



# Build Interactive {shiny} Apps to Share Your Work With Anyone!

**Oslo useR group, 2021-05-19**

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Norwegian Geotechnical Institute

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Department of Forest and Climate, NIBIO



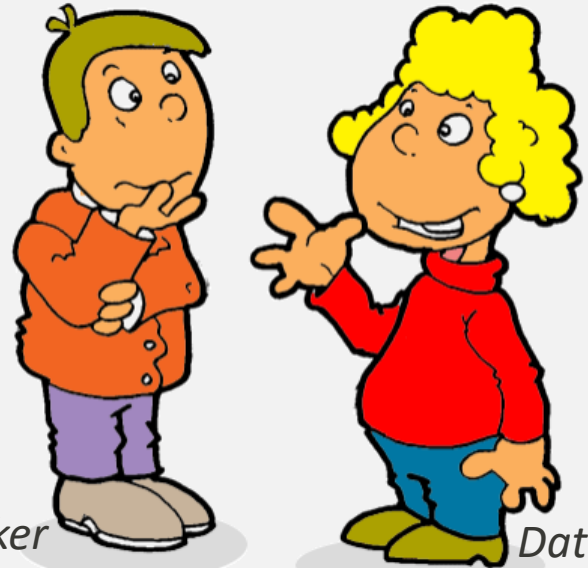
# What we got to offer you this evening!

- Introduction: Why Shiny?
- How to build your first Shiny App!
- Shiny's little cousin «flexboards»
- Advanced Shiny Apps
- Shiny in Production



# Why Shiny?

You have to come see my new R script, it's gone  
make us world famous!



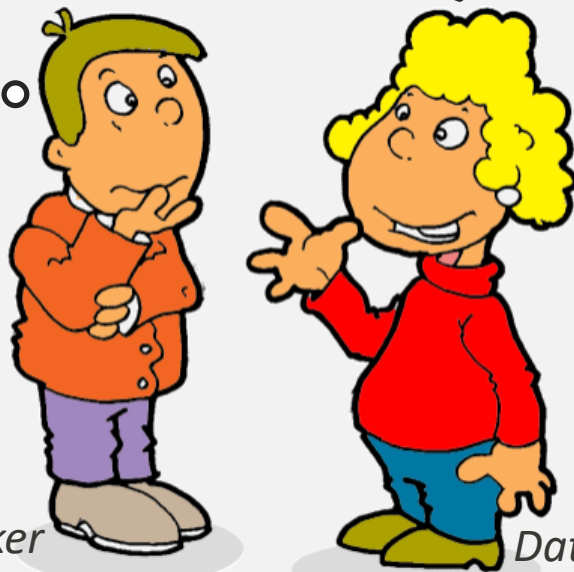
*Decision Maker*

*Data Analyst*

# Why Shiny?

You have to come see my new R script, it's gone  
make us world famous!

Hmm... R... isn't that some  
currency below equator  
somewhere...



*Decision Maker*

*Data Analyst*

# Why Shiny?

Ahh... a Regular Web Browser,  
Now We're Talking!



*Decision Maker*

# What is Shiny?

- Package to create Web Apps from (only) R
- Maintained by Rstudio since 2012
- Run whatever R code you want to!



# Shiny: The concept

- Enables anyone to run R from a web site!
- How it works
  - User edits inputs (date etc)
  - R runs code based on inputs
  - Results are presented in plots etc.
- What can it do?
  - Insights
  - Day-to-Day Data Tasks
  - Prototyping

