ITU Regional Workshop on "Prospects of Smart Water Management (SWM) in Arab Region"
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ICT technologies and architecture for efficient Water Resources Management

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Non revenue water (NRW)

Globally

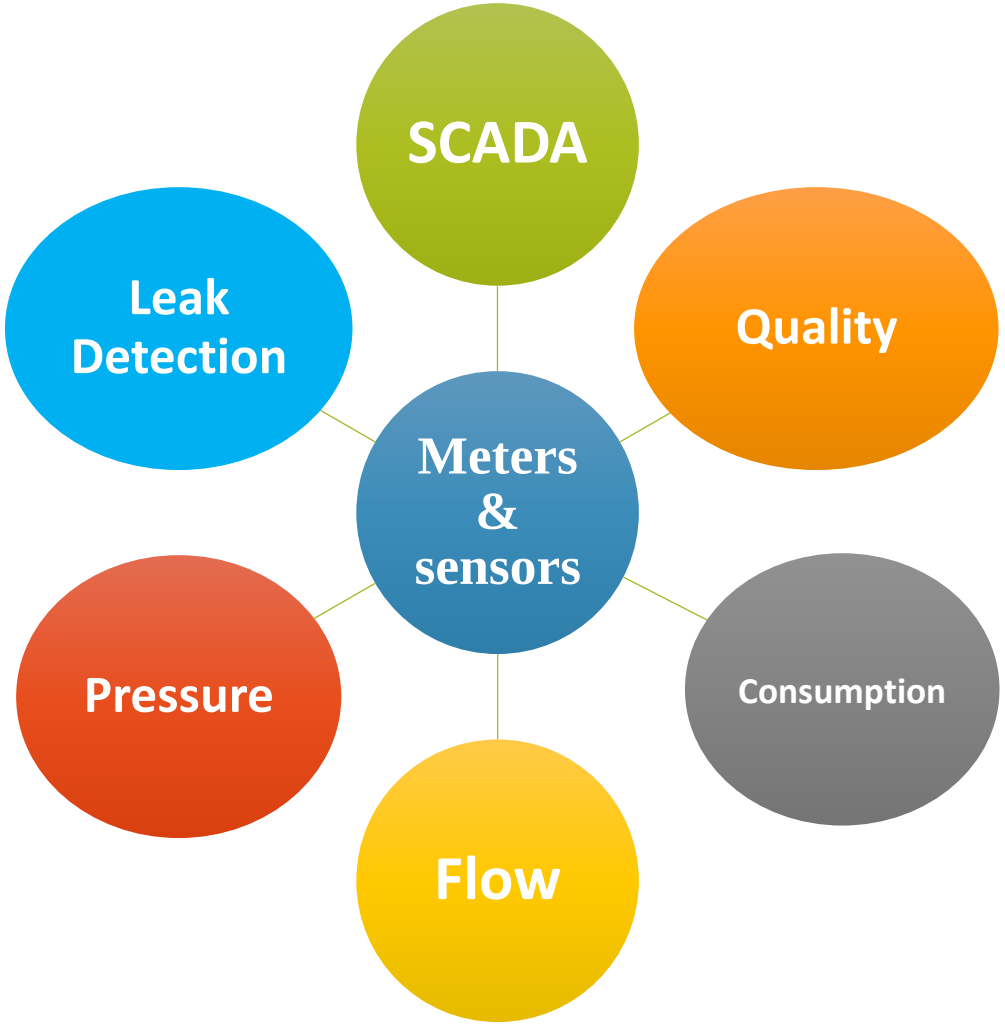
Billion/year for supply of clean water

Billion People in absolute water scarcity

of countries lose more than 40% of water pumped into distribution systems

billion/year for pumping energy costs

Meters and Sensors



Sensors and Meters (SCADA)

Supervisory Control and Data Acquisition (SCADA)

Supervisory control and data acquisition (SCADA) technology has evolved over the past 30 years as a method of monitoring and controlling large processes

SCADA includes, software packages connected to hardware

Software to improve the safety and efficiency of the operation

Acquisition of data through the sensors,

The transmission of the acquired data between a number of remote sites,

The data presentation through the central host computer and the control of the data at the operator terminal or workstations

These systems usually consist of the following subsystems:

- Remote terminal units (RTUs) or programmable logic controllers (PLCs)
- A communication infrastructure
- A supervisory (computer) system
- Master station
- Master terminal unit, or MTU;
- A communication system to support the use of operator workstations;
- Standard human machine interface (HMI) software

SCADA systems, advantages

It is the most common method currently applied in distribution systems, like water distribution and wastewater collection systems.

