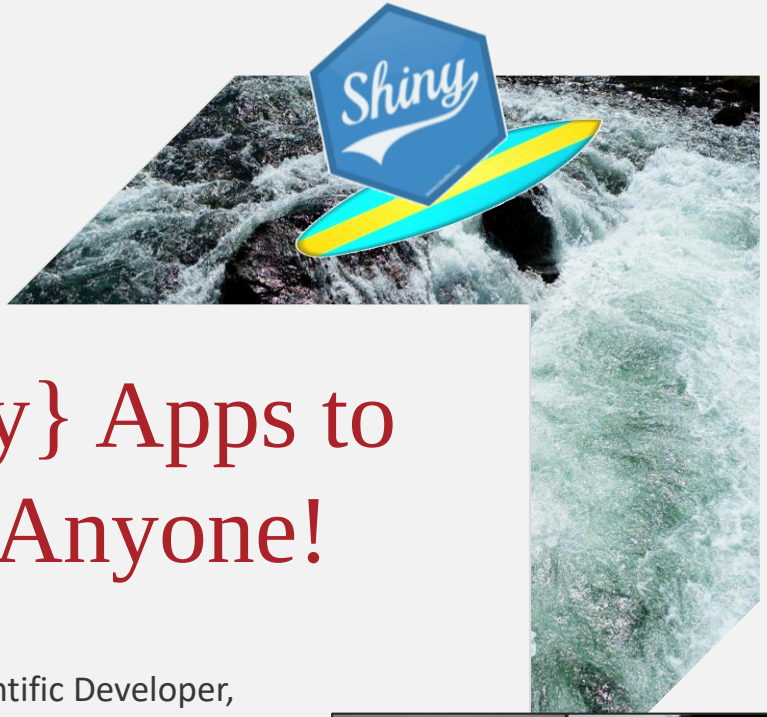
NGI NIBIO




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

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

**Andreas Botnen Smebye**, Environmental Chemist and Scientific Developer,
Norwegian Geotechnical Institute

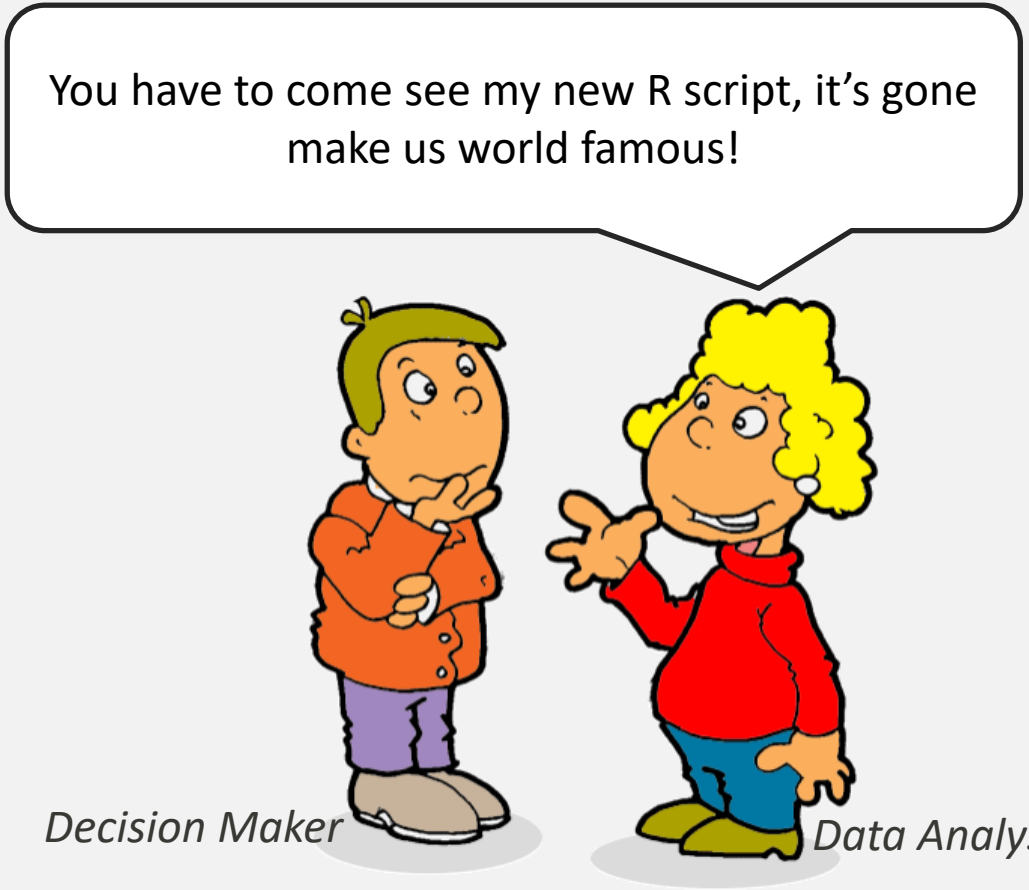
**PhD Christian Wilhelm Mohr**, Researcher,
Department of Forest and Climate, NIBIO