## Google Trend Index

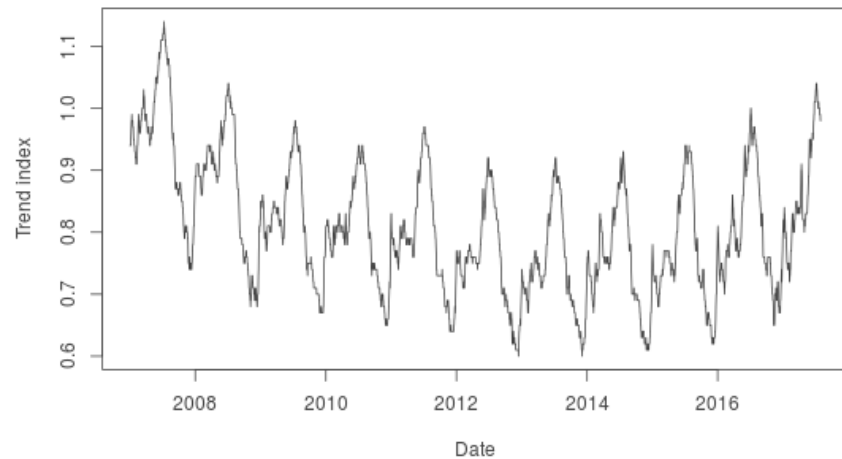
Trend index

Travel ▼

Date range

2007-01-01 to 2017-07-31

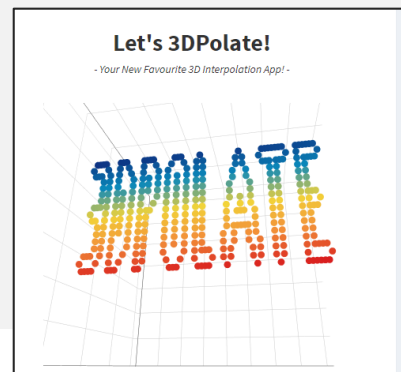
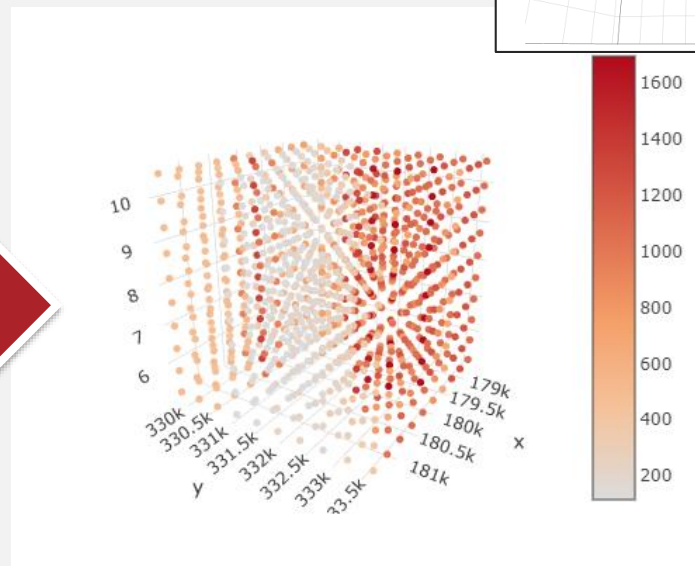
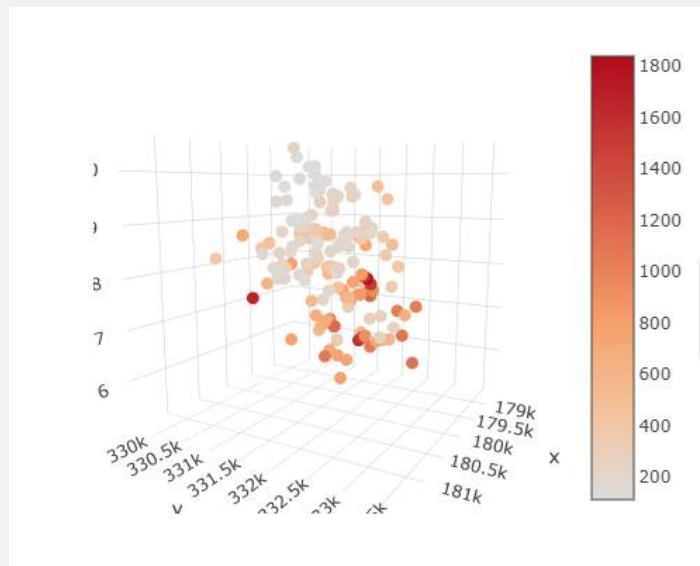
☐ Overlay smooth trend line



The Google Travel Index tracks queries related to airlines, hotels, beach, southwest, las vegas, flights, etc. The index is set to 1.0 on January 1, 2004 and is calculated only for US search traffic.

Source: [Google Domestic Trends](#)

# Demo: 3D Interpolation from Points measurements to full grid

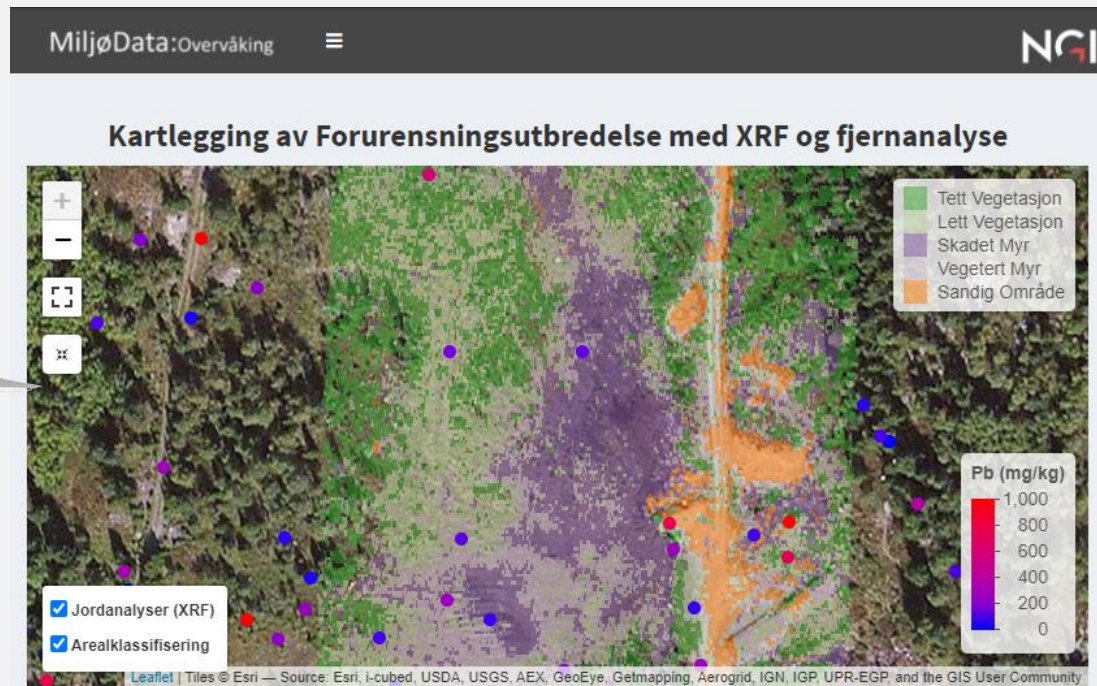




# Demo: Mapping and Risk Assessment of Polluted Sites



Data collected with drones  
with multispectral imaging

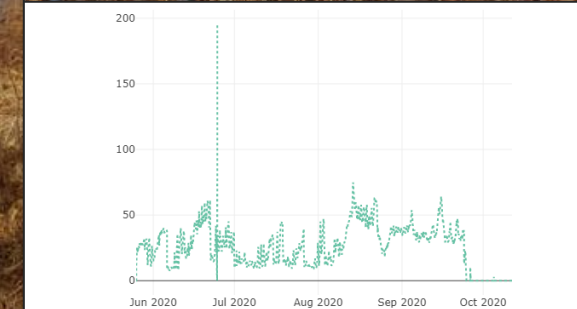
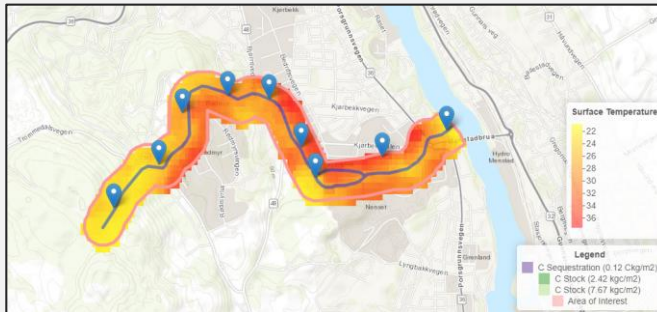


# Some other Use Cases

- Prototyping: Live Sensor Data
  - With logger producer Libelium
- Satellite Data vs Ecosystem Services
  - Assessing carbon storage and land surface temperature

