THOUGHT PIECE

# Network Monitoring

**Contact us**
**T** 02380 111 420
**E** info@i2owater.com
2 Vancouver Wharf, Hazel Road
Woolston, Southampton, SO19 7BN, United Kingdom
**www.i2owater.com**

THOUGHT PIECE:

# NETWORK MONITORING

**Comprehensive monitoring of the distribution network has been made possible by low cost battery-powered communicating sensors. This thought piece challenges thinking about how network managers and their bosses can get the most out of the opportunities this creates.**

A number of things have made it possible to monitor water distribution networks:

- Pervasive communications thanks to the popularity of the mobile phone
- Advances in battery technology
- Miniatuarisation and lower power electronics
- Reduced cost of electronic components

Progress on these fronts continues and we can expect:

- Competition between NB-IoT and Sigfox and Lora to improve availability of low power comms
- Extended battery life
- Smaller form factors and lower power electronics
- Competition that ensures electronic component prices stay low

This brings the distribution network into closer alignment with the water treatment world and the domain of Control:

| Network was... | Network is becoming... | Control has for a long time been... |
|---|---|---|
| Manually operated | Remotely operated | Remotely operated |
| Geographically subdivided | More centralised | Centralised |
| Maintained on the basis of time | Maintained based on asset condition | Maintained based on asset condition |
| Without power | Battery powered | Mains powered |
| Not connected | More connected | Always connected |
| 9am to 5pm unless emergency | 24 hour supervised | 24 hour supervised |

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And so people's instinctive reaction is to integrate network monitoring with SCADA, even to create one monolithic technology for the water industry. But is this the right thing to do?

## ARE CONTROL AND THE NETWORK REALLY SO SIMILAR?

Control and the network are different in terms of the power source for monitoring and controlling devices, domains of expertise, and geographic size.

A battery is like a water bottle in a desert: how long it lasts depends on how fast you drink it. Replacing a battery is costly in terms of the cells and the visit to site. Using external battery packs has the same cell cost, and the added inconvenience of housing them in places where space can be restricted. So it is important to use battery power sparingly and only when it's needed. It is not a good idea to use battery power to support a system that is:

- Always on (even having to 'listen' for an incoming 'call' consumes power)
- Frequently sending back data (each use of a modem consumes power)

It is necessary to design a network monitoring system only to send back data when it can be used effectively.

## IMPLEMENTATION

Mains power on the other hand is like a 24/7 water supply, and there are no constraints on its use except for its cost.

The processes, tools and people required to deploy and maintain treatment works and distribution networks are different. They are different knowledge domains. They would no doubt benefit from greater mutual understanding, but they are sufficiently different that people skilled in each should not be taking decisions about the other's domain.

The network will still require manual activity (even if there is less of it) over a wide geographical area. This places different requirements on the availability of information through mobile devices.

## DOES CONTROL HAVE THE CAPACITY TO TAKE ON MORE?

Most Control rooms are already drowning in alarms. Before we add to their burden we would do well to ensure that both Control and the Network move along this path in relation to the tsunami of data that is becoming available:

| Alarm | Visualisation | Event detection | Diagnosis | Automation |
|---|---|---|---|---|
| An indicator that something has breached a parameter and might need investigating | An aid to spotting or understanding a situation | Software identifies an event from a data stream which meets more complex criteria than a threshold | Software matches an event to a cause | Software identifies an event and takes appropriate action |

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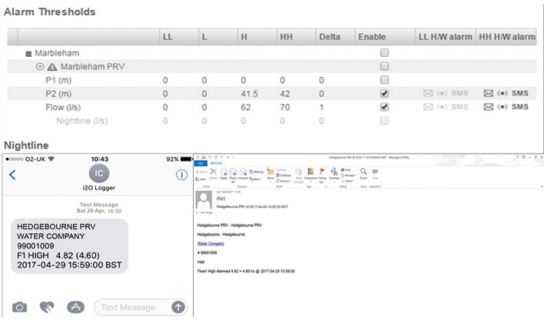
## 1. DATA RETURN

i2O loggers by default return data daily and on breach of a threshold alarm which also trigger SMS or email alerts (the system is fully configurable for data return frequency nonetheless).




## 2. DATA INGRESS

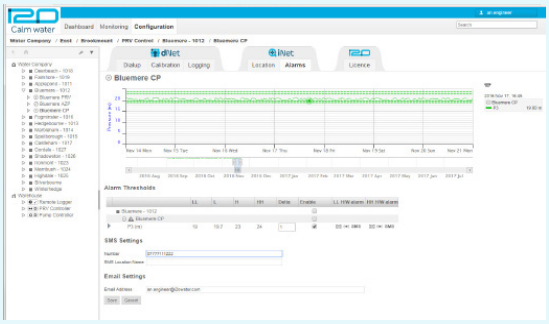
Can ingest data from i2O loggers or 3rd party loggers.

## 3. VISUALISATION

Provides visualisation that aids the process of identifying and understanding issues.

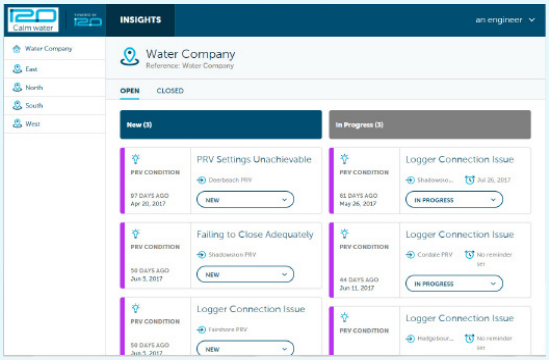

## 4. ALARM THRESHOLDS

Enables threshold alarms to be set and reviewed.



## 5. DETECTION

Can detect and diagnose PRV condition.




## 6. DATA EXPORT

Can export data to a SCADA system.

## 7. INTEGRATION

Integrates seamlessly with our Advanced Pressure Management solution oNet.

## WHAT SHOULD YOU INCLUDE?

The distribution network and Control are similar but not the same. It should be possible to integrate them more closely but unwise to merge them. There are still many opportunities for improvement in both, and further advances in enabling technology to come.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