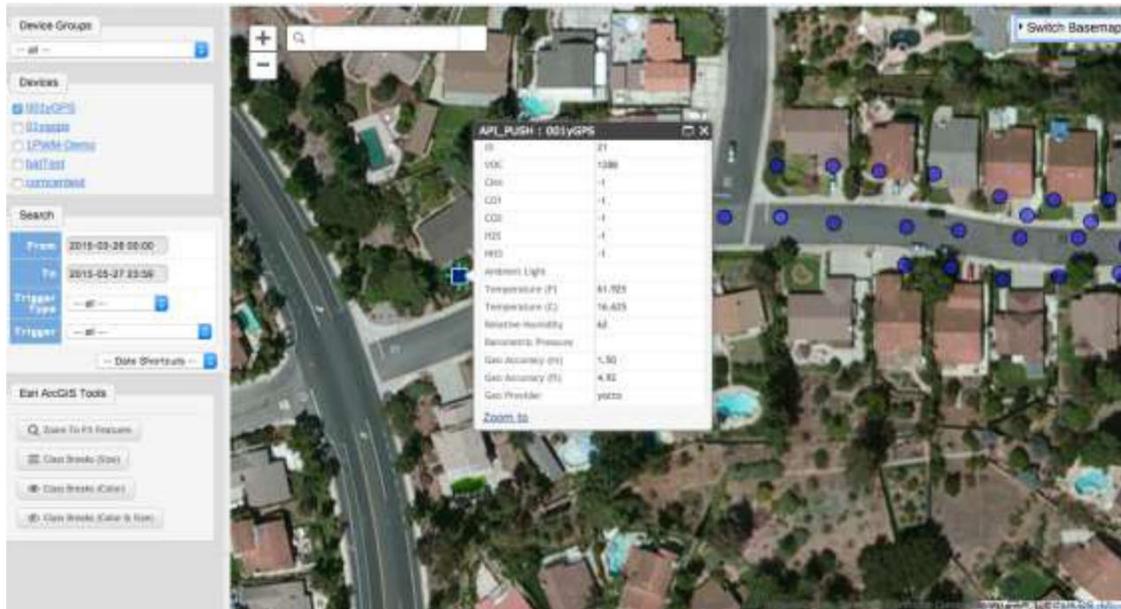
INDUSTRIAL HANDHELDS	Open Source Spatial IOT Platform for quick deployment in Industrial IOT Frameworks, Integrates LI & IOT and connects to other Enterprise systems	Spatial Mobile App which connects with the central ICT framework
Rugged Handheld Computers with Precision GNSS Technology for Accurate Field Datasets		O&M, Outage management, Leak Repair, Hydrant & Valve Inspection, Asset Integrity Management
Integrated IOT Sensor Boards for Water Quality, Leak Detection, RFID, Temp etc		Smart Metering, Smart Billing, Mapping & Survey, Planning, Network Updation & Modelling

The solution brings the visualization on spatial layer with sensor signals and real time data feeds of all objects on network, for quick decision and analysis

Mobile Computing **Platform**

with high speed processor and memory, designed for industrial computing, along with proprietary LI engine for precision accuracy and IOT sensor interfaces for usage in machine 2 machine com-munication platforms.

Satellite

Sensors

LI e Algorithm (Location intelligence) Engine

LI engine is a multi GNSS

Algorithm made in India for the first time to achieve Precision Accuracy below 2 meters using a combina-tion of geostationary satellite signals and Satellite Based Augmentation systems

IoT Sensor Interfaces

IOT Interface

SXtreo IOT Interface converts any asset in to a digital asset by allowing easy interface to varied sensors required for IOT implementation on fixed and mobile basis

Mobile and server based proprietary App and Solution

Framework which can interpret and integrate preci-sion location data from LI engines and IOT sensors and incorporate the same on spatial databases for integration with enterprise business systems like SAP. Oracle. BI and Analytics.

