

GitOps and Containerisation for INSPIRE

Automation in Building, Testing and Deployment of Software Applications

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The Netherlands

European Commission

INSPIRE Maintenance and Implementation Group (MIG)

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Open Source
Geospatial
Professional @
justobjects.nl



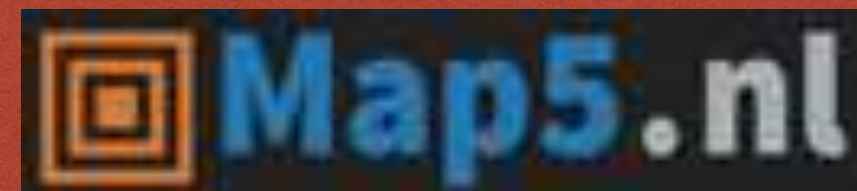
Member



Chair



Cloud Services



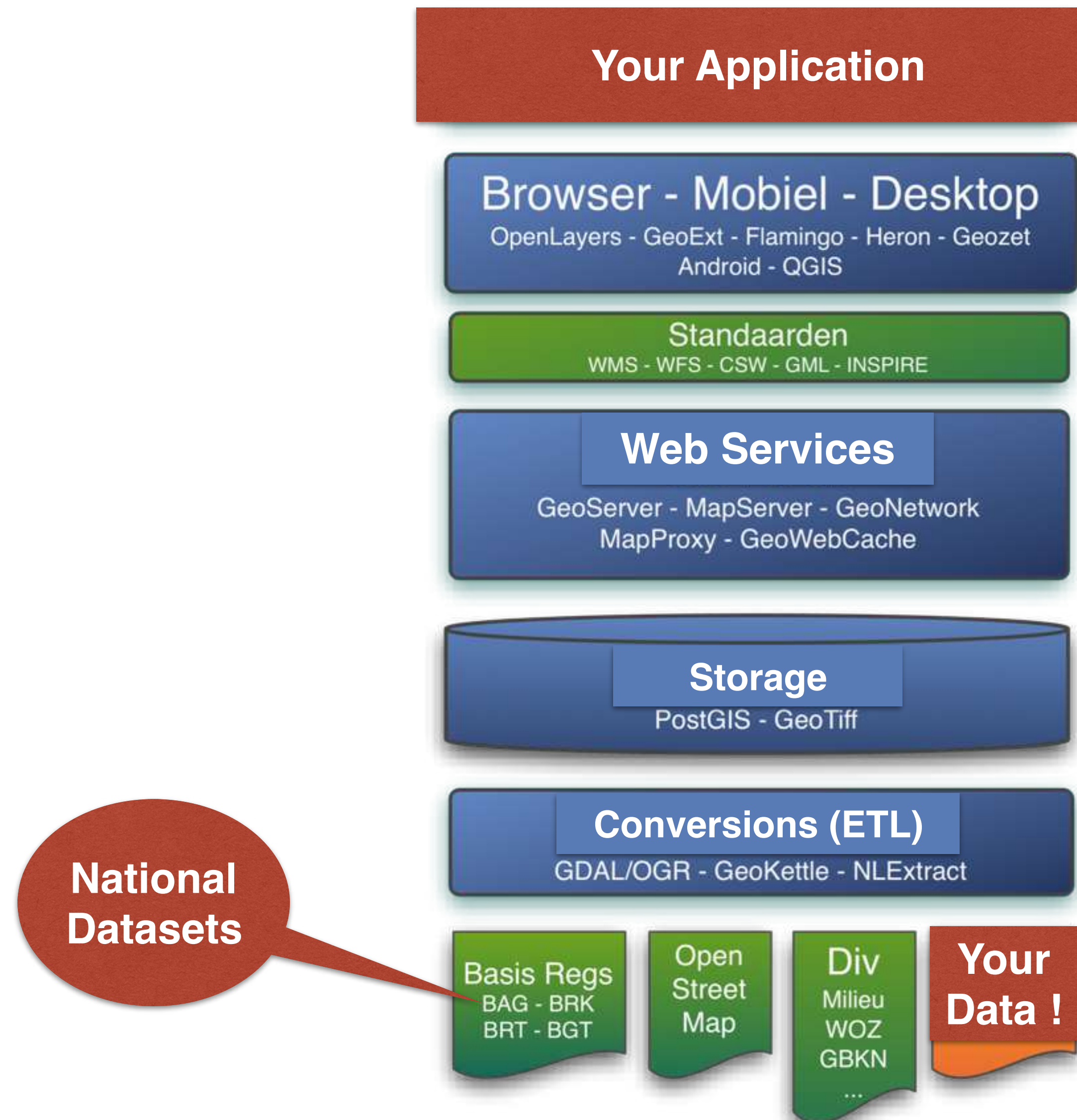
Installing and maintaining Open Source Geospatial Components!