# What we got to offer you this evening!

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


NGI

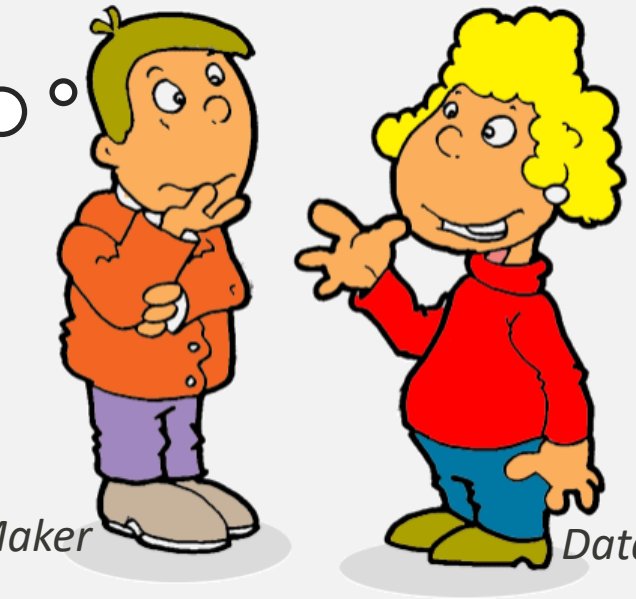
# Why Shiny?


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*

NGI

# Why Shiny?


Push that Button!
Ahh… a Regular Web Browser,
Now We're Talking!
Shiny.com
Run Model
Data Analyst
Decision Maker

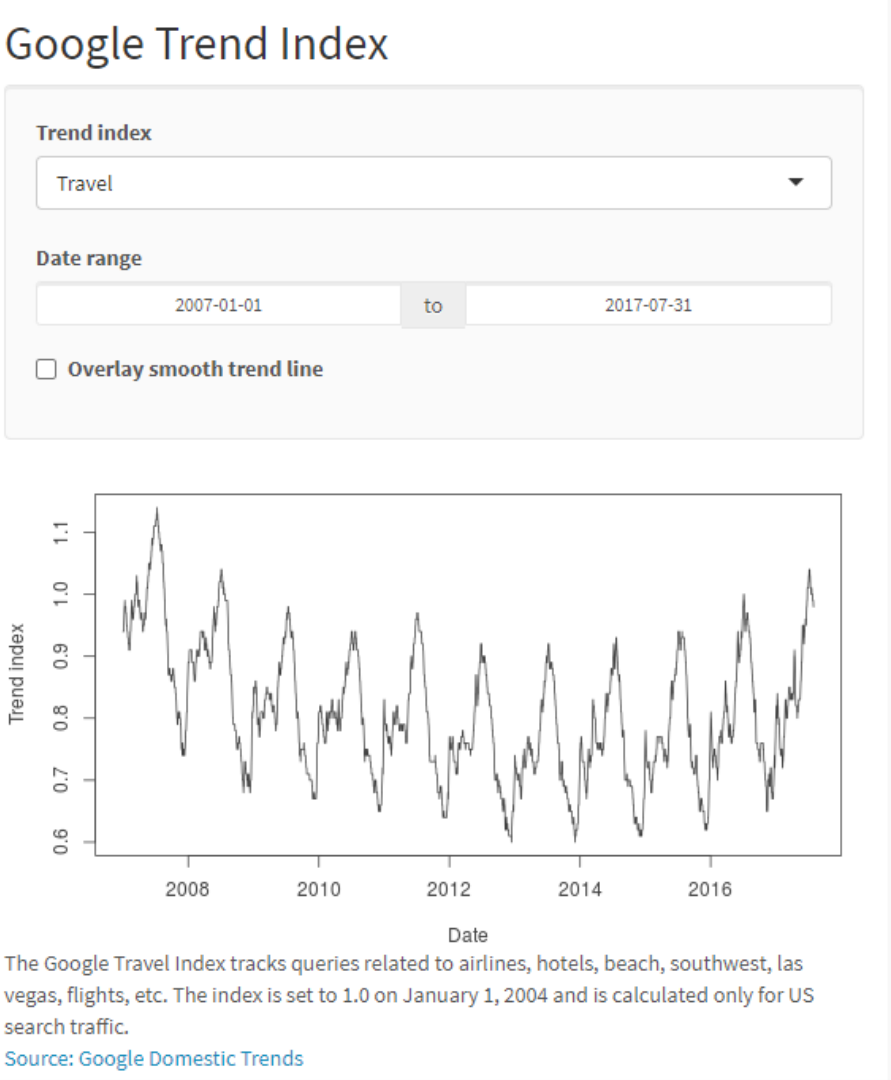
# What is Shiny?