SXgeo

Mobile Platform

Enterprise Platform

## Why do the Water supply and distribution networks require such Softwares & Devices?

In the last decade all water distribution and supply networks made an important shift in terms of utilizing ICT for better management & optimization of assets. Spatial visualization replaced the CAD based system as the primary interface for integrating the ICT system, with the advent of enterprise grade spatial softwares from GE Smallworld, Bentley, ESRI, Hexagon and spatial databases like Oracle Spatial.

MOVEMENT TO SMART WATER NETWORKS

This change in ICT is a prerequisite to SMART WATER implementations worldwide in all water supply and distribution networks especially, to enable sustainable usage of energy through ICT control and situational awareness. The following are the areas in Water supply and distribution networks where the devices have multiple applications:

Hydrant Inspection - Eliminate paper/pencil inspections and manual data entry

Leak Repair - Respond to leaks quickly and efficiently perform repairs

Meter Change-out and Inspection - Eliminate paper/pencil and manual data entry

Mapping and Data Collection - Asset management with precision

Network Incident Management - Reduce duplication of work and dispatching multiple crews to the same incident

Smart Metering - Eliminate paper/pencil inspections, and manual data entry

Valve Inspection - GIS spatial tools to view, select and plan valve inspection jobs

Spatial Visualization and two way communication as the centre of ICT for SMART WATER
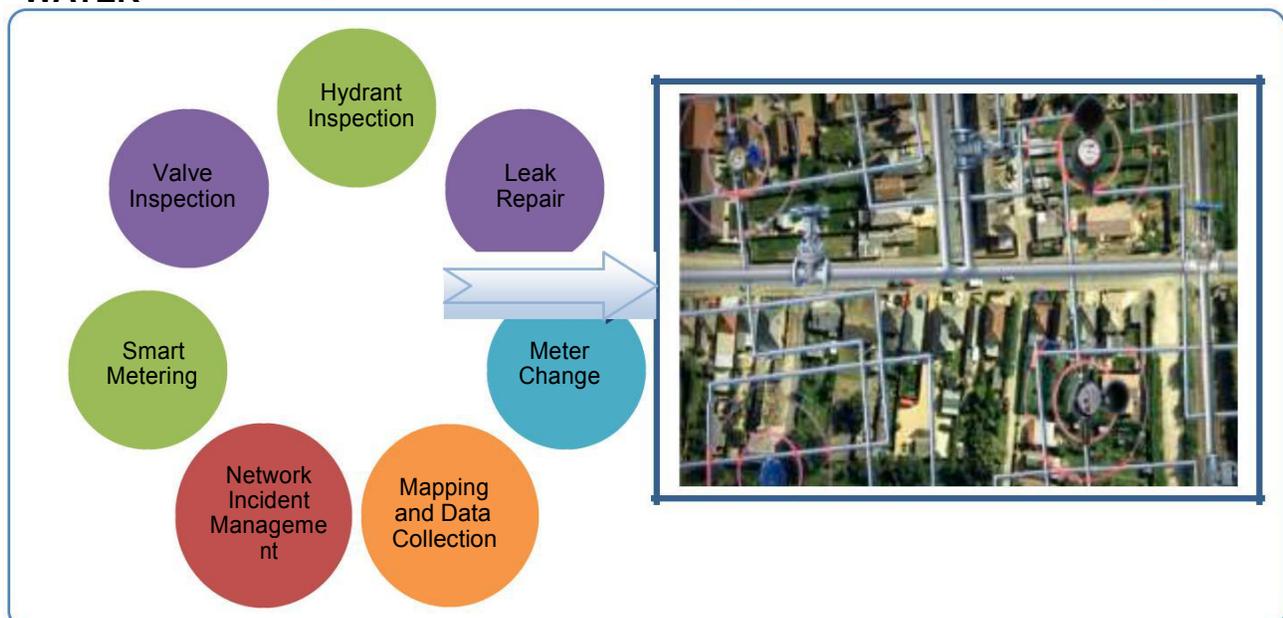
THE CHANGE IN CENTRE BRINGS UP THE CHANGE IN PERIPHERY

GNSS DEVICES now play the key role in **MANAGING, MONITORING** and **PLANNING THE NETWORK** through **ACCURATE LOCATION ACCESS** and **SPATIAL DATABASE ACCESS** for all Field Crew

With the change in the centre from CAD to GIS, all objects in the network, now have clear geo-referenced location expressed discreetly through its X, Y, and Z co-ordinates on the earth plane, uniquely identified through the position and allows for location based analysis and query as in

"How do you track your leak prone areas and document water loss due to leaks?"?