The system control unit performs centralized monitoring, and control long distance communication network; including monitoring the status of data processing and alarms.

The method can work using the combination of radio and direct-wired connection systems.

The General Packet Radio Services (GPRS) and Global System for Mobile communication (GSM)

Sensors and Meters (Quality)

Water Quality Sensor

Help to detect and address problems related to the quality of water before affecting consumers.

Water quality monitoring inside the distribution or the network system helps in addressing problems and providing related operational management activities

Sensors and Meters (Pressure)

Pressure Management Sensor

Producer	Type and Code	Communication means
Siemens AG	Sitrans P DS III, IP65/IP68	Profibus, RS 485, HART
SAE IT Systems	net-line FW-5, IP20	Ethernet, RS 485
WIKA	S-10, IP65/IP67/IP68	Analog
Ifm electronic	PI2793, IP 67/IP68/IP69K	Analog

Sensors and Meters (Flow)

Producer	Type	Technology	Communication
Siemens	SITRANS F M	Electrodynamics	Profibus, RS485, HART, etc.
Endress & Hauser	Promag	Electrodynamics	Ethernet port
Flexim	Fluxus® ADM	Ultrasonic	HART, ModBus, Profibus, BACNET
Isoil Industria	ISOMAG Flowiz Next	Magmeter	GSM, GPRS Wireless
ABB	AquaMaster3	Electrodynamics	GSM
Krohne	Optiflux Waterflux 3070	Electrodynamics	Profibus, RS485, HART,GSM

Sensors and Meters *(Energy Consumption)*

Energy Consumption Sensors

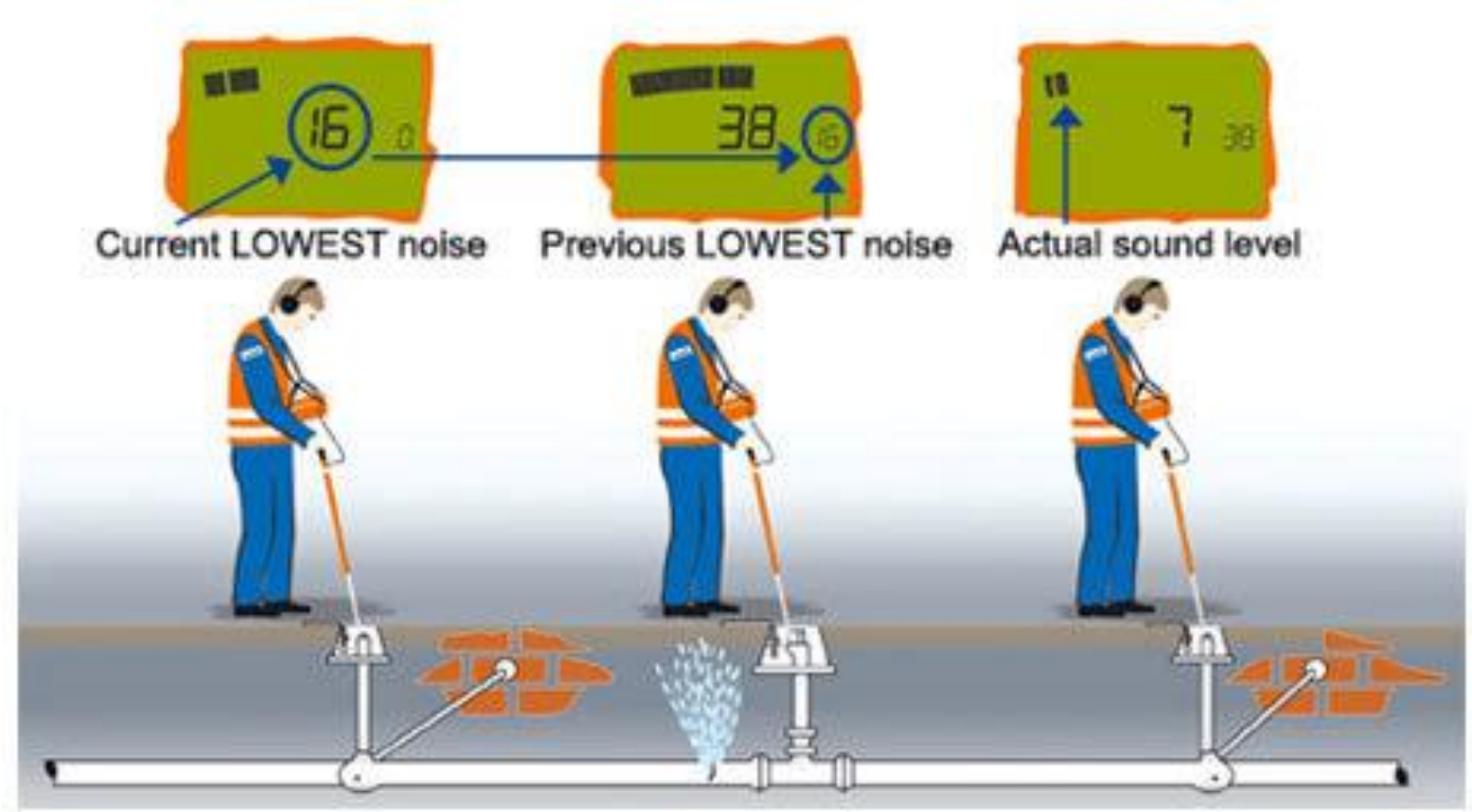
Producer	Type	Communication means
Siemens AG	Sentron Pac 3200	Profibus, Rs 485
Grundfos	CIM and CIU	Profibus