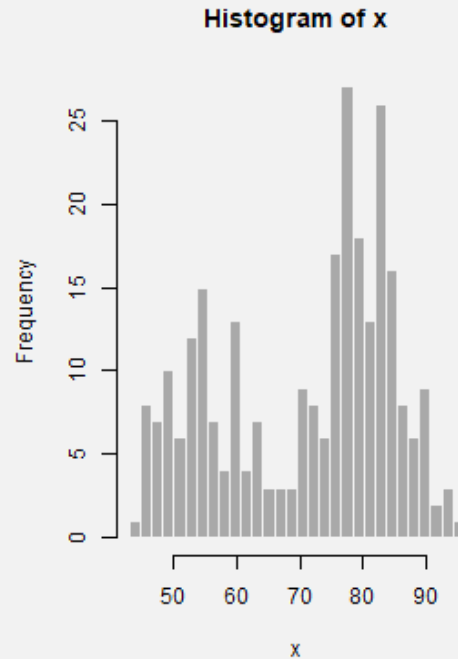
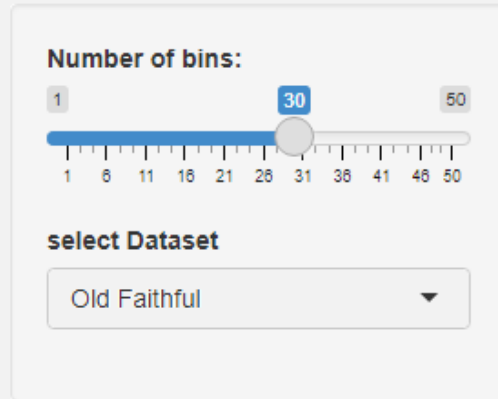
<http://miljo.ngi.no/natwip>

- Teaching



# Time to create «The First App»!

## Old Faithful Geyser Data



# «The Second App»!

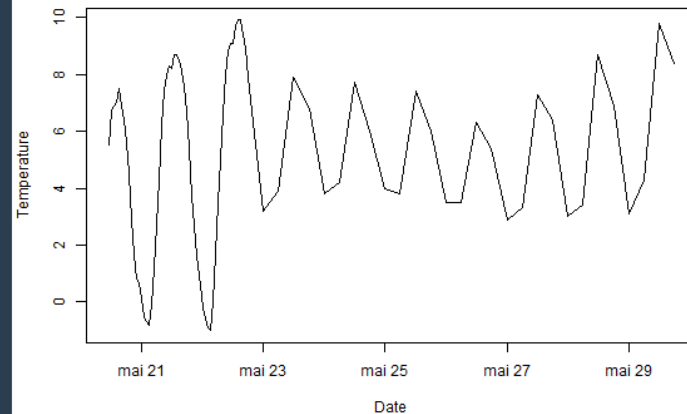
## Weather Forecast

Latitude:

61.74495

Longitude:

8.43067



# Shiny Advanced!

## ➤ The developer tools you will Love!!!

- Reactlog – What happen when(?): <https://rstudio.github.io/reactlog/>
- Profiling – profvis: <https://rstudio.github.io/profvis/>
- Loadtesting: <https://rstudio.github.io/shinyloadtest/>
- Shinylogs: <https://github.com/dreamRs/shinylogs>
- Google Analytics: <https://code.markedmondson.me/googleAnalyticsR/>
- List of Shiny Packages: <https://github.com/grabear/awesome-rshiny>
- Shiny Developers Series: <https://r-podcast.org/>
- Shiny Guide for Production: <https://engineering-shiny.org/>

## ➤ Error tracing – put this in your «global» when needed(!)

- `options(shiny.error = browser) #call "e" when it fails – important for dplyr!`
- `options(shiny.trace = TRUE) #makes it chatty!`
- `options(shiny.fullstacktrace = TRUE) #makes it even chattier!`
- `browser() / breakpoints` wherever you like (lets you access reactive values)!



# What is Production?



**Software Environments** that are used and **relied on by real users**, with **real consequences** if things go wrong



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**Software Environments** that are used and **relied on by real users**, with **real consequences** if things go wrong

Hmm.. Why is it all grey suddenly? I'm gone call someone right away!



# Goals for Production



## ➤ Keep it up!

- *Unplanned outages are rare or nonexistent*

## ➤ Keep it safe!

- *Data, functionality and code are kept away from unauthorized access*

## ➤ Keep it correct!

- *Works as intended, provides the right answers*

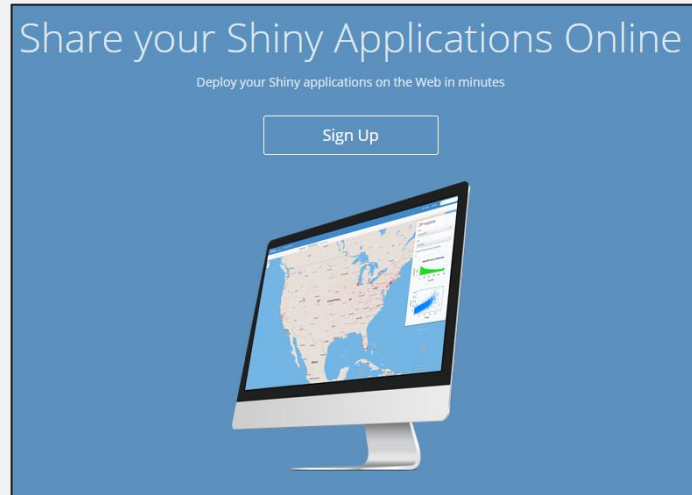
## ➤ Keep it snappy!