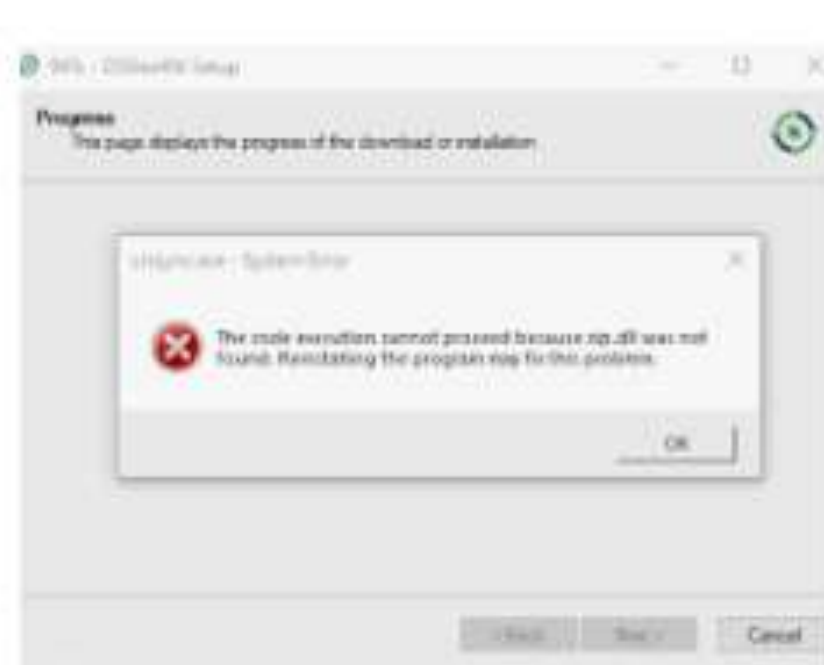
Challenges?

Which Components are we talking about?



Meta Architecture (OpenGeoGroep)

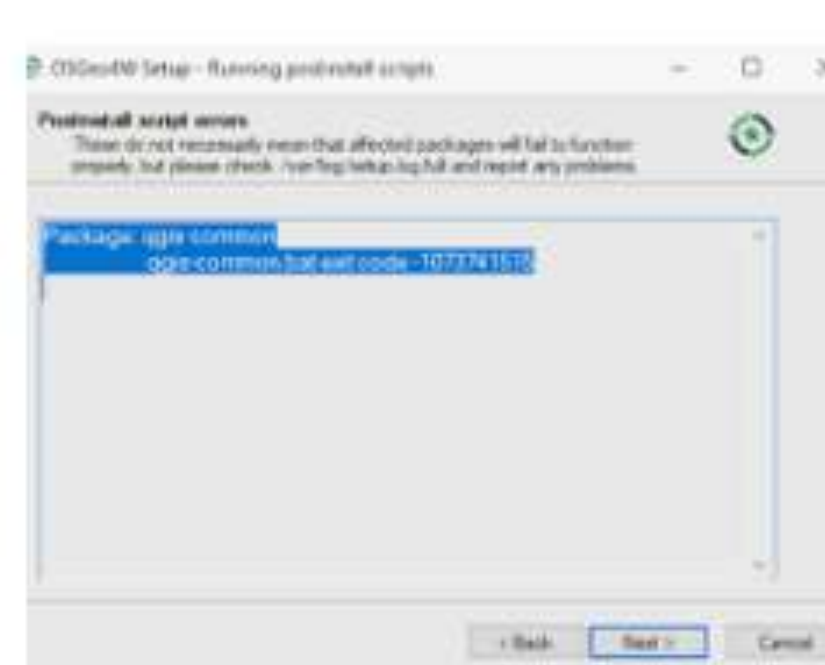




Installation problem QGIS - Geographic ...
gis.stackexchange.com



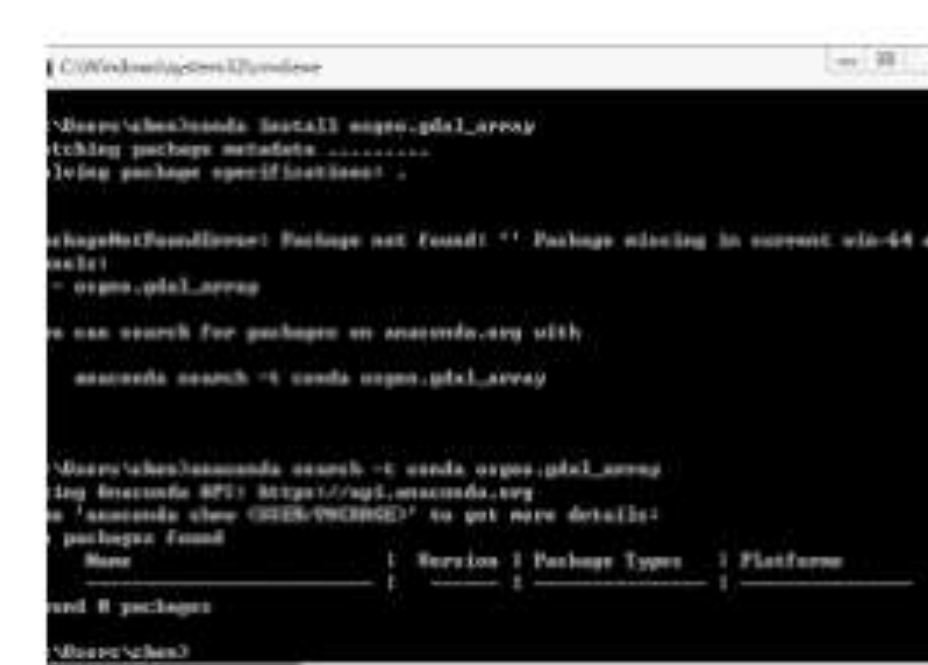
Installation problem QGIS - Geographic ...
gis.stackexchange.com