Sensors and Meters (Consumption)

Water Consumption Meter

Water consumption meters measure and record the amount of water used over time by different methods. The water meters not only measure the consumption, but also improve management and help to detects leakages.

Water Leakage sensor

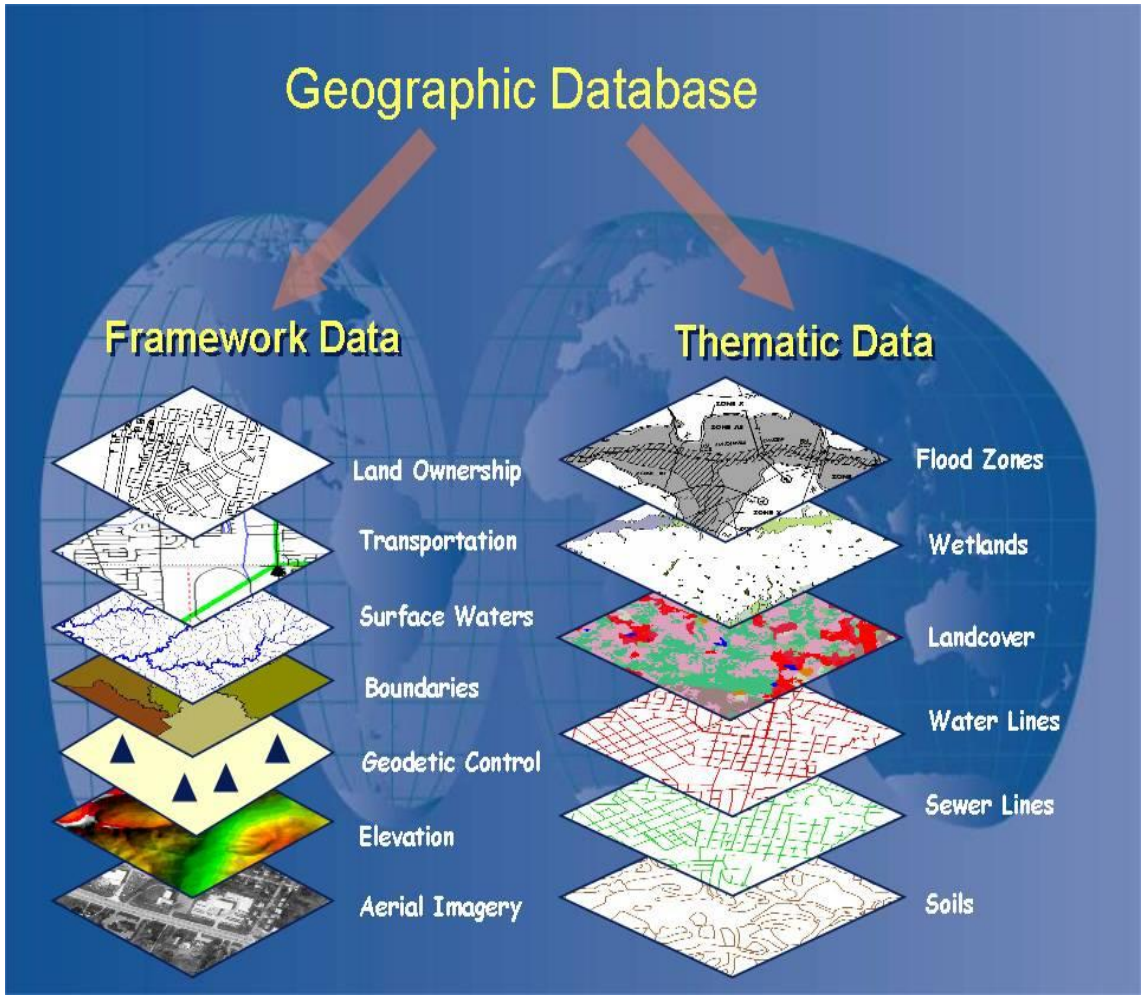



ITU-D
1992
2017
CELEBRATING
25YEARS
OF ACHIEVEMENTS

Information and Communications Technology

Information Infrastructure

- **GIS**: technology that integrates hardware, software, and data required to capture, manage, analyse, and display all forms of geographically referenced information. GIS allows the user to view, visualize, question, interpret, and understand data in different circumstances that clarify patterns, trends, and relationships in the form of reports, maps, and charts.



Source: http://www.onslowcountync.gov/assets/18981.jpg?langType=1033

Communication Infrastructure

Traditional water management systems mainly depends on protocols, industrial control systems, and adopted registered structures.

Difficult to follow emerging communication trends very quickly.

Opportunity to adopt an existing infrastructure into a more flexible IP-based monitoring system: alarm gathering, leakage detection and prevention, demand prediction, energy reduction, water quality monitoring, and billing activities.

