Making the most of your IoT data:

Next-generation cloud systems for trusted, provable service delivery

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Water RA’s Digital, Data & Sensors Webinar Series
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Topics

- The IoT landscape in 2020
- Why and how is IoT relevant to the Water Industry?
- Key considerations for water companies adopting IoT
- State-of-the-art example
- Future trends
- Take-aways
The IoT global landscape

Enormous connectivity already, and it’s only set to keep growing – rapidly

- 31 B Connected IoT devices, 2020
- $1.29 T (US) Global IoT market, 2020
- 127 New IoT devices connected every minute
- 75 B Predicted IoT devices, 2025

Source: https://securitytoday.com/
The Australian landscape

- Rapid growth, set to accelerate with new satellite options & 5G.

- Issues remain but are being tackled: especially connectivity.

Why should the water industry care?

Better business intelligence

New solutions

Efficiency improvements

Cost savings

To assist:

Land & Environment

Flood & Drought Management

Water Quality Monitoring

Asset Management

Catchment Area Mapping

Regulation & Compliance

Through IoT sensors such as: water quality, flow rate, temperature, pressure, humidity, gas, level, proximity, ……
Making the most of your IoT data

Take a systems approach from the outset, including all sensors, other data sources, and your systems.

- Careful planning of your IoT system will unlock the benefits promised, but due consideration must be given to key topics, including:
  - Scalability
  - Security
  - Comms
  - Integration
  - Provenance
  - Processing
  - Speed
Key considerations

IoT sensors and network

- Sensor and network considerations must be taken together

### Key Sensor Considerations
- Measurements required
- Data quality / accuracy
- Number & cost
- SWAP
- Update rate
- Reliability & longevity
- Operating environment
- Communication options
- Ease of integration
- Lead time & support

### Key Network Considerations
- Range / coverage
- Bandwidth
- Power usage
- Sensor compatibility
- Ease of integration
- Cost
- Maturity
- Reliability & resilience
- Security
- Reusability / sensor agnostic
# Key considerations

## Networks

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<th>Low Power Wide Area Network (LPWAN)</th>
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</table>
Key considerations

Cloud platform

The big 3 dominate, so how to choose?

2006

AWS

Most mature
Most extensive
Most flexible
Least downtime
Greatest reach

2010

Azure

Best for MS integ
Ranked #1 for
dev & test tools
Less enterprise-ready

2008

Google Cloud

Designed for
cloud-based
businesses
Most flexible
contracts

Design to be agnostic and flexible
Focus on time-to-value

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Key considerations

Data security & provenance

• Introducing IoT devices to existing or new networks brings increased vulnerabilities.
• Important steps for maintaining / enhancing security include:
  • Monitoring endpoints
  • Scanning devices for vulnerabilities
  • Segregate the IoT network from the corporate network

• Trust in data, starting from its source right through to usage / display is an increasingly important aspect of any IT system, including those with IoT devices
  ➢ Data provenance is the process of tracing and recording the origins of data and its movement between databases, and is an acute issue central to the validation of and trust in data.
  ➢ State-of-the-art solutions are based on Distributed Ledger Technology (DLT), synonymous with Blockchain is a sub-set (e.g. Hyperledger and Ethereum).
Key considerations

Data provenance through DLT

• A distributed ledger is a database that exists across several locations or among multiple participants.

• It is essentially a time-stamped series of immutable records of data that is managed by a cluster of computers not owned by any single entity.

• Each data ledger is secured and bound to each other using cryptographic principles (hashing).

• Ideal for (wrt the water industry):
  • Governance
  • Supply chain auditing
  • IoT - improves cost monitoring
  • Smart contracts

➢ Decentralisation
➢ Transparency
➢ Immutability
**State-of-the-art-example**

**D-CAT’s FusionPlatform®**

- Flexible, plug-and-play cloud platform for delivering value from sensor data
- Sensor agnostic
- Rapid configuration of algorithm processing chains to meet performance needs and price points
- Secure, and supports DLT
- Fully scalable and built for serving a wide range of industries, including water
IoT fusion example

Using the FusionPlatform®

Subsoil moisture mapping @ 10cm

Satellite passes over area (~ every 3 days)

10m resolution multi-layer image corrected ready for processing

Relative topsoil water & moisture maps derived

% Moisture readings from probe at 10cm depth every 30 mins & soil info.

%moisture map @10cm depth

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Trends & take-aways

• Some trends to watch:

1. Plan your IoT adoption carefully to reap maximum benefits and avoid pitfalls
2. Build on solid infrastructure that scales and is future-proofed
3. Services must be easy to consume and reconfigure, and delivering business value

• This is a rapidly moving space: sensors, cloud, comms, security/provenance

* Digital twin image from watch-50.com