- *Fast enough response time to ensure userfriendliness*



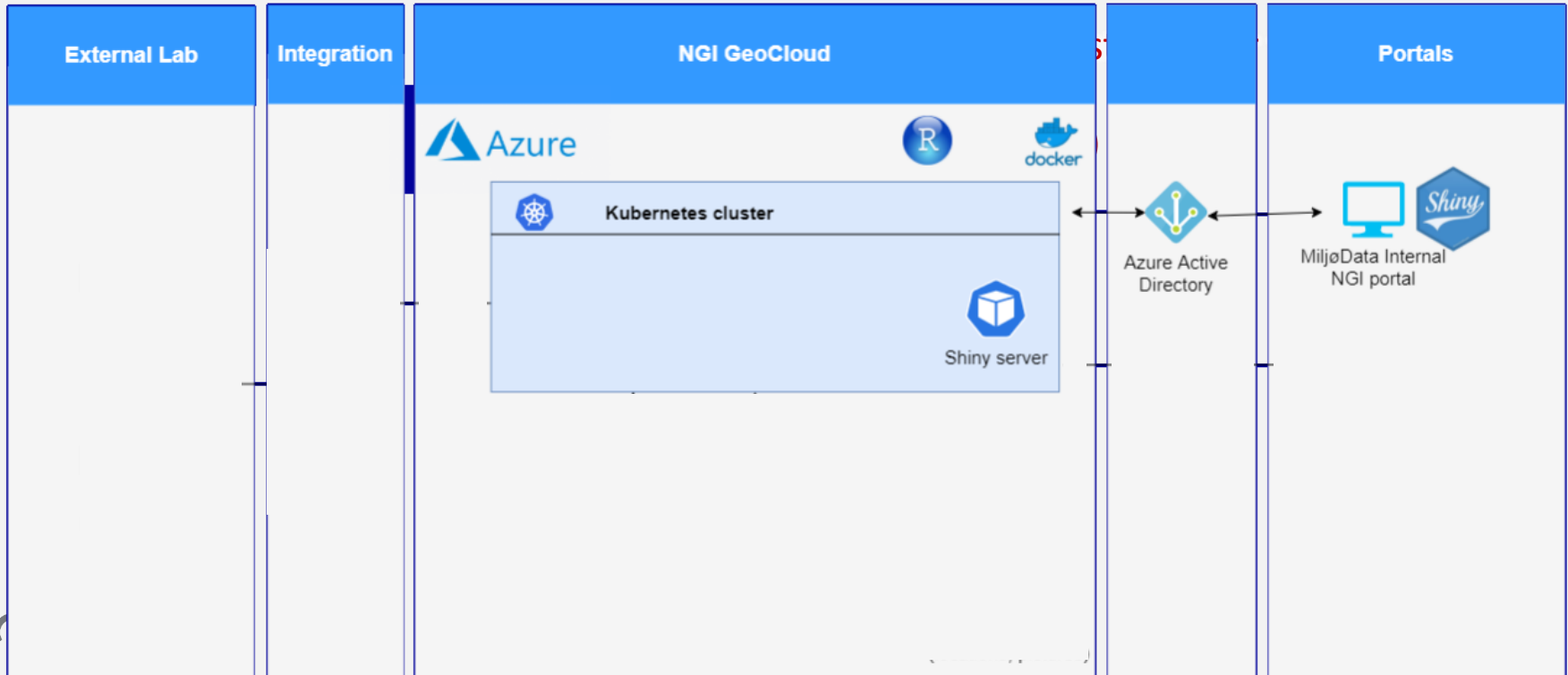
# How to get into production?

- If you can, use free\* hosting @ shinyapps.io
- NGI are a proud **paying** customer of RStudio
- Pros
  - Robust hosting environment (scaling etc)
  - Easy to meet goals (monitoring, staging etc)
  - Low costs and low maintainance
- Cons
  - Integrations towards other services
  - Multifactor authentication not available



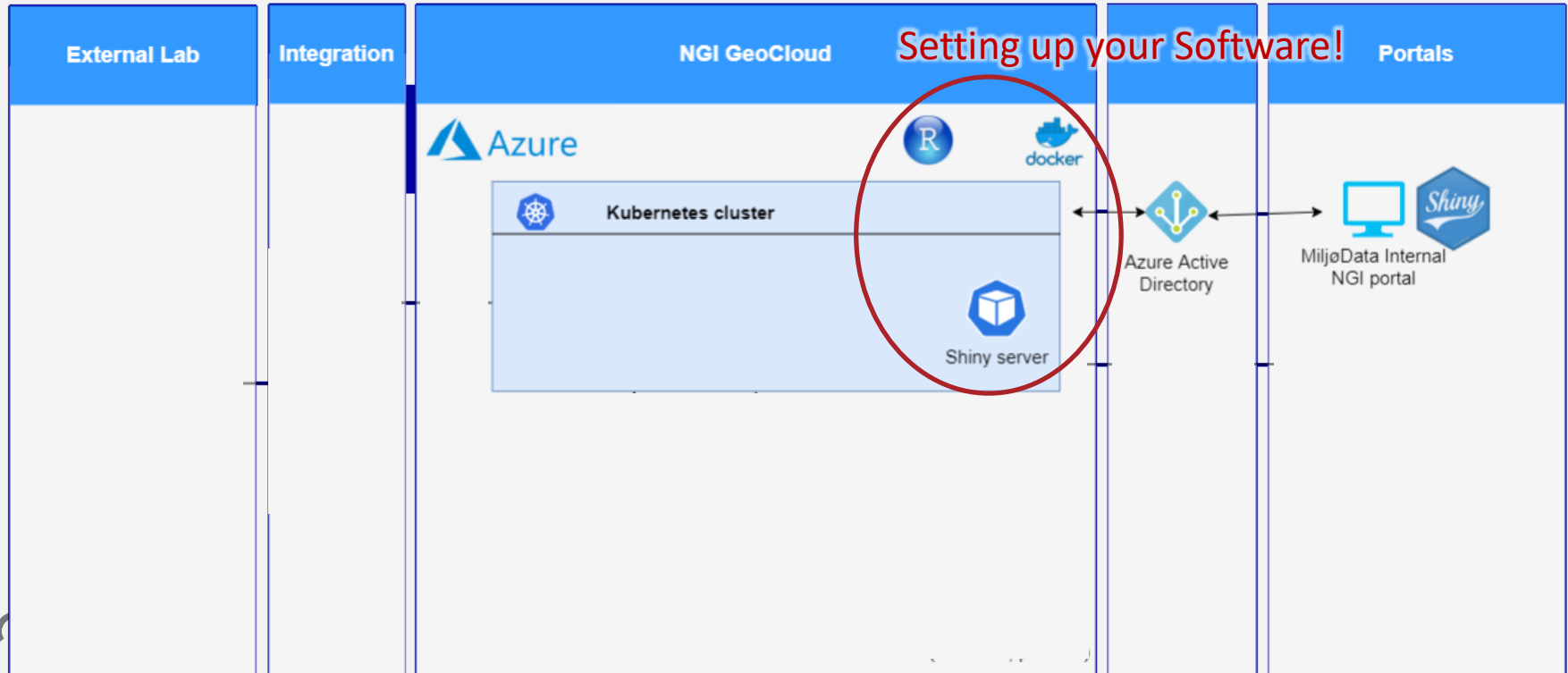
# Full-blown Production in Your Own Cloud!

➤ Build Your Own Shiny Server to Fit Your (picky) Needs!