Installation problem QGIS - Geographic ...
gis.stackexchange.com



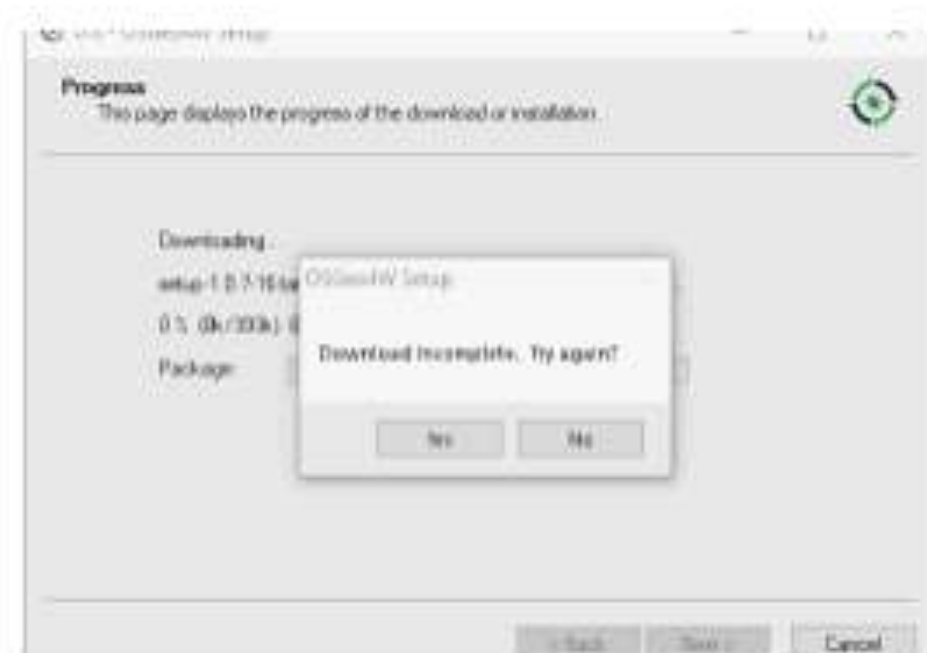
Sen2cor error--no module named osgeo ...
forum.step.esa.int