Australia project

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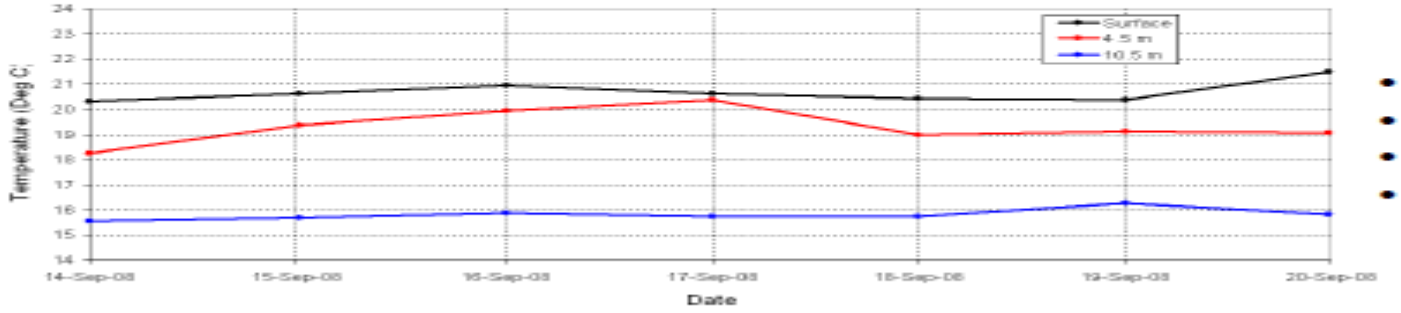
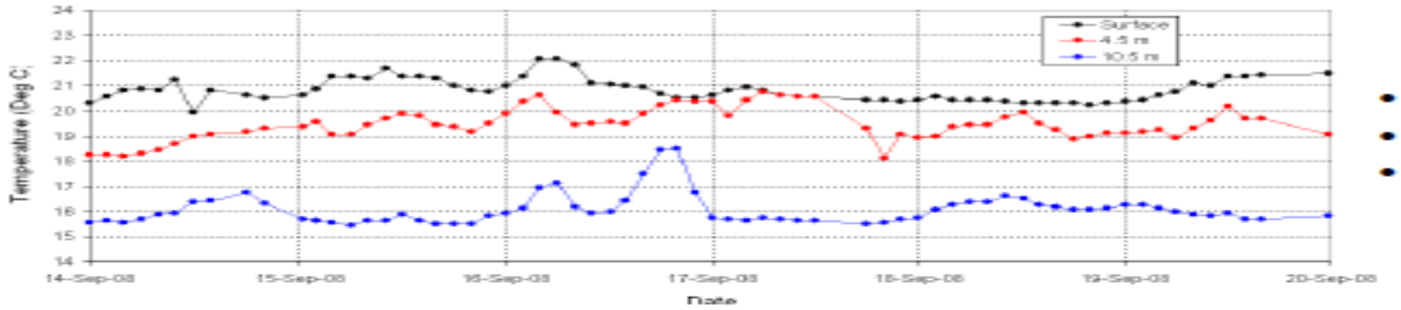
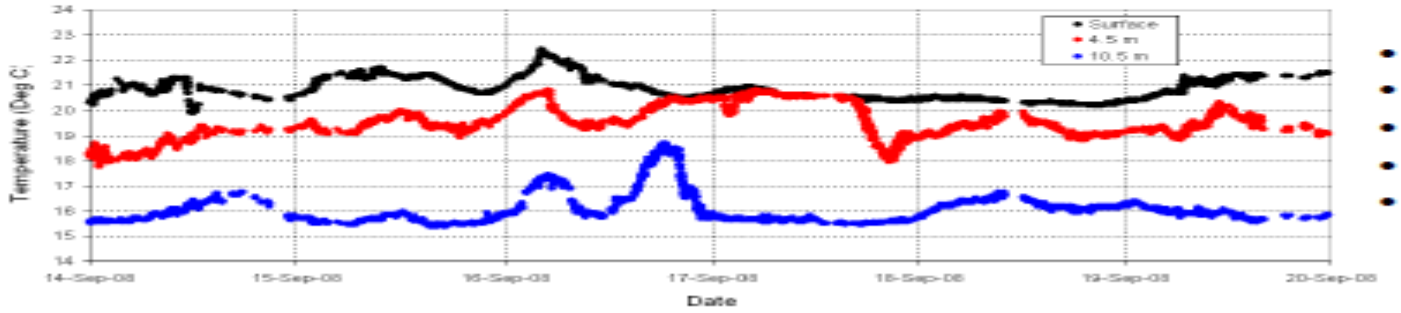
Paradigm Shift