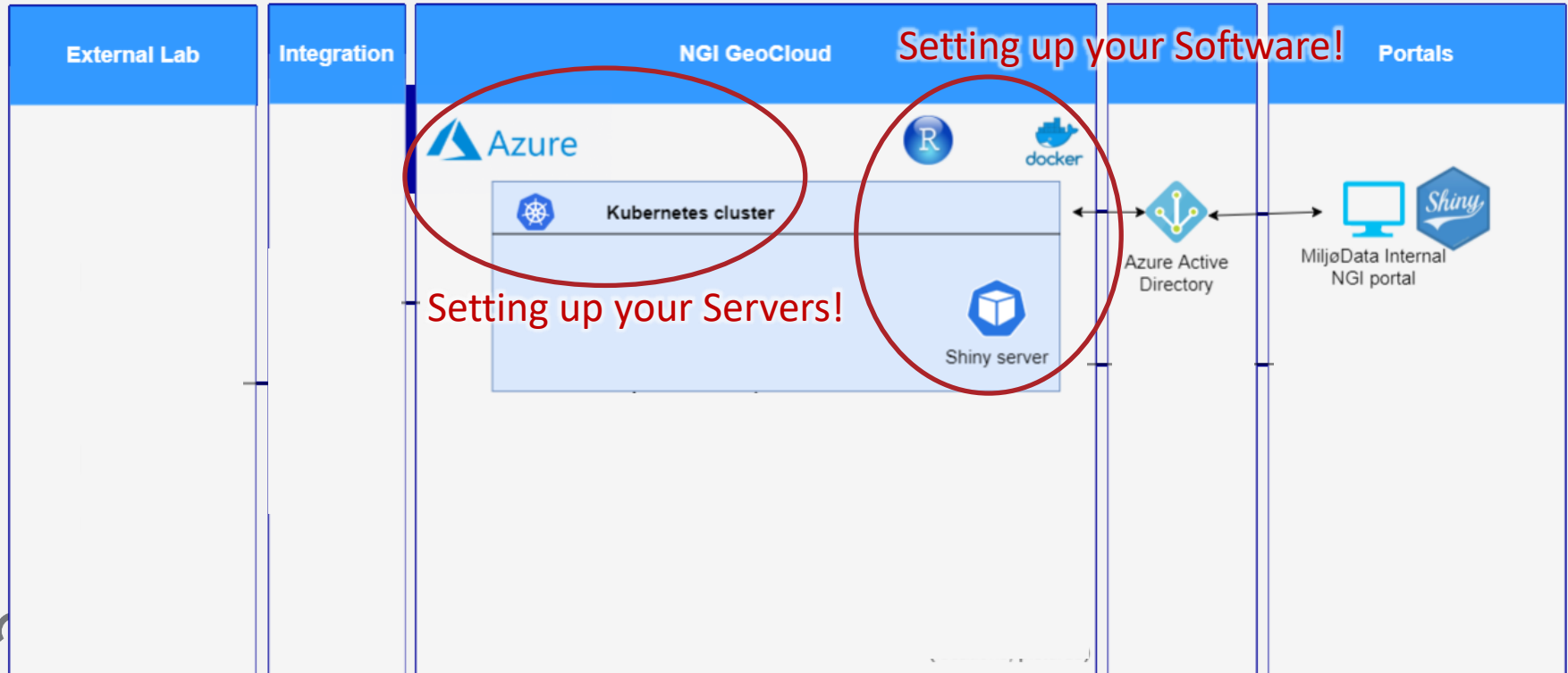
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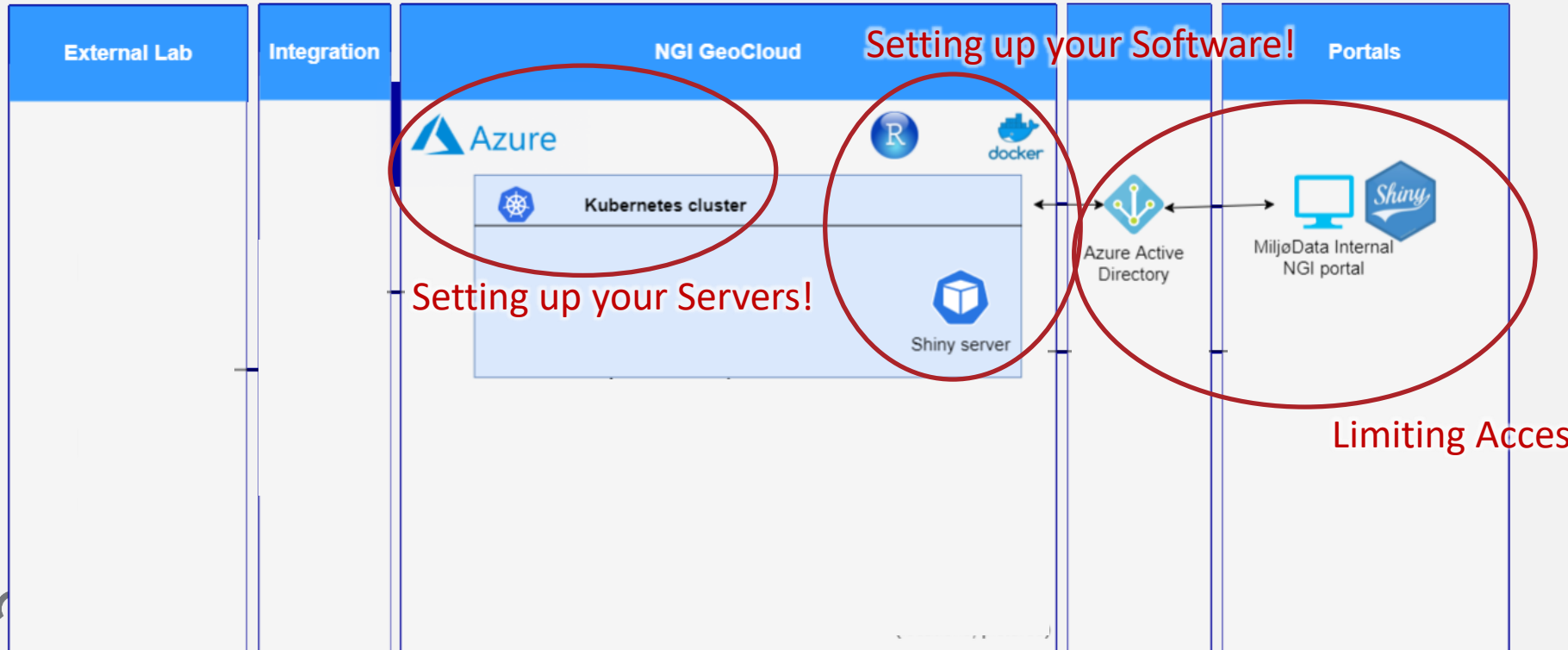
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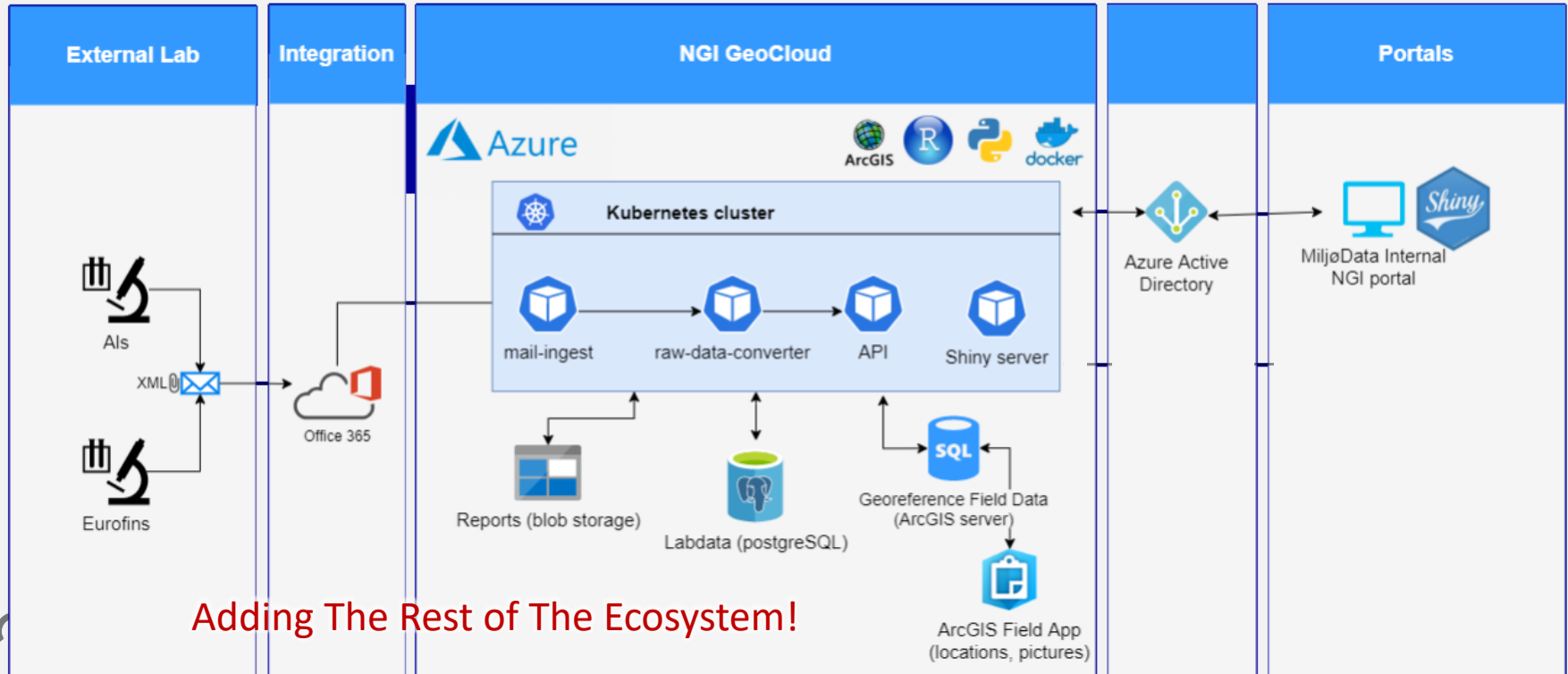
