QGIS Plugins for 3D Geological modelling Demo

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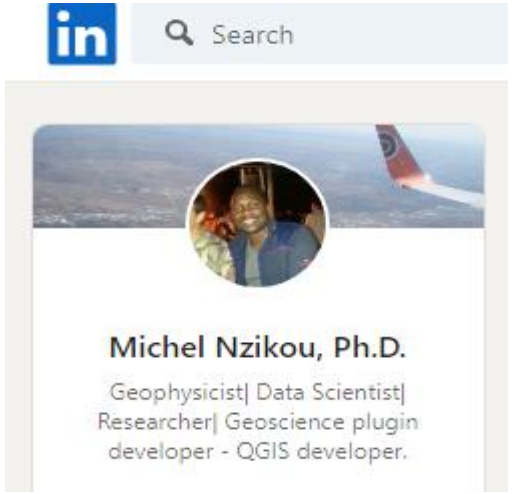

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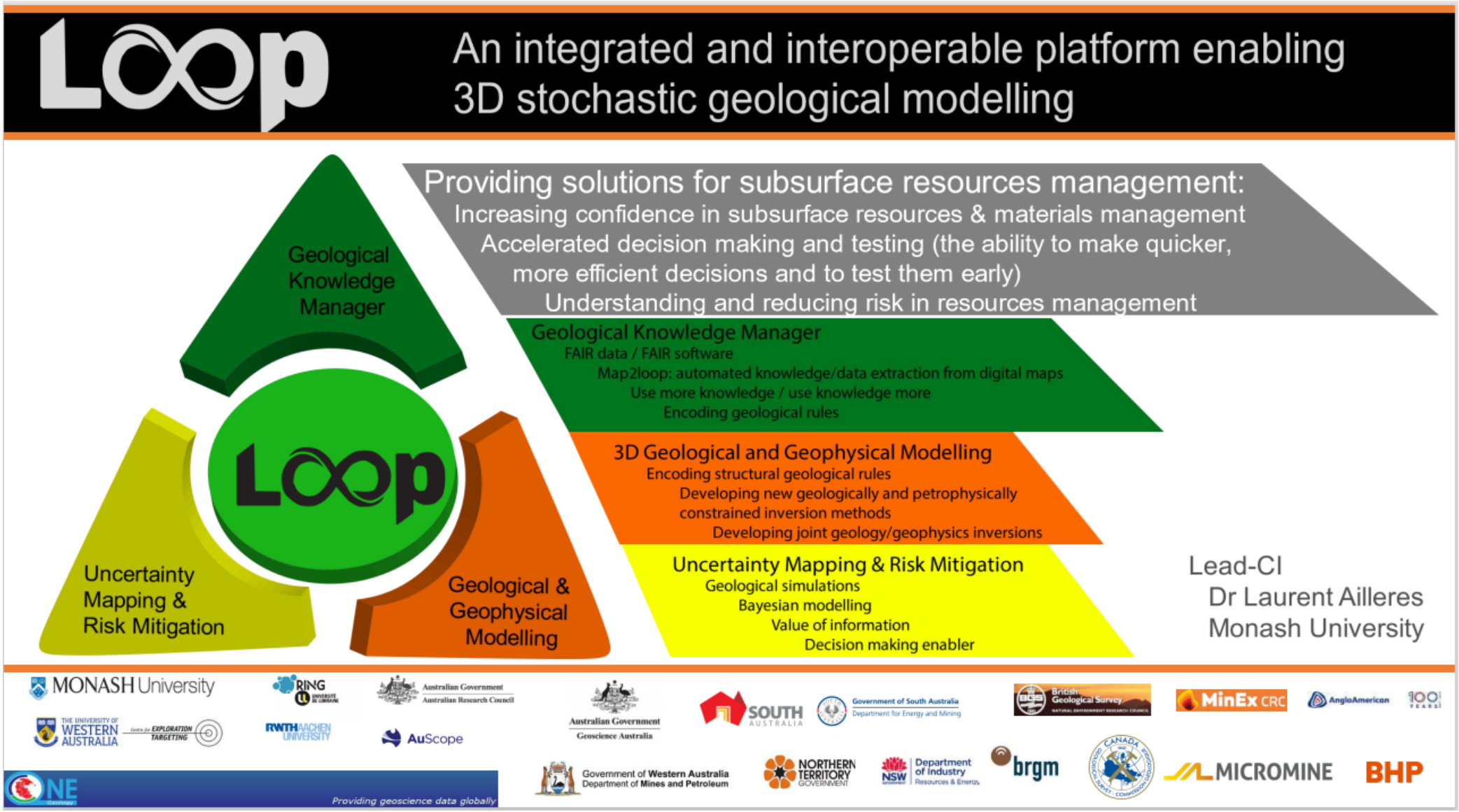
1. Loop Project