"Real Time" Water Quality Monitoring



- 1 Sample / day (week)
- Labour intensive
- Weather dependant
- Bad temporal resolution



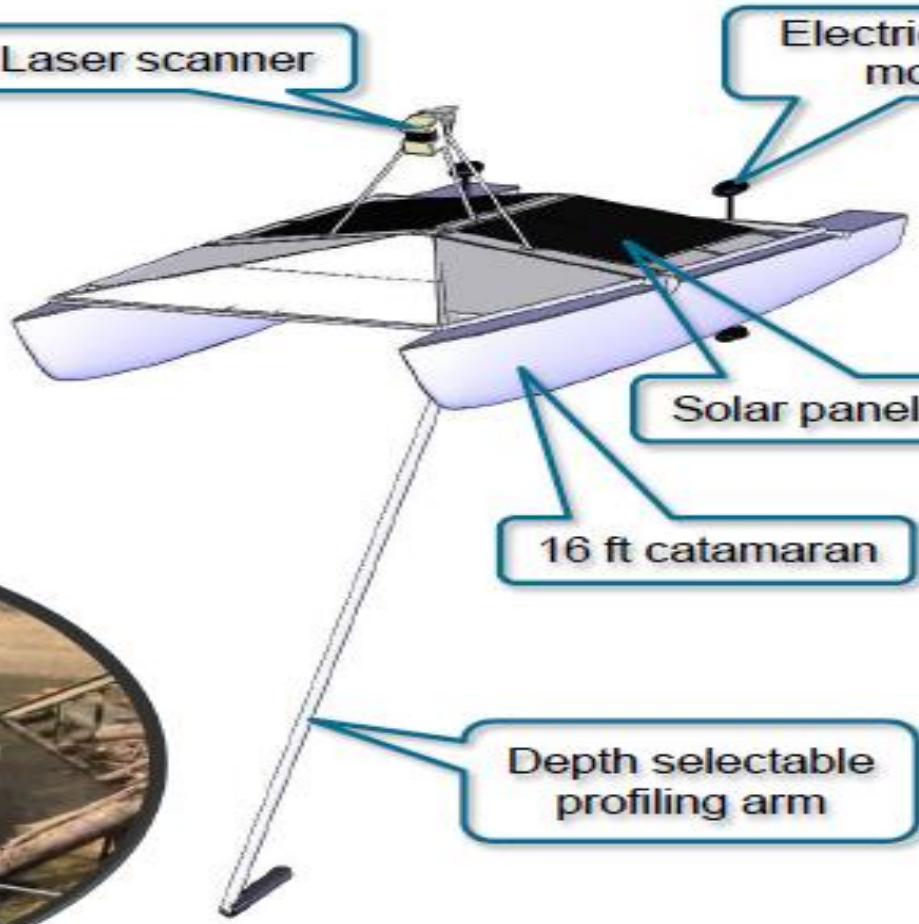
- 1 Sample every 2 hours
- High cost
- Bad spatial resolution