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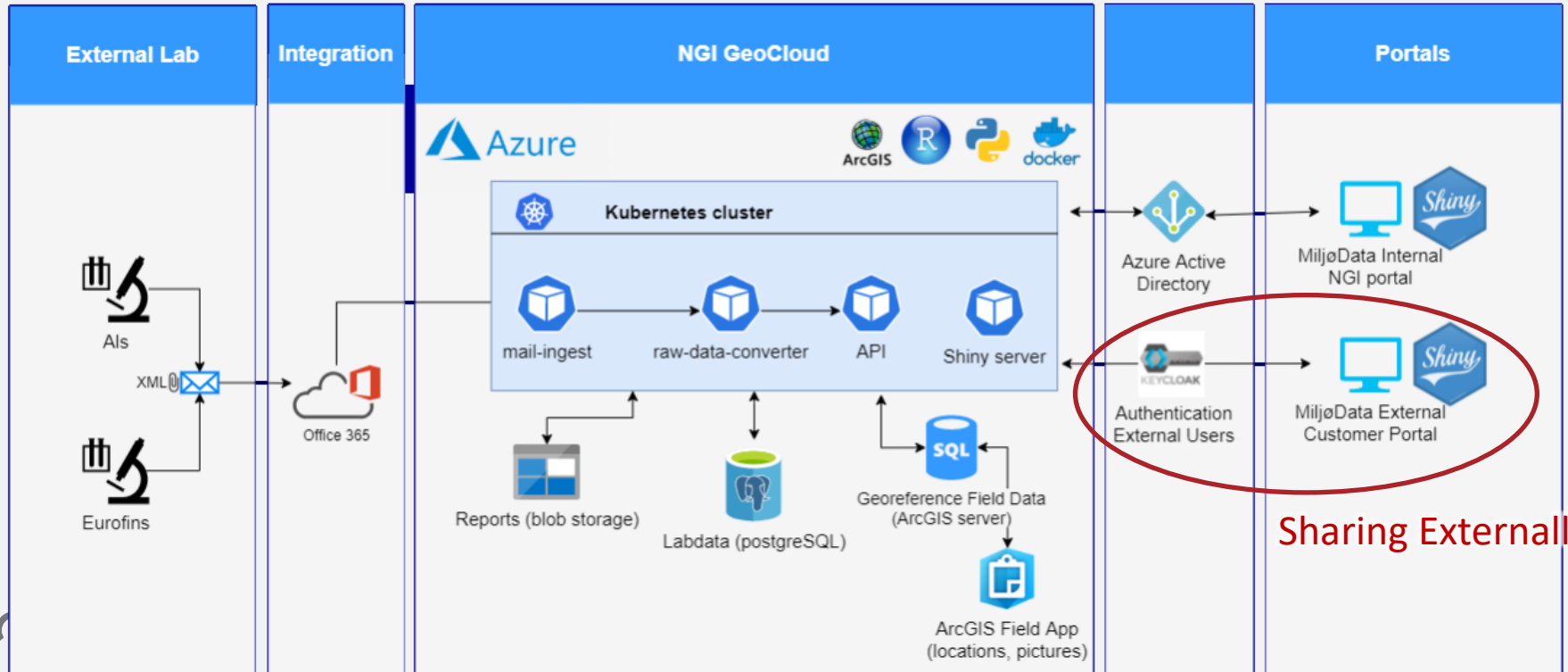
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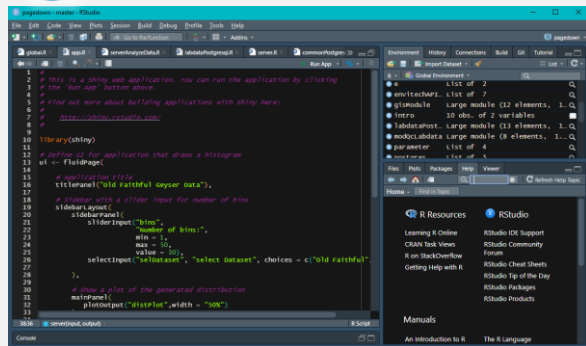
Adding The Rest of The Ecosystem!