2. QGIS Development

3. End Point Solution

4. Live Demo

1. Loop Project


Loop
An integrated and interoperable platform enabling 3D stochastic geological modelling
Geological Knowledge Manager
Uncertainty Mapping & Risk Mitigation
Geological & Geophysical Modelling
Loop
Providing solutions for subsurface resources management:
Increasing confidence in subsurface resources & materials management
Accelerated decision making and testing (the ability to make quicker, more efficient decisions and to test them early)
Understanding and reducing risk in resources management
Geological Knowledge Manager
FAIR data / FAIR software
Map2loop: automated knowledge/data extraction from digital maps
Use more knowledge / use knowledge more
Encoding geological rules
3D Geological and Geophysical Modelling
Encoding structural geological rules
Developing new geologically and petrophysically constrained inversion methods
Developing joint geology/geophysics inversions
Uncertainty Mapping & Risk Mitigation
Geological simulations
Bayesian modelling
Value of information
Decision making enabler
Lead-CI
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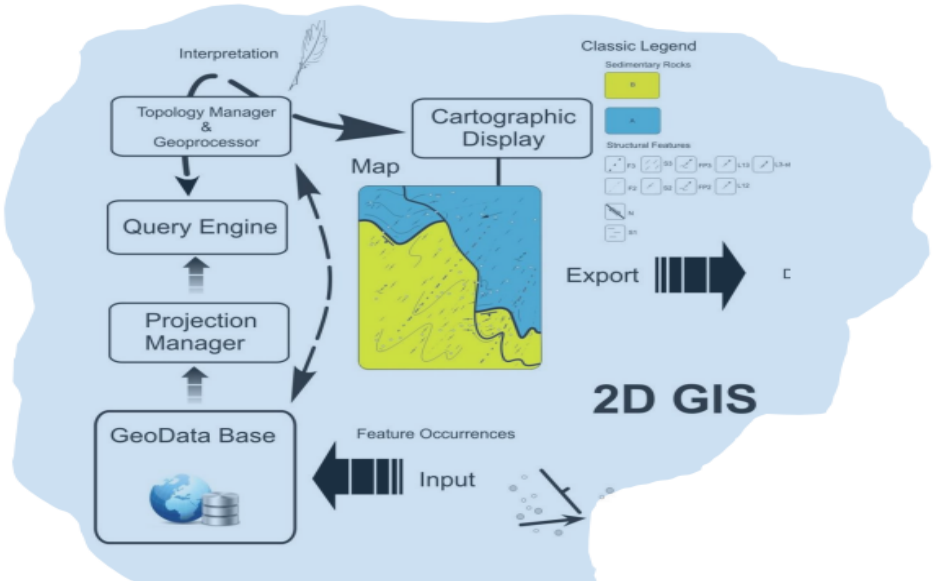
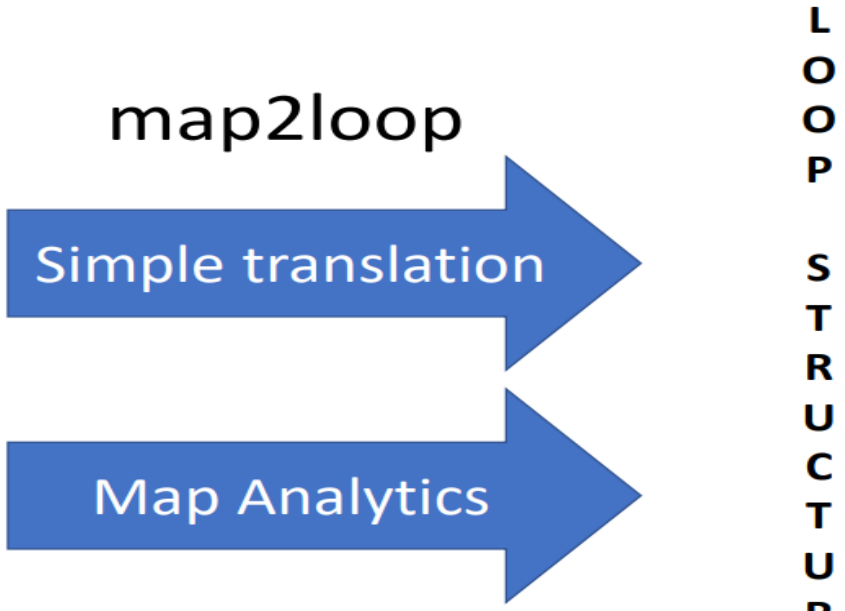
Map Deconstruction: map2loop