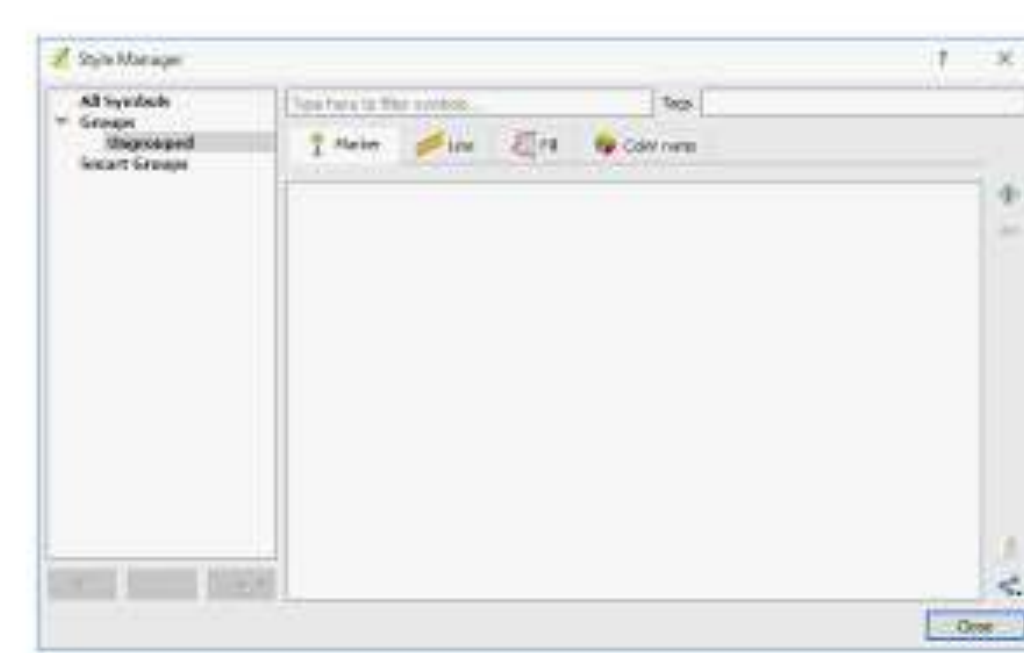
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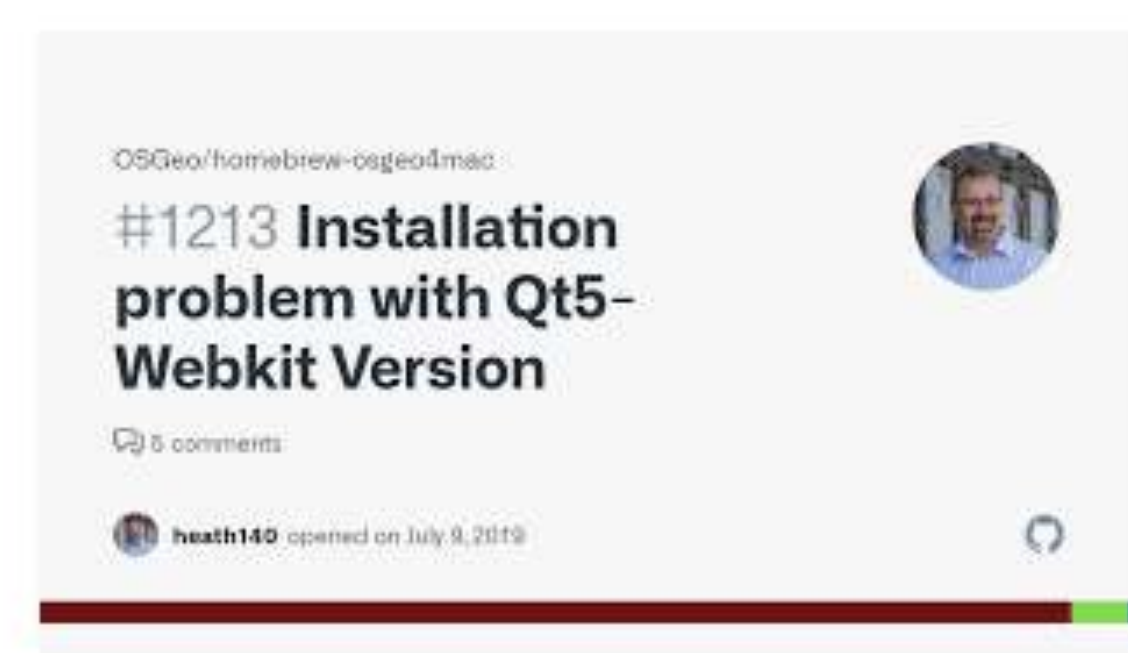
Sen2cor error--no module named osgeo ...
forum.step.esa.int



OSGeo Network Installer Download Error ...
gis.stackexchange.com



Install QGIS through OSGeo4W
giscourse.com



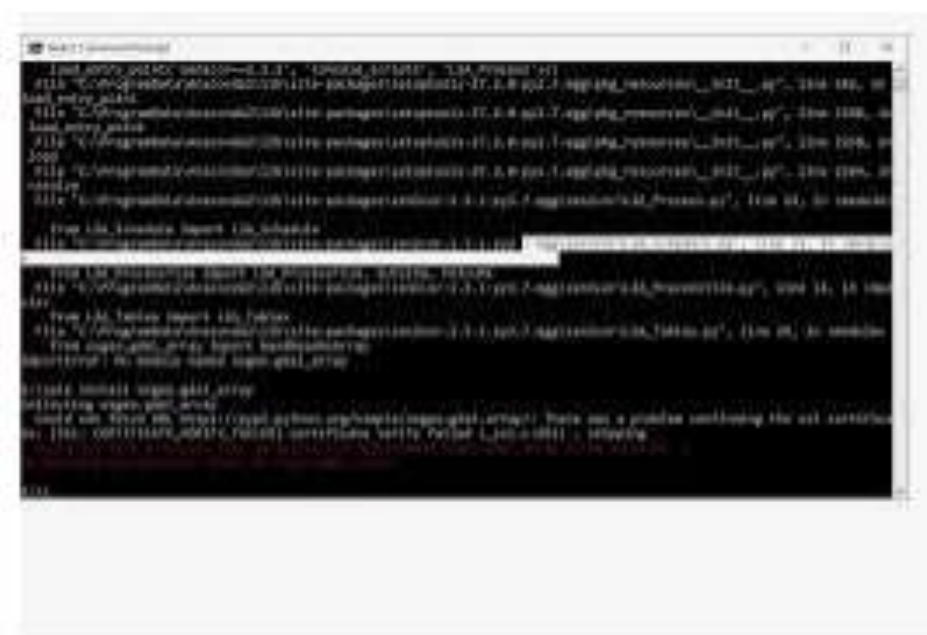
Installation problem with Qt5-Webkit ...
github.com