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

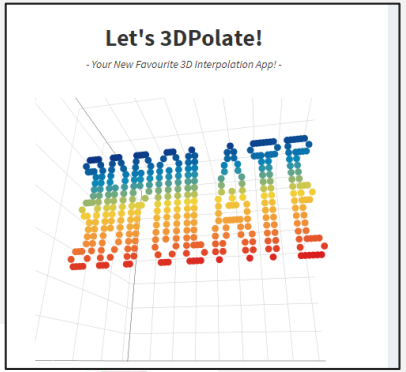

NGI

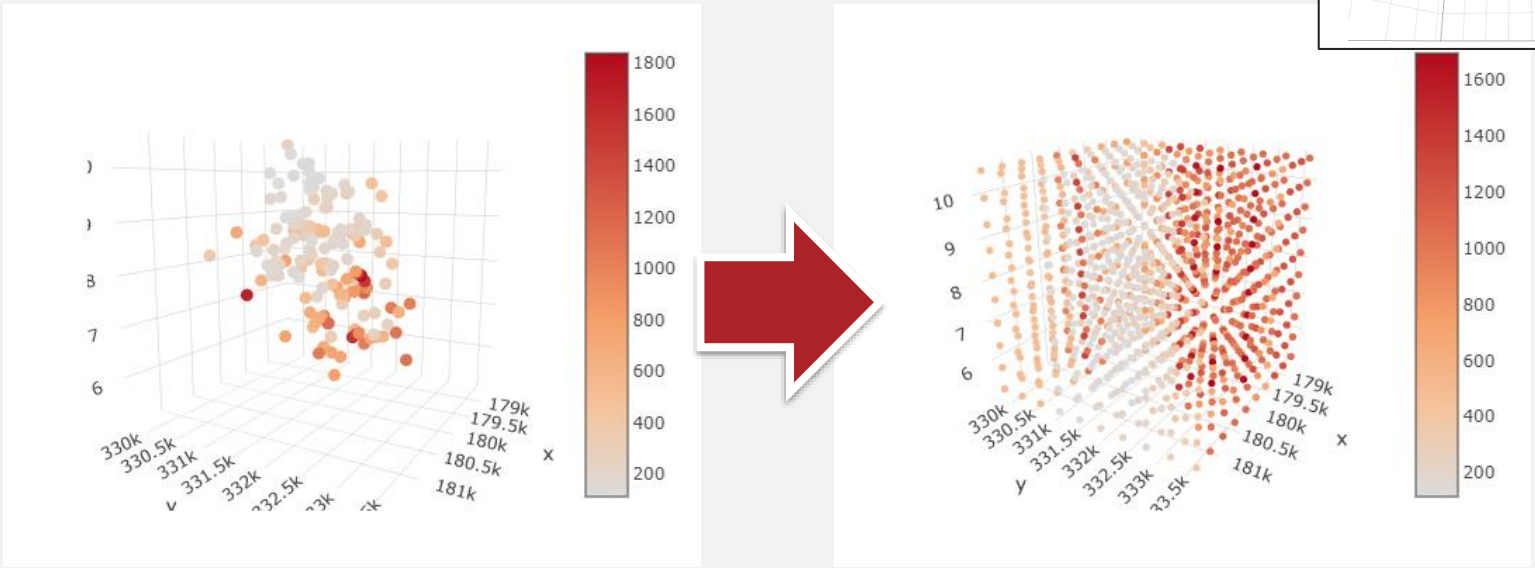
# Shiny: The consept

- 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



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

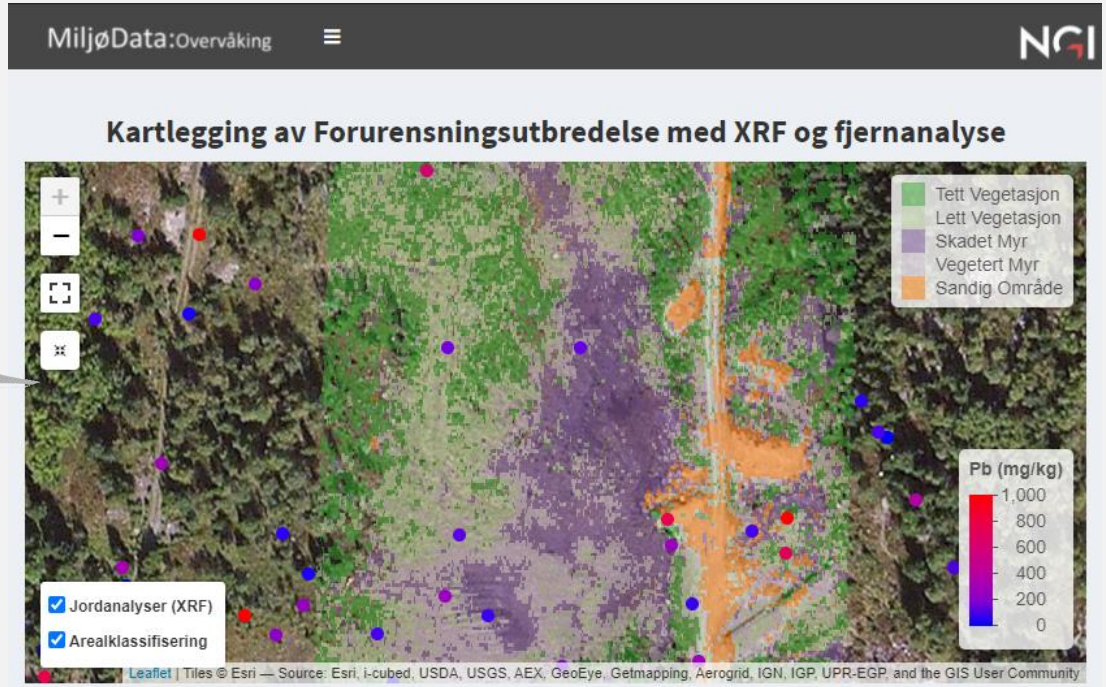



https://miljongi.shinyapps.io/3DPolate/

# Demo: *Mapping and Risk Assessment of Polluted Sites*

*Data collected with drones with multispectral imaging*



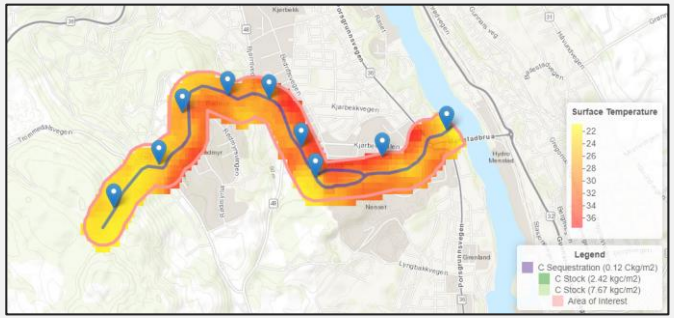

NGI

https://www.ngi.no/Prosjekter/Nye-verktoey-og-metoder-for-risikovurdering-og-tiltak-ved-skytebaner-med-Forsvarsbygg
http://miljo.ngi.no/Steinsjoen/