- **Open Source**
- **Automated extraction of geological information from maps**
- **Unbiased repeatable process**



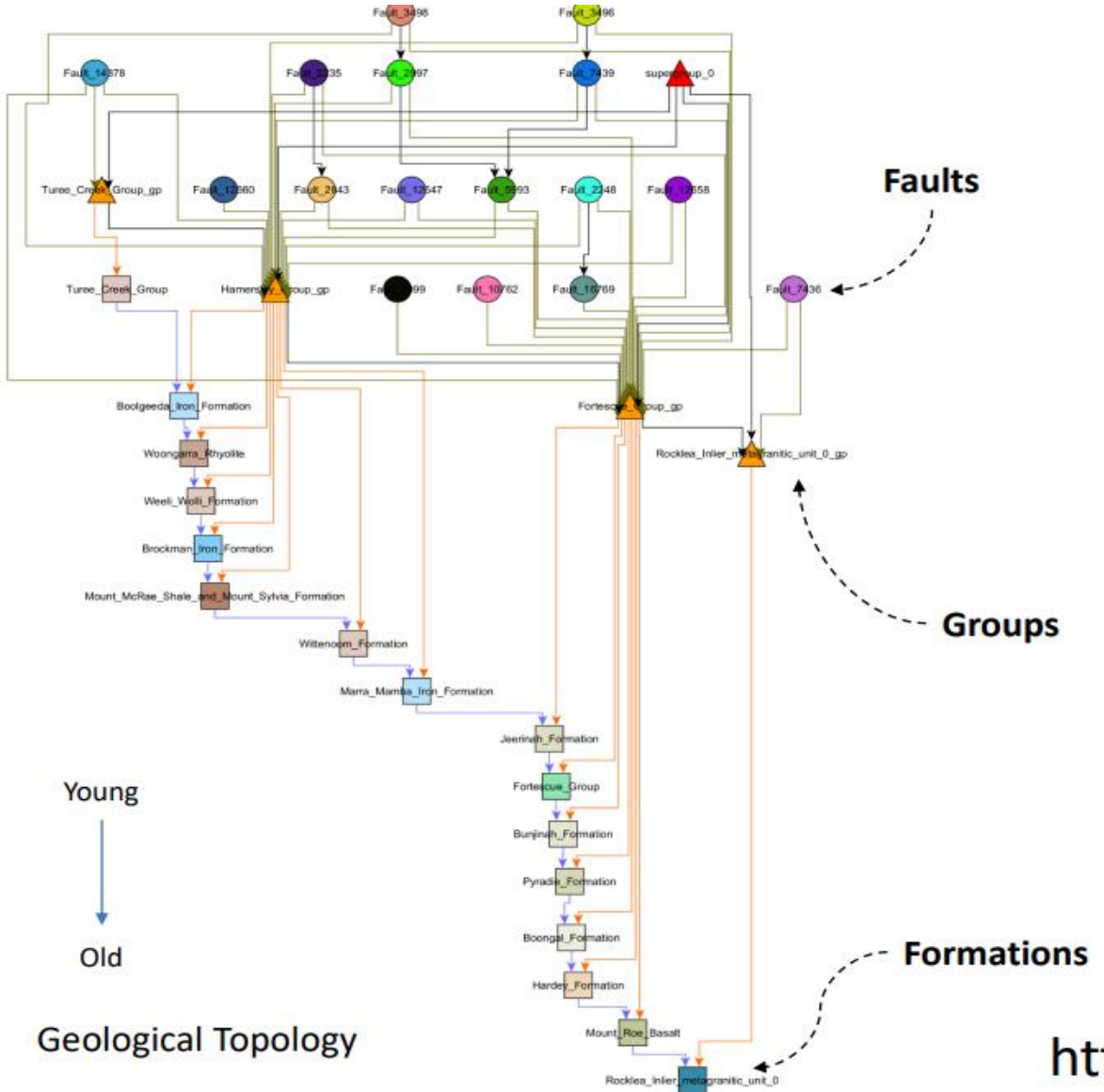


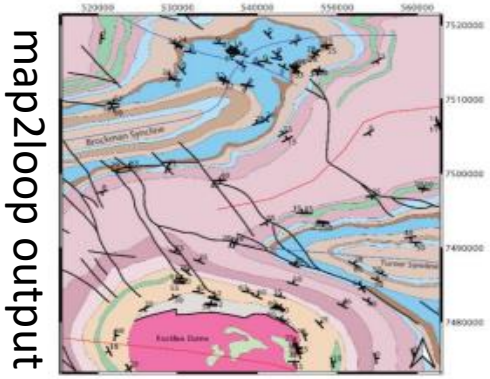
LOOP STRUCTURAL

Current Usage: manual method with one model built
map2loop: automated which allows multiple hypotheses

https://github.com/Loop3D/map2loop-2

Map Deconstruction: map2loop





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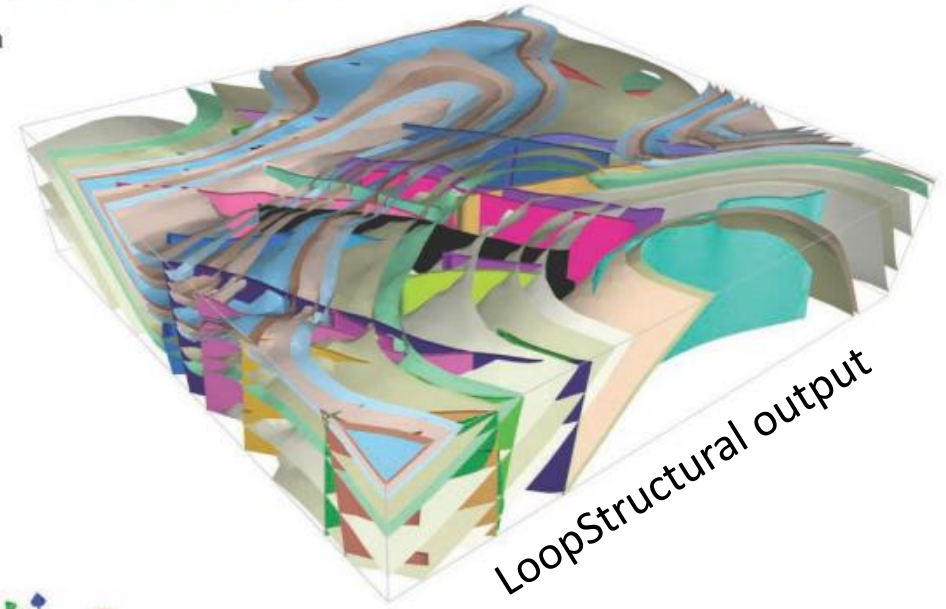

https://github.com/Loop3D/map2loop-2

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Loop

2. QGIS Plugin Development

- Free and open source
- Fast and extremely easy installation on both window and Linux & Mac
- Lots of plugins and extensions, reliable and constantly updated
- Design your customized QGIS Plugin
- Very simple and effective GUI to work with
- Seamless to connect with databases and export and import spatial data to and from.
- ..
- ..