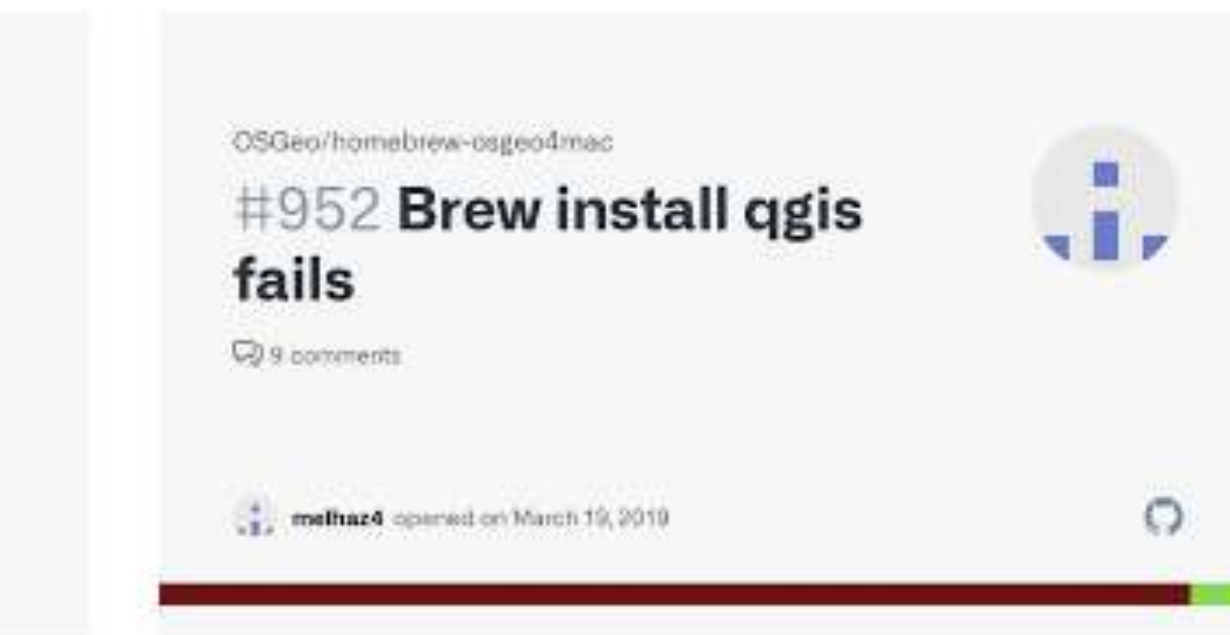
QGIS while loading any GDAL/OGR related ...
gis.stackexchange.com



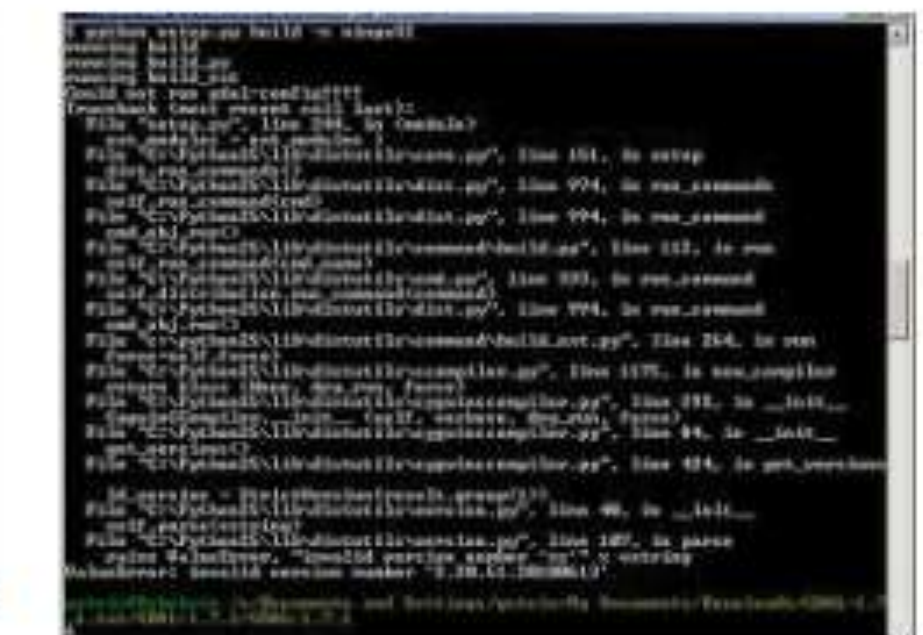
Install QGIS through OSGeo4W
giscourse.com