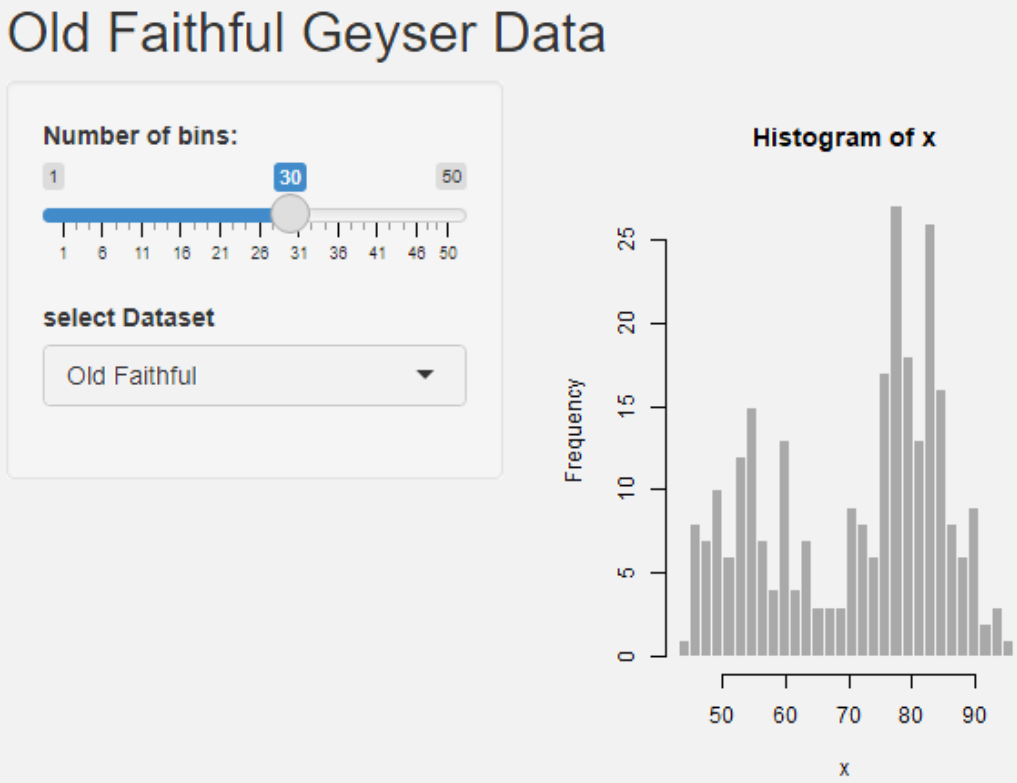
# Some other Use Cases

- Prototyping: Live Sensor Data
  - With logger producer Libelium
- Satelite Data vs Ecoystem Services
  - Assesing carbon storage and land surface temperature