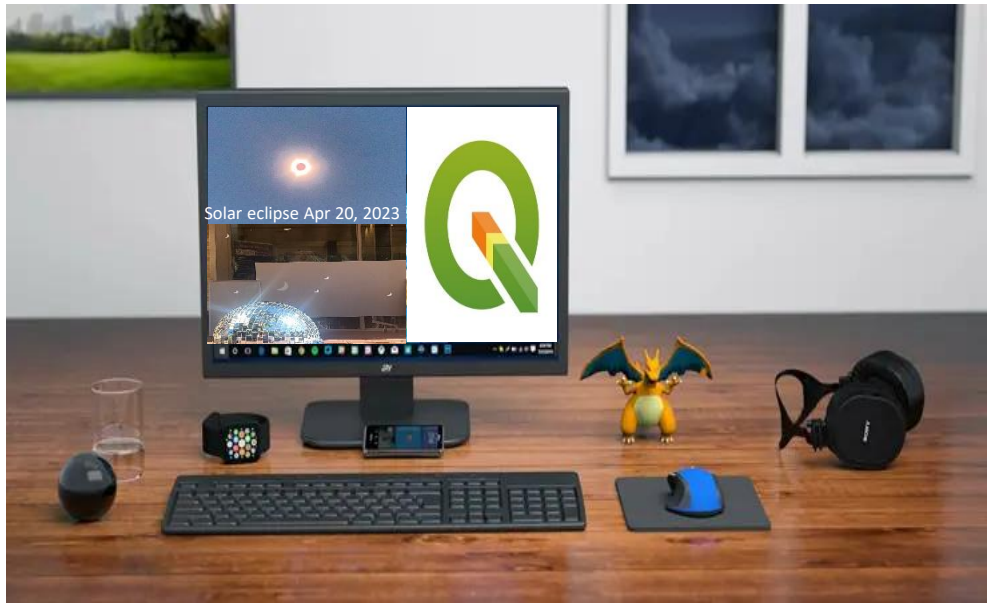
https://github.com/Loop3D/qgis-loopplugin

3. What is an end point solution?

- Docker container
- WebSocket

2.1. Proposed Workflow Development

Local PC



Remote Server

QGIS

In dev/testing phase (version v0.5)

Communications currently in dev

Working in progress

Map2loop

Remote server

Remote server in testing phase

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docker docs | Search the docs | Home | Guides | Manuals | Reference | FAQ | Samples | Contribute

Guides / Docker overview

- Docker overview
- Get Docker
- Get started
- Docker Desktop hands-on guides
- Language-specific guides
- Develop with Docker
- Build with Docker
- Deployment and orchestration
- Educational resources

Docker overview

Docker is an open platform for developing, shipping, and running applications. Docker enables you to separate your applications from your infrastructure so you can deliver software quickly. With Docker, you can manage your infrastructure in the same ways you manage your applications. By taking advantage of Docker's methodologies for shipping, testing, and deploying code quickly, you can significantly reduce the delay between writing code and running it in production.

The Docker platform

Docker provides the ability to package and run an application in a loosely isolated environment called a container. The isolation and security allows you to run many containers simultaneously on a given host. Containers are lightweight and contain everything needed to run the application, so you do not need to rely on what is currently installed on the host. You can easily share containers while you work, and be sure that everyone you share with gets the same container that works in the same way.

Docker provides tooling and a platform to manage the lifecycle of your containers:

- Develop your application and its supporting components using containers.
- The container becomes the unit for distributing and testing your application.
- When you're ready, deploy your application into your production environment, as a container or an orchestrated service. This works the same whether your production environment is a local data center, a cloud provider, or a hybrid of the two.

What can I use Docker for?

Fast, consistent delivery of your applications

Docker streamlines the development lifecycle by allowing developers to work in standardized environments using local containers which provide your applications and services. Containers are great for continuous integration and continuous delivery (CI/CD) workflows.