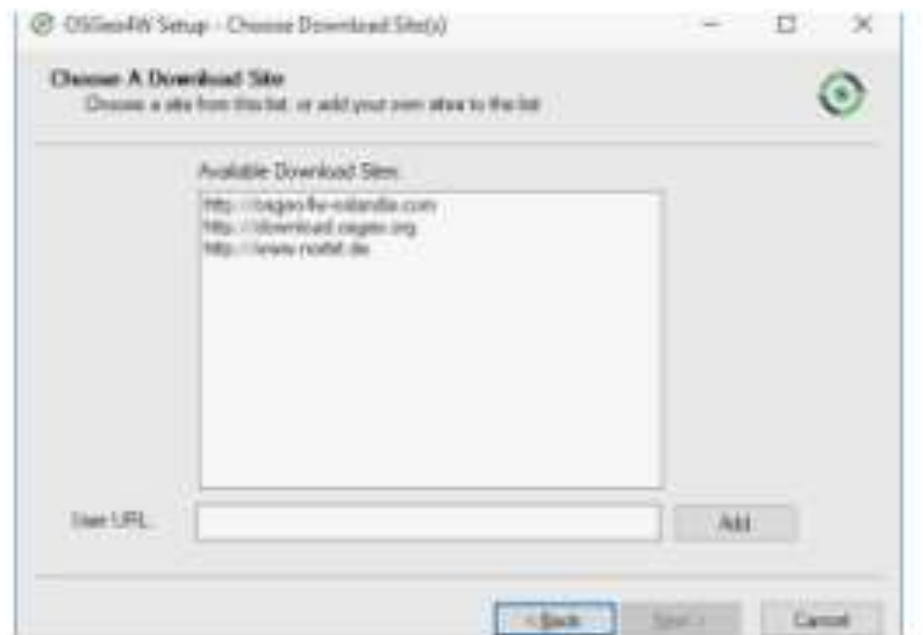
Sen2cor error--no module named osgeo ...
forum.step.esa.int



Brew install qgis fails - Issue #952 ...
github.com



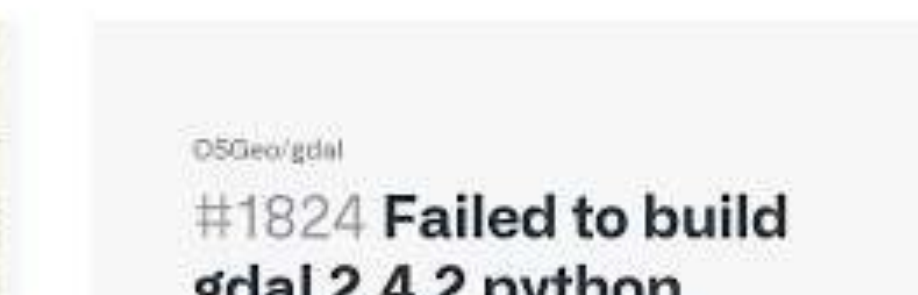
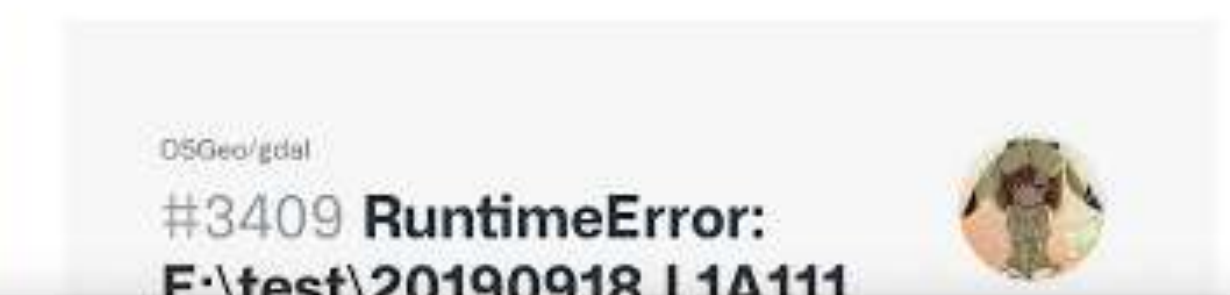
Installing GDAL with Python on windows ...
gis.stackexchange.com



Install QGIS through OSGeo4W
giscourse.com



Clean install of QGIS version 2.18.27 ...
gis.stackexchange.com



Installing and Maintaining Open Source Geospatial Components: Some Pain Points

- Different programming languages: Java(Script), Python, C+, ..
==> Different installation/upgrade techniques
- Networking: inter-connecting, proxies, SSL-certificates
- Additional maintenance: (QoS) monitoring, firewalling
- Different deployment environments, hence configurations:
Dev, Test, Acceptance, Production
- Operating System updates, 'DLL-hell' ==> *'It works, don't touch it !'*

And the solution?

Containers in the Cloud!



Open Source Container Company Docker ...
adtmag.com



Containerization: Advantages And ...
anexio.com



Containerization Crash Course - What is ...
boxboat.com



Containerization on Embedded Systems ...
blogs.knowledgelens.com



dead, long live containerization
diginomica.com



Containerizing Legacy Applications: The ...
contino.io



containers: Virtualbox, KVM, Xen, LXC ...
davidokwii.com



Containers success stories from 3 ...
techgenix.com



Apps in Containers -
t2client.com



Containers Part 1: Why You Need them ...
medium.com



The state of containers: Current trends ...
techbeacon.com



& Deploy Containerized Applications ...
medium.com



Kubernetes vs. Docker: Comparing ...
technologyadvice.com



Containerisation: Benefits and How I...
newtglobal.com



Container vs. VM security: Which is better?
searchcloudsecurity.techtarget.com



A big step forward in container ...
zdnnet.com



Modularity, Microservices and ...
jaxenter.com



AWS Container Consulting
missioncloud.com



Short Answer:

Docker !

