Modelling Group
WATER NEW ZEALAND

Modelling Symposium

MOTT MACDONALD

A radical approach to wastewater model builds – saving time and money whilst increasing consistency

Presented by
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water NEW ZEALAND
The New Zealand Water & Wastes Association Waiora Aotearoa

Building hydraulic models is …

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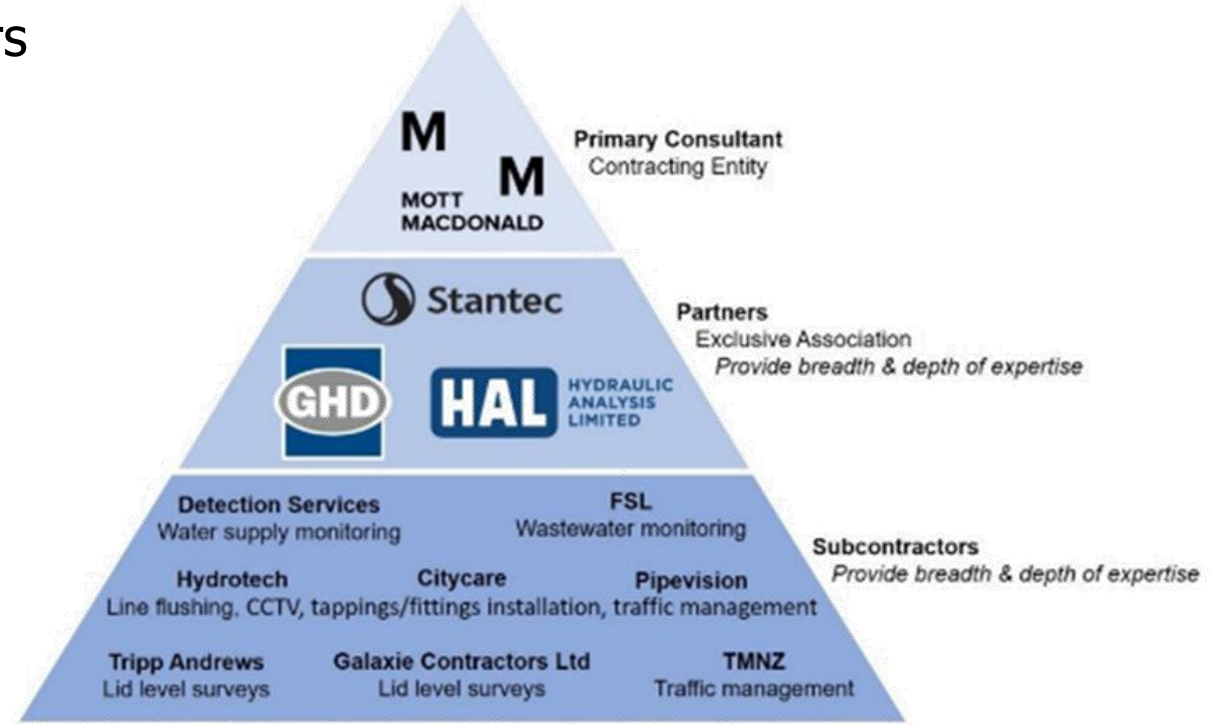
Photo by Mouaadh Tobok on Unsplash

Network Performance Monitoring and Modelling (NP2M)

- 6 Year programme of water and wastewater monitoring and modelling
- Partnership with consultants and contractors

Watercare



Network Performance Monitoring and Modelling (NP2M)

More than 20 wastewater model build/updates needed to be delivered in a timeframe of 9 – 12 months …

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This is a greater challenge than any modelling program has achieved in New Zealand