Consider the following example scenario:

websockets

Search

- Getting started
  - Part 1 - Send & receive
  - Part 2 - Route & broadcast
  - Part 3 - Deploy to the web
- How-to guides
- Frequently asked questions
- API reference
- Topic guides
- About websockets

Getting started

Requirements

websockets requires Python ≥ 3.7.

Use the most recent Python release

For each minor version (3.x), only the latest bugfix or security release (3.x.y) is officially supported.

It doesn't have any dependencies.

Installation

Install websockets with:

```
$ pip install websockets
```

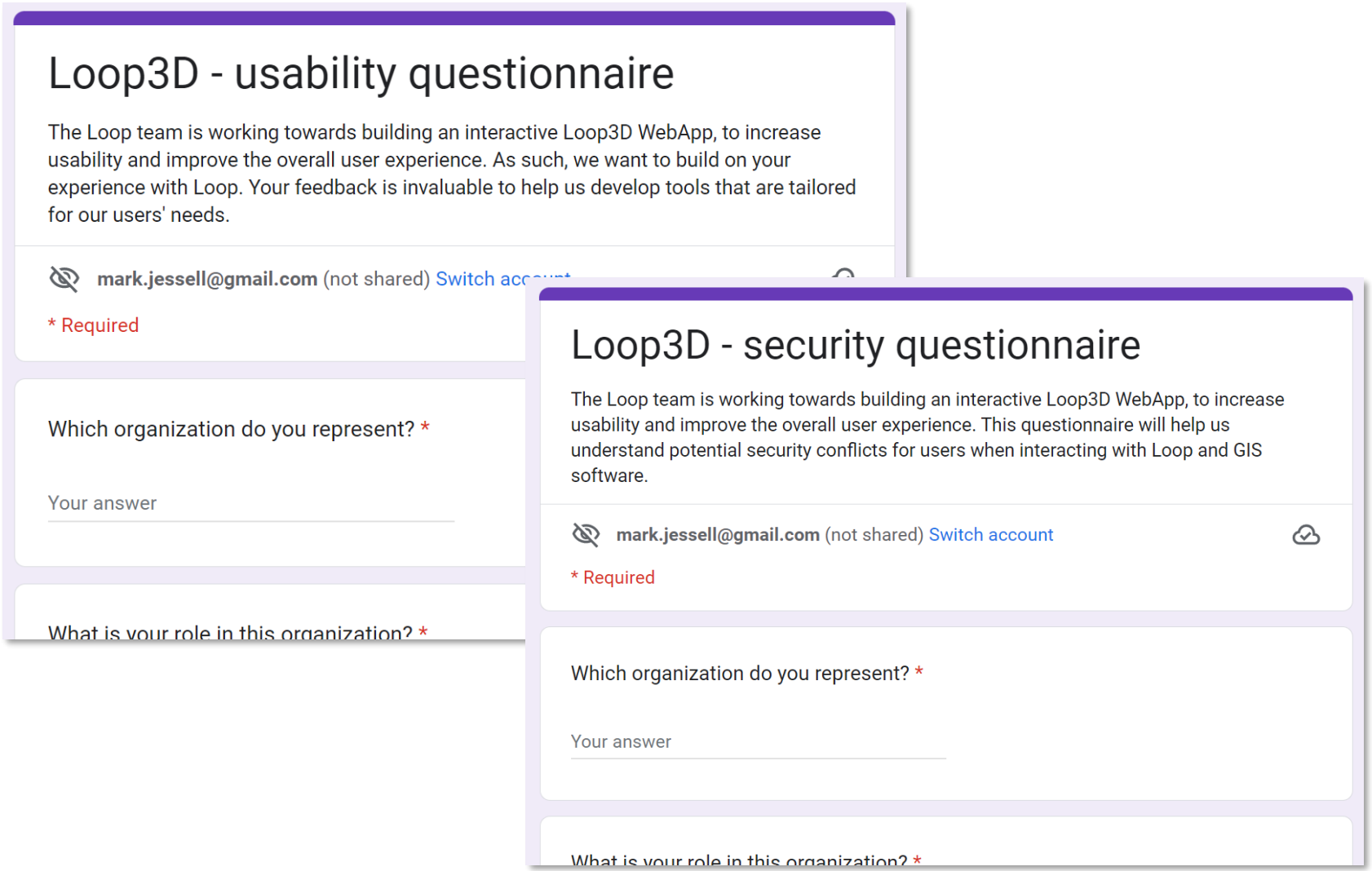
Wheels are available for all platforms.