Docker

*“Docker is a way of standardizing how software is
packaged, deployed, and updated.*

*Docker deployments are composed of a series of one or more
containers.*

***Each container provides one service of the application (-stack),
such as a GeoServer, a PostGIS database server etc.”***

**But Docker
requires**

Orchestration

Dot on the Horizon!



**Kubernetes:
Steep learning curve**

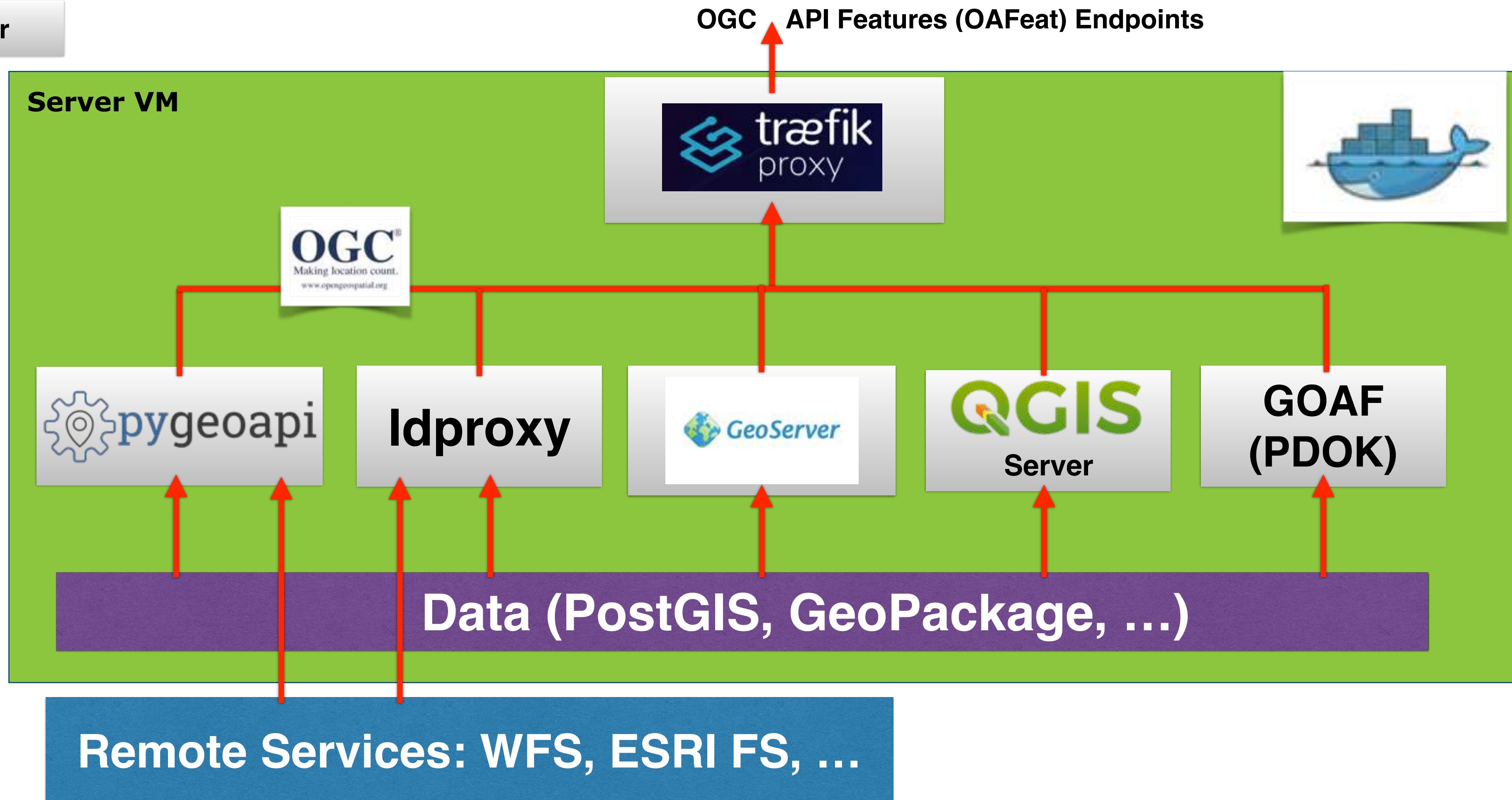
**Next:
Presenting a lighter weight
deployment orchestration
(using GitOps)**

2021- Geonovum - OGC API Testbed for OGC API Features

Legend

→ Dataflow

Docker container



See: <https://apitestdocs.geonovum.nl>

Cloud Deployment: GitOps in a Nutshell

*Push
Software &
Config
Changes*

*Build
Test
Deploy*

==> Git ==> “Cloud”

<https://www.gitops.tech/>

Geonovum OGC API Testbed GitOps Workflow - Core



<https://www.gitops.tech/>

Geonovum OGC API Testbed GitOps Workflow - Expanded

GitHub (complete configuration **“Source of Truth”**)