# Full-blown Production in Your Own Cloud!

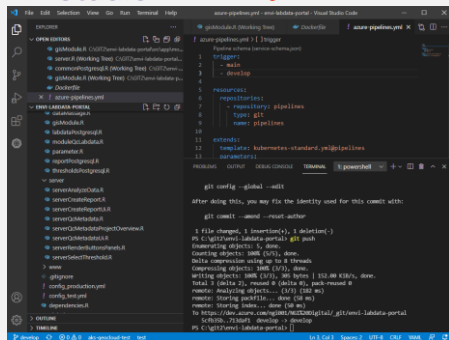
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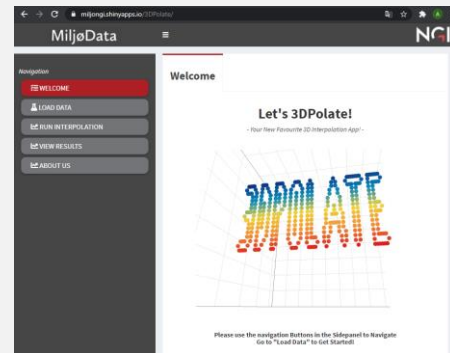
# Our Work Flow for App Development



*Develop App Locally  
- test and document*



*Push New Version to Repos  
- automatic build/deploy*



*Function Testing in Staging*



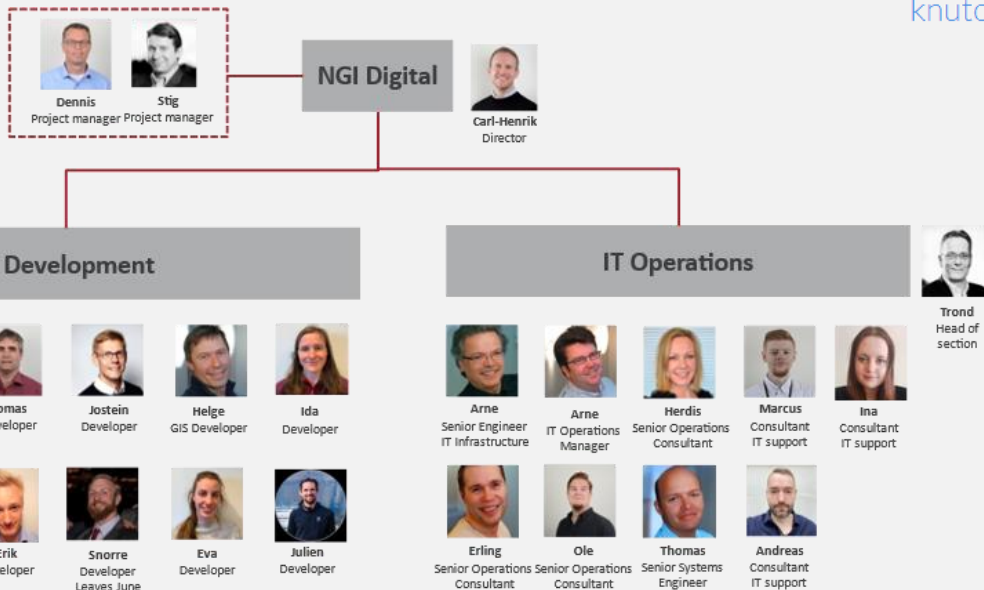
*New App in Production!!!*



# Monitoring Your App: Go see Your Friends!

## Mapic Consult
































[knutole@mapic.io](mailto:knutole@mapic.io)



### Other digital resources at NGI:

- 50-60 scientific developers
- 15-20 product owners
- 5-10 GIS expert users
- 15-20 parametric modelling and 3d model developers
- 10-15 IoT experts
- 75 employees on Datacamp

# Tech stack: Increase Your Productivity!

Language/frameworks	 C# / .NET	 Python	 R / Shiny	 React	 Next.js	 Vue	 Node.js	 TypeScript
DevOps - CI/CD	 Azure DevOps	 Azure Boards	 Azure Repos	 Azure Pipelines	 Azure Artifacts	 Azure Container Registry		
Data	 PostgreSQL	 Azure Storage Account / blob	 Azure IoT Hub	 Azure Logic Apps	 Azure Service Bus	 NATS	 Azure Keyvault	 Redis
Operations / monitoring	 Grafana	 Loki	 Prometheus	 Azure Monitor	 Sentry			
Infrastructure	 Docker	 Kubernetes	 Keycloak	 Azure Active Directory	 Azure Virtual Network			

# Tech stack: Increase Your Productivity!

**Language/frameworks**

- .NET Core
- C# / .NET
- Python

**DevOps - CI/CD**

- Azure DevOps
- Azure Boards

**Data**

- PostgreSQL
- Azure Storage Account / blob

**Operations / monitoring**

- Grafana
- Loki

**Infrastructure**

- Docker
- Kubernetes
- Keycloak
- Azure Active Directory
- Azure Virtual Network