Tutorial

Learn how to build an real-time web application with websockets.

- Part 1 - Send & receive
  - Prerequisites
  - Download the starter kit
    - `PLAYER1`
    - `PLAYER2`

Understanding User needs



Loop3D - usability questionnaire

The Loop team is working towards building an interactive Loop3D WebApp, to increase usability and improve the overall user experience. As such, we want to build on your experience with Loop. Your feedback is invaluable to help us develop tools that are tailored for our users' needs.

mark.jessell@gmail.com (not shared) Switch account

* Required

Which organization do you represent? *

Your answer

What is your role in this organization? *

Loop3D - security questionnaire

The Loop team is working towards building an interactive Loop3D WebApp, to increase usability and improve the overall user experience. This questionnaire will help us understand potential security conflicts for users when interacting with Loop and GIS software.

mark.jessell@gmail.com (not shared) Switch account

* Required

Which organization do you represent? *

Your answer

What is your role in this organization? *

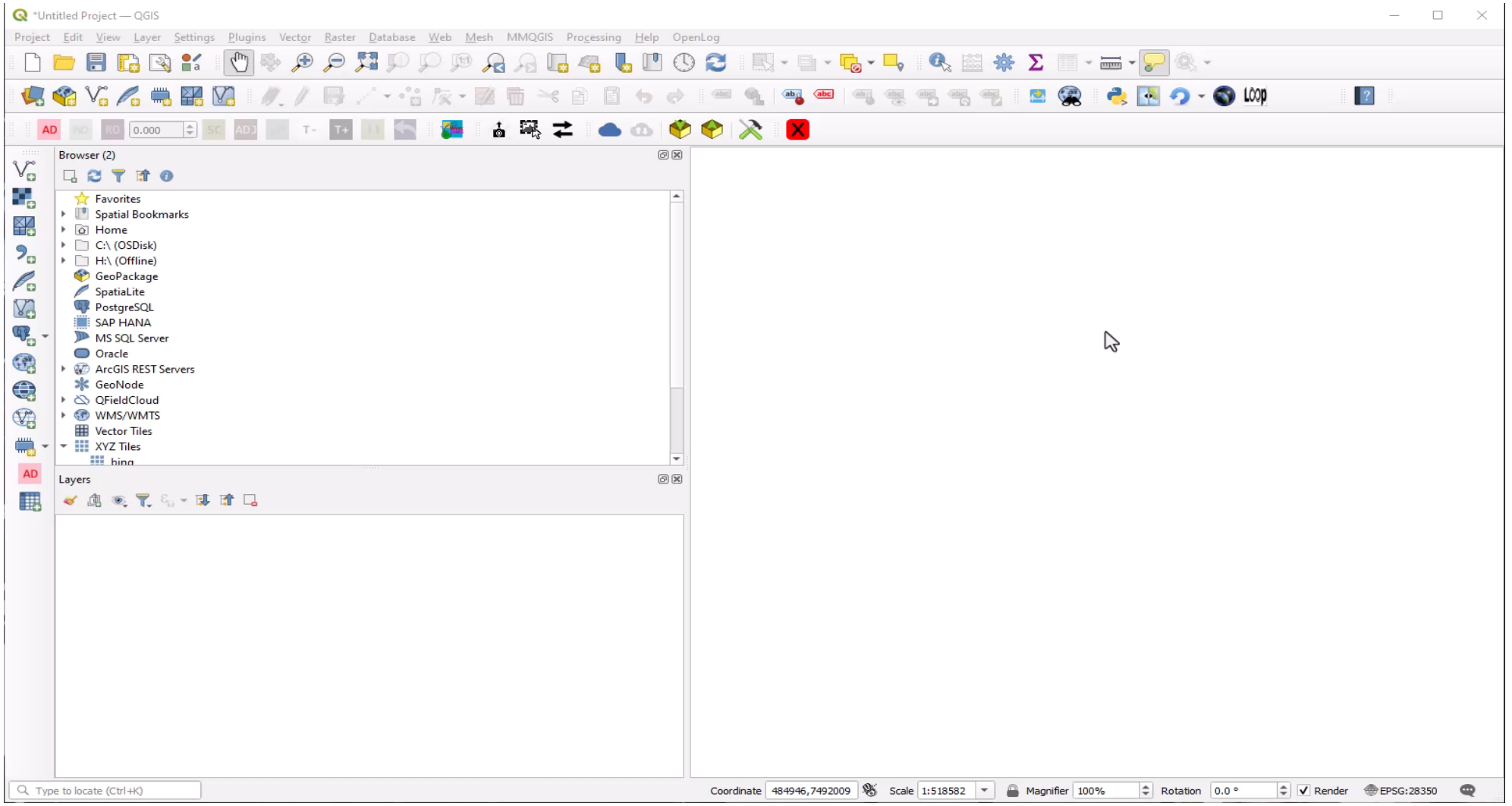
4. Live demo

Requirement: QGIS 3.28 Firenze LTR

Git clone or download: Loop3D/qgis-loopplugin: This tool outputs data that are used to run map2loop and for LoopStructural 3D modelling. (github.com)

Download Docker Desktop Installer: → Get Docker | Docker Documentation

Automated data processing & data clipping



https://github.com/Loop3D/qgis-loopplugin

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Loop

output

Python run script

```python
from map2loop.project import Project
from map2loop.m2l_enums import VerboseLevel
import shutil
proj = Project(
                geology_filename='..\loop_source_data\source_data\geol_clip.shp',
                fault_filename='..\loop_source_data\source_data\faults_clip.shp',
                fold_filename='..\loop_source_data\source_data\faults_clip.shp',