Docker (with Docker Compose)

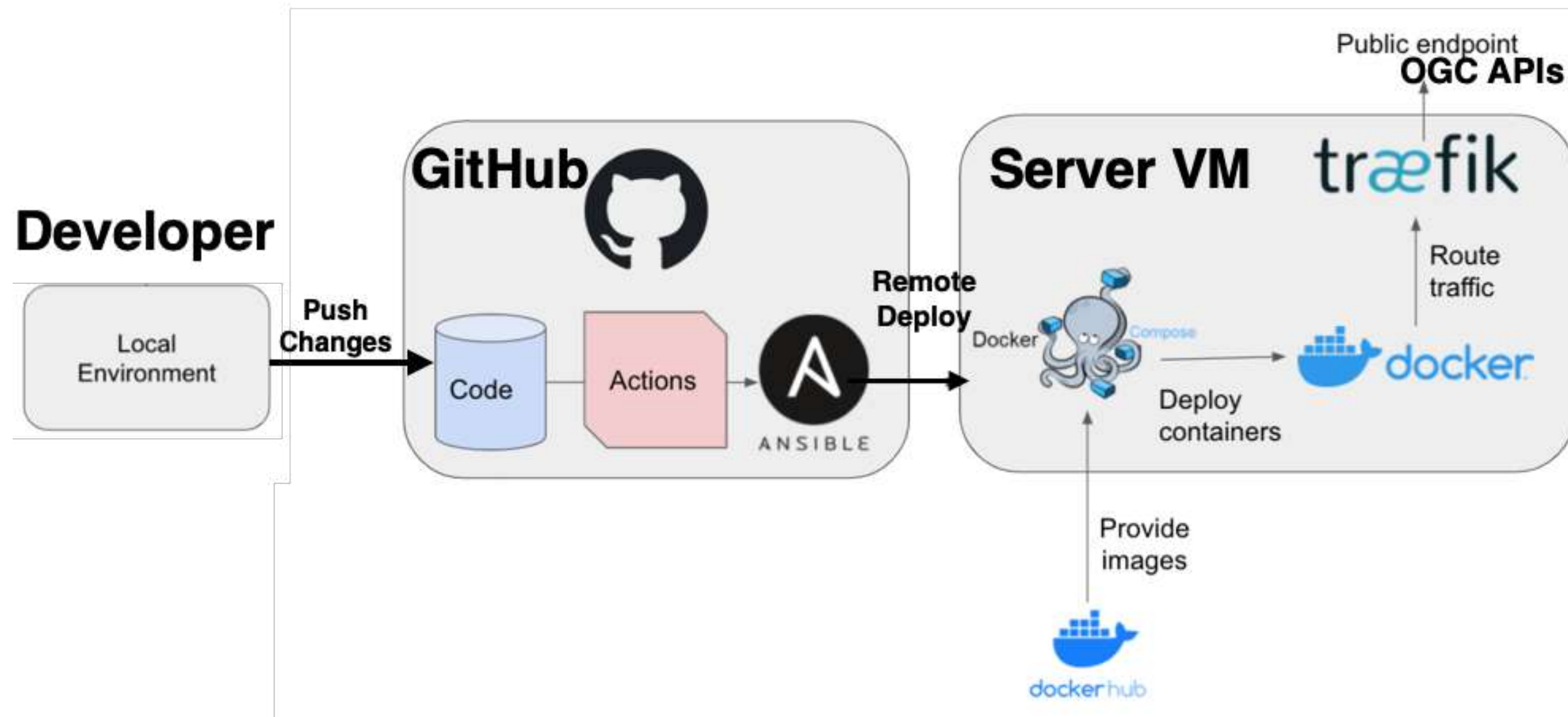
Ansible (remote deploy)

via **GitHub Workflows (Actions)**

- Continuous deployment (CI/CD) triggered from GitHub “push”
- Secured config via GitHub Secrets and Ansible Vault
- Provided as GitHub Template Repository *

* <https://github.com/Geonovum/ogc-api-testbed>

Geonovum OGC API Testbed GitOps Workflow - Visual



Conclusions & Recommendations

- **GitOps:**
very viable CI/CD data services deployment strategy
- Start with **lightweight GitOps**
using GitHub+Ansible+Docker
- Ultimately go for **Kubernetes** deployment
using GitOps

Thank You for Listening!

Links

- Geonovum - OGC API Testbed - Documentation
<https://apitestdocs.geonovum.nl/>
- Geonovum - OGC API Testbed - Live Server
<https://apitestbed.geonovum.nl/>
- Geonovum - OGC API Testbed - GitHub Template
<https://github.com/Geonovum/ogc-api-testbed>
- Running service for EC JRC: <https://jrc.map5.nl/>
- GitHub repo: <https://github.com/justb4/ogc-api-jrc>
- EC-JRC report (includes GitOps):
<https://publications.jrc.ec.europa.eu/repository/handle/JRC127730>