"How many valves are showing pressure drop between Location 1 & 2? If valve 3 is now released what will be the effect within 5 sq km?"

"Do you have confidence that your hydrants will perform properly during an emergency?"

The field workers maintaining and manning the network now needs access to the same central system and all networks now need their field workers to IDENTIFY, MONITOR, INTERVENE, & UPDATE RECORDS OF ACTIONS by accessing the same central system through RUGGED HANDHELD COMPUTING DEVICES WITH ACCURATE GNSS POSITIONING which can ACCESS, COMMUNICATE and UPDATE the system on the SPATIAL PLATFORM.

What are the primary uses of such devices & technologies?

GIS Tools

GIS-centric mobile workflow allowing inspectors to view, locate and inspect fire hydrants

Seamless workflow

Seamless field-to-office workflow for collecting, managing and utilizing your meter
and inspection data

Dashboard

Standard dashboard for measuring performance and overall condition of your hydrants

Work offline

Work offline and synchronize meter data wirelessly to the central server, preventing the need
to return to the office or perform manual data entry

Visualize Network

GIS-centric mobile workflow allowing inspectors to view, locate and inspect fire hydrants

Management Tools

Tools to manage and track progress of hydrant inspections

Capture

Capability to capture photos for audit reasons, 1D/2D barcodes, and GPS coordinates when
required

Streamline inspection

Preconfigured inspection form and workflow to streamline the field inspection process

Available on Multiple Platforms

Supports various platforms including Android, iOS, Windows 7/8 and Windows Mobile

Multiple Views

Capability to configure various street, topo and aerial basemaps

Export to other systems

Inspection data can be exported in a GIS format file that can be imported to your
enterprise Geodatabase

Key Features of SMART WATER

GIS spatial tools to view, select and plan hydrant inspection jobs

GIS spatial tools to search for addresses, street intersections and dispatch leak repair jobs

Import tool used to import meter information and change-out routes from the billing system

Asset management with precision

Provides an Integrated Network Model

Simplify the process of identifying, managing and reporting incidents & other issues on your water network

Key Benefits to the customer

Network Overview - Increase knowledge about the water distribution network, identify areas requiring constant repairs

Reduce Cost - Reduce non-revenue water and operational costs

Customer Satisfaction - Reduce health risks for contamination and improve customer service

Review Leaks - Determine revenue loses by gathering leak information during the repair

Mobile - Remove dependency on paper maps by quickly accessing information directly on your SXtreo ruggedized mobile devices

GPS - Use GPS technology to quickly locate water network assets including valves to isolate leaks

Photo - Capture photos to document the leak repair process and capture GPS coordinates to document leak location and associated water network assets

Wireless Sync - Sync repair information wirelessly preventing the need to return to the office and to update the utility operators on the status

Manage - Efficiently plan, manage and monitor hydrant inspections

Efficiency - Streamline the field inspection process through intelligent inspection forms and efficient reporting of need repair hydrants

Monitor - Measure performance and overall condition of your hydrants through standard dashboards

Update GIS - Update your GIS and billing using information captured in the field

Eliminate trips - Inspect meter boxes and eliminate repeated trips to meter

location

Accuracy - Capture high precision GPS positions including elevations in real time using the SXtreo GAGAN enabled GNSS rugged handheld device.

Seamless Workflow - Provide seamless field-to-office workflow for collecting, managing and utilizing GIS data

Reduce response time - Reduce response time to water network incidents

Reduce workload - Reduce management and regulatory reporting workload

Camera and Barcode - Clear imaging of field conditions and 1D/2D barcodes under any condition