**Monitoring Dashboard (envi-labdata)**

monitoring.ngapi.no/d/CRtjsPWGK/envi-labdata?orgId=1&refresh=5s&from=now-2d&to=now

Env / envi-labdata

Last 2 days

**Incoming emails**

Timestamp	Sender	Subject
2021-05-20 01:15:10	2021-05-19T23:15:10.300602676Z stdout	F processing completed: Eurofins XML
2021-05-19 11:45:06	2021-05-19T09:45:06.517677619Z stdout	F processing completed: EDD AL5-Workorder :
2021-05-19 01:15:14	2021-05-18T23:15:14.109788343Z stdout	F processing completed: Eurofins XML

**Memory Usage**

2.50 Mil  
2 Mil  
1.50 Mil  
1 Mil  
500 K  
0

05/19 00:00 05/19 12:00 05/20 00:00 05/20 12:00

envi-labdata-api  
envi-labdata-api-auth  
envi-labdata-converter  
envi-labdata-portal  
envi-labdata-portal-auth

**CPU Usage**

0.0300  
0.0200  
0.0100  
0

05/19 00:00 05/19 12:00 05/20 00:00 05/20 12:00

envi-labdata-api  
envi-labdata-api-auth  
envi-labdata-converter  
envi-labdata-portal  
envi-labdata-portal-auth

**Processing of Lab orders**

Timestamp	Sender	Subject
2021-05-20 01:15:18	2021-05-19T23:15:18.421388517Z stdout	F 2021-05-19 23:15:18,421:WARNING:root:LABC
2021-05-20 01:15:18	2021-05-19T23:15:18.421276715Z stdout	F 2021-05-19 23:15:18,421:WARNING:root:LABC
2021-05-20 01:15:18	2021-05-19T23:15:18.4165085847Z stdout	F 2021-05-19 23:15:18,416:WARNING:root:LABC
2021-05-20 01:15:18	2021-05-19T23:15:18.416392245Z stdout	F 2021-05-19 23:15:18,416:WARNING:root:LABC
2021-05-20 01:15:18	2021-05-19T23:15:18.416356345Z stdout	F 2021-05-19 23:15:18,416:WARNING:root:LABC
2021-05-20 01:15:18	2021-05-19T23:15:18.380410532Z stdout	F 2021-05-19 23:15:18,380:WARNING:root:LABC
2021-05-20 01:15:18	2021-05-19T23:15:18.380316931Z stdout	F 2021-05-19 23:15:18,380:WARNING:root:LABC
2021-05-20 01:15:18	2021-05-19T23:15:18.374956255Z stdout	F 2021-05-19 23:15:18,374:WARNING:root:LABC
2021-05-20 01:15:18	2021-05-19T23:15:18.374856953Z stdout	F 2021-05-19 23:15:18,374:WARNING:root:LABC
2021-05-20 01:15:18	2021-05-19T23:15:18.374782852Z stdout	F 2021-05-19 23:15:18,374:WARNING:root:LABC
2021-05-20 01:15:18	2021-05-19T23:15:18.244721986Z stdout	F 2021-05-19 23:15:18,244:WARNING:root:LABC
2021-05-20 01:15:18	2021-05-19T23:15:18.244661197Z stdout	F 2021-05-19 23:15:18,244:WARNING:root:LABC
2021-05-20 01:15:18	2021-05-19T23:15:18.24457596Z stdout	F 2021-05-19 23:15:18,244:WARNING:root:LABC
2021-05-20 01:15:18	2021-05-19T23:15:18.244484593Z stdout	F 2021-05-19 23:15:18,244:WARNING:root:LABC
2021-05-20 01:15:18	2021-05-19T23:15:18.244351793Z stdout	F 2021-05-19 23:15:18,244:WARNING:root:LABC
2021-05-20 01:15:18	2021-05-19T23:15:18.244257591Z stdout	F 2021-05-19 23:15:18,244:WARNING:root:LABC

**Messages in queue**

1  
0.500  
0  
-0.50

2021-05-20 09:11:37 2021-05-20T07:11:37.725821299Z stdout F 2021-05-20 07:11:37,724:WARNING:root:St

# Tech stack: Increase Your Productivity!

The screenshot displays a web application dashboard with a sidebar menu on the left and a main content area. The sidebar menu includes sections for Language/frameworks, DevOps - CI/CD, Data, Operations / Dev, and Infrastructure, each with several sub-items. The main content area shows the 'Issues' section for the 'envi-labdata-api' environment, filtered by 'All Unresolved' issues. It lists two issues: 'UnprocessableEntity' and 'Forbidden', both marked as 'Unhandled'. The 'Forbidden' issue is highlighted with a red circle. Below the issues list, the text 'Catching and Handling Errors!' is displayed in red. The bottom of the dashboard features a 'Tech stack' section with logos for various services: Docker, Kubernetes, Keycloak, Azure Active Directory, Azure Virtual Network, Azure Container Registry, Azure Keyvault, and Redis. The Sentry logo is circled in red.

Language/frameworks

- Projects
- Issues
- Performance
- Releases
- User Feedback

DevOps - CI/CD

- Alerts
- Discover
- Dashboards

Data

- Activity
- Stats
- Settings

Operations / Dev

- Upgrade Now
- Help
- What's new

Infrastructure

envi-labdata-api

All Environments

Last 14 days

## Issues

All Unresolved 2 For Review Ignored Saved Searches

is:unresolved

Sort by: Last Seen

		EVENTS	USERS	ASSIGNEE
<input type="checkbox"/>	Resolve	Ignore	Mark Reviewed	
<input type="checkbox"/>	UnprocessableEntity	labordersapi		
422 Unprocessable Entity: The request was well-form...		8	0	
ENVI-LABDATA-API-2 Unhandled 6d ago   6mos old				
<input type="checkbox"/>	Forbidden	projectapi		
403 Forbidden: You don't have the permission to acce...		16	0	
ENVI-LABDATA-API-N Unhandled 1wk ago   1mo old				

Showing 2 of 2 issues

## Catching and Handling Errors!

API Docs Contribute

Docker

Kubernetes

Keycloak

Azure Active Directory

Azure Virtual Network

Azure Container Registry

Azure Keyvault

Redis

Sentry

# Thank you for listing!

- **NGI are hiring**, please send me an e-mail if you wanna hear more!
- Presentation and Code: [github.com/smebotand](https://github.com/smebotand)







#påsikkergrunn