- 1 Sample / minute
- Low cost
- Robust (redundancy)
- High spatial resolution
- High temporal resolution

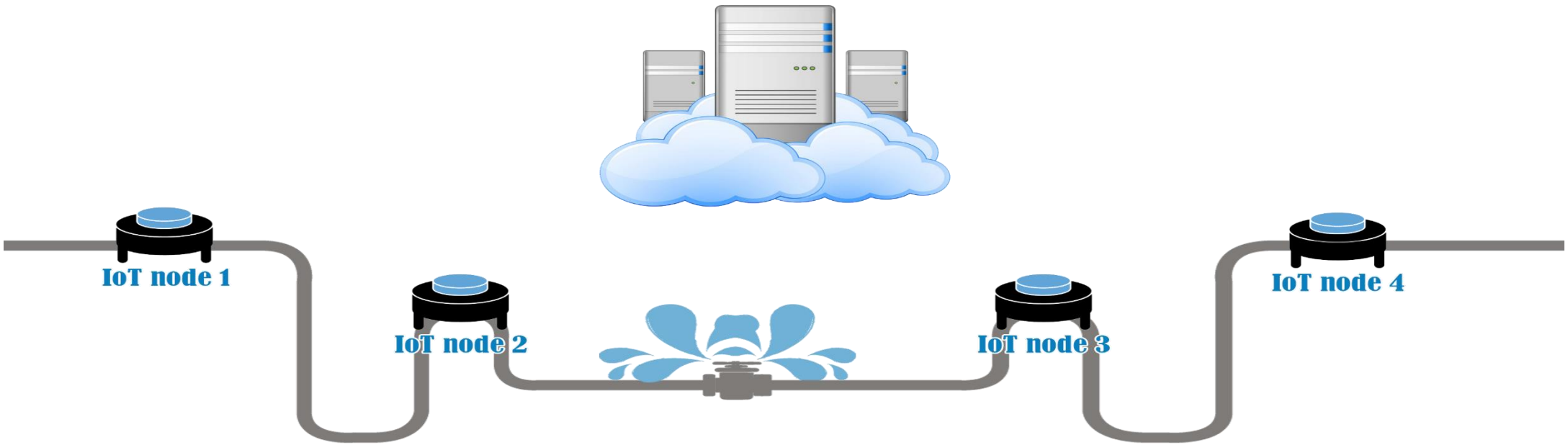
Mobile sensing platform

Sensors
Temperature
Dissolved oxygen
pH
Turbidity
Methane
Wind
Light
Fluorescence



CSIRO : Smarter water management through sensor-based networks

Egyptian Water Monitoring system



Mapping of water resources and weather forecasting
(ITU report)

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Figure 2: Major Areas for ICT in Water Management

Mapping of Water Resources And Weather Forecasting
- Remote sensing from satellites
- In-situ terrestrial sensing systems
- Geographical Information Systems
- Sensor networks and Internet

Asset Management For The Water Distribution Network
- Buried asset identification and electronic tagging
- Smart pipes
- Just in time repairs / Real time risk assess-ment

Setting up Early Warning Systems and Meeting Water Demand In Cities Of The Future
- Rain/Storm water harvesting
- Flood management
- Managed aquifer recharge
- Smart metering
- Process Knowledge Systems

Just In Time Irrigation In Agriculture And Landscaping
- Geographical Information Systems
- Sensor networks and Internet

Thank You