The challenge

Lots of repetitive tasks with low value that require a high accuracy

Model builds lack consistency, between models and different partners

Difficult to make sure that all parts of the modelling standard are followed

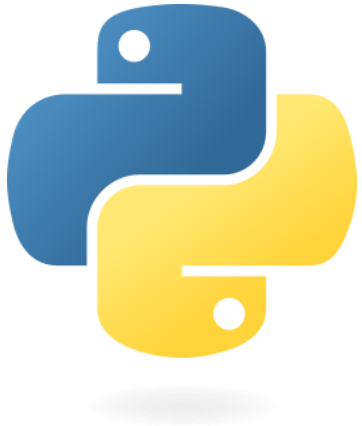
The solution

A program level approach

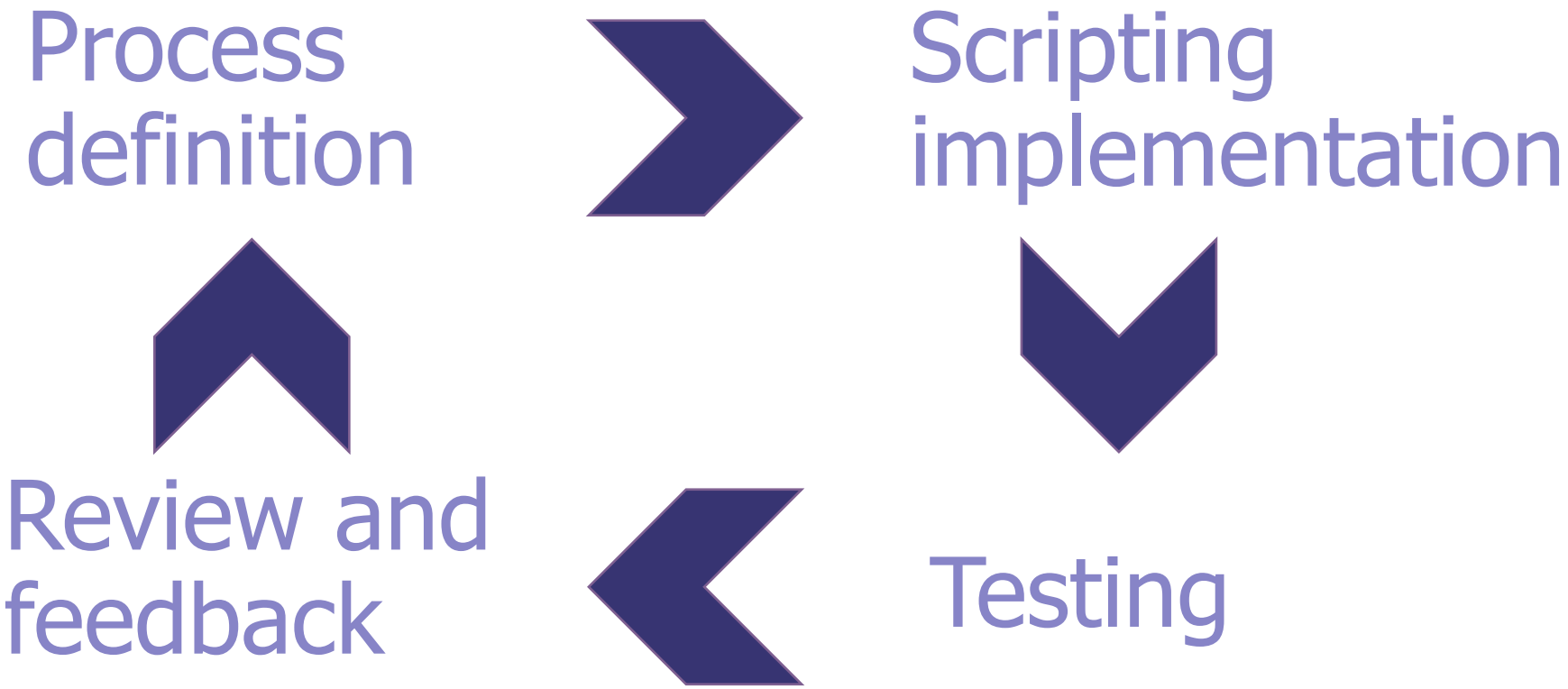
The solution

A program level approach

Digital solution - scripting



How is it done?



Python

General purpose, widely used programming language.

Used for generic geospatial processing. This means:

- Extraction of GIS data
- Pre-processing spatial data (e.g. parcels)
- Consistent naming of outputs

Ruby

Infoworks ICM prescribed programming language.

Can be used in ICM directly to interactive with all tables. Used for:

- Importing GIS data and field mapping
- Specs based calculations
- Subcatchment allocation
- Population allocation
- Inferences
- Checks

Collaborative approach and sharing of learning

Collaborative approach and sharing of learning

What is one true source of subcatchments?

- All parcel layers have their own unique issues
- Feedback and updates

How should subcatchment be allocated?

- Transferrable solution between water and wastewater
- Feedback and updates

The product

```
In[2]: import __hello__
```

```
puts "Hello World!"
    puts "Hello World!"
        puts "Hello World!"
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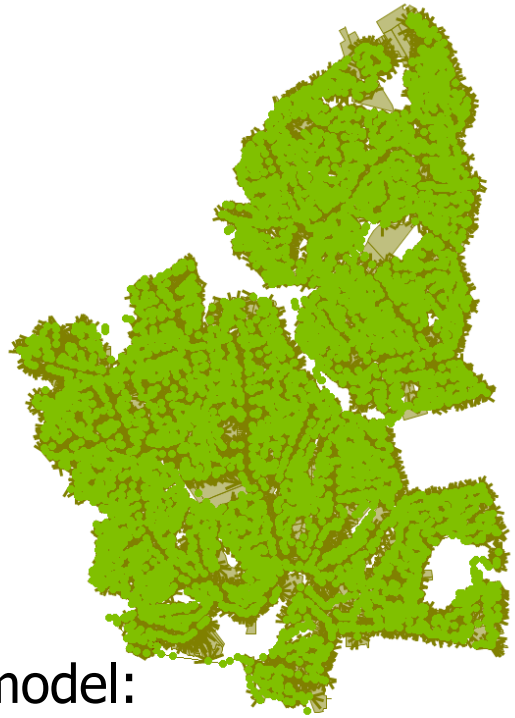

The expertise of the modellers is needed to achieve a running model:

- Set up model structures and rising mains (if needed)
- Review long sections
- General checks and model specific adjustments

Handover

Tag & Flag

Commit

Data

Documentation

The outcome

7 + 14

The tool has been and will continue to be updated based on feedback received from programme partners.

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7 + 14

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The next goal

Bring in data from existing MIKE and ICM models

Lessons learnt – How far should an automated process go?

Good judgement cannot be scripted.

Modellers make much better decisions than an automated process in new or complex situations.

Automated processes are good at well defined, standardised tasks.

Lessons learnt – Iterative and collaborative solution development

Modellers are not software developers but more scripting work is on the horizon. What can we learn from software developers?

- Treat scripts as an evolving product
- Define the scope early on with the product owner
- Actively seek user feedback and act on it
- Be mindful of who will be using the scripts

Lessons learnt - How much can documentation really be trusted?

Running Ruby in ICM is one of the biggest mysteries in the world because the documentation is one of the few sources of information.

How good is the ICM Ruby documentation?

Acknowledgements

This work is not possible without:

Nathan Donald (Watercare)

The Mott MacDonald team

Our programme partners

A Minecraft youtuber who knows a lot more about ICM and Ruby than me.

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Thank you!
Questions? Patai?

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