                structure_filename='..\loop_source_data\source_data\structure_clip.shp',
                mindep_filename='http://13.211.217.129:8080/geoserver/loop/wfs?service=WFS&version=1.0.0&request=GetFeature&typeName=loop:
                dtm_filename='http://services.ga.gov.au/gis/services/DEM_SRTM_1Second_over_Bathymetry_Topography/MapServer/WCSServer?',
                metadata_filename='.\data.json',
                overwrite='true',
                verbose_level=VerboseLevel.NONE,
                project_path='..\tester',
                working_projection='epsg:28350',
                )

proj.update_config(
                    out_dir='..\tester',
                    bbox_3d={'minx': 520000, 'miny': 7490000, 'maxx': 550000, 'maxy': 7510000, 'base': -3200, 'top': 1200},
                    run_flags={'aus': True, 'close_dip': -999.0, 'contact_decimate': 5, 'contact_dip': -999.0, 'contact_orientation_decima
                    proj_crs='epsg:28350',
                    clut_path='',
                )

proj.run()
shutil.copyfile('../source_data/map2loop.qgz', proj.config.project_path+'/map2loop.qgz')
```

Config file

```
{
    "bedding":"Bed",
    "bo":"structypei",
    "btype":"overturned",
    "c":"unitname",
    "d":"dip",
    "dd":"azimuth2",
    "deposit_dist":"500",
    "ds":"descriptn",
    "f":"feature",
    "fault":"Fault",
    "fdip":"dip",
    "fdipdir":"dip_dir",
    "fdipdir_flag":"num",
    "fdipest":"dip_est",
    "fdipest_vals":"shallow,steep,vertical",
    "fdipnull":"0",
    "ff":"feature",
    "fold":"Fold axial trace",
    "ftype":"Strike",
    "g":"group_",
    "g2":"supergroup",
    "gi":"objectid",
    "intrusive":"intrusive",
    "max":"min_age_ma",
    "mcom":"commodity_",
    "min":"min_age_ma",
    "minf":"infrastructure",
    "msc":"site_code",
    "mscm":"site_commo",
    "msn":"short_name",
    "mst":"site_type_",
```

https://github.com/Loop3D/qgis-loopplugin

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- https://www.meetup.com/en-AU/Fury-River-Dragon-Boat-Club/

THANK YOU