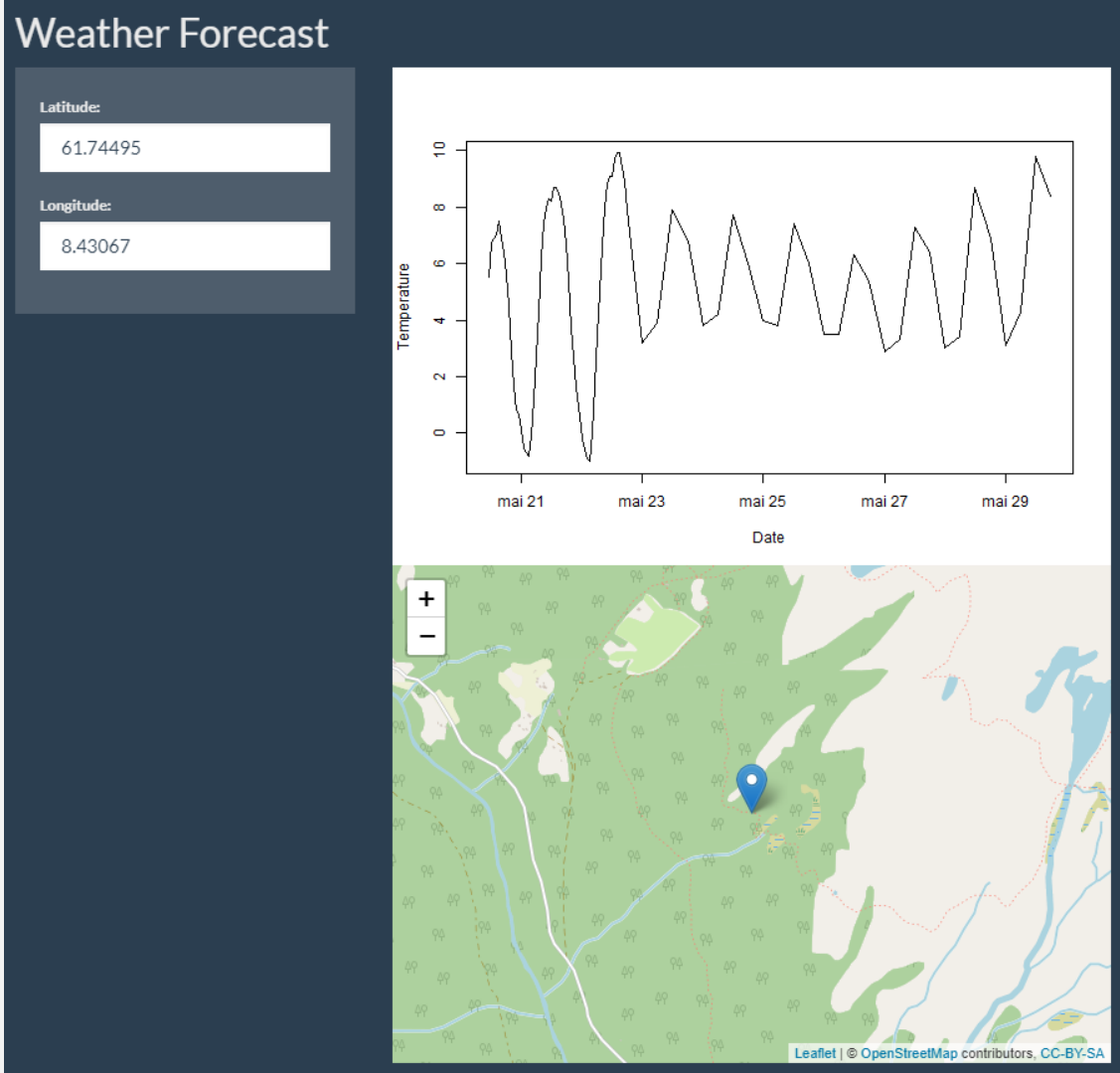
  http://miljo.ngi.no/natwip
- Teaching




# Time to create «The First App»!



# «The Second App»!



# 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)!

NGI

# What is Production?


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

*J. Cheng, CTO RStudio on shiny in Production:*
https://www.rstudio.com/resources/rstudioconf-2019/shiny-in-production-principles-practices-and-tools/

# What is Production?

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


*J. Cheng, CTO RStudio on shiny in Production:*
https://www.rstudio.com/resources/rstudioconf-2019/shiny-in-production-principles-practices-and-tools/

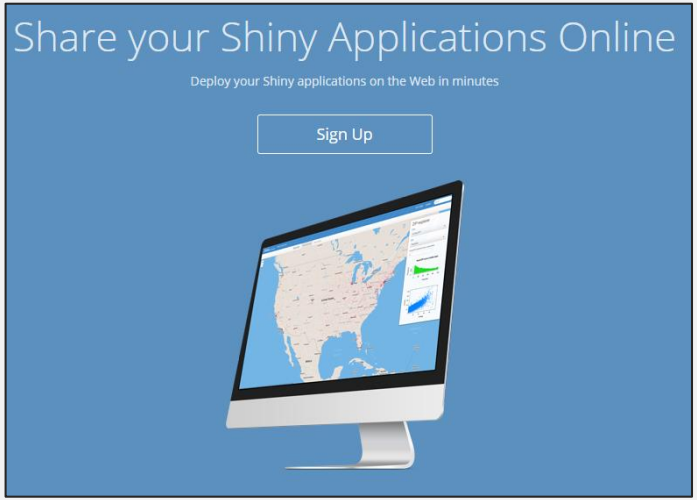
# Goals for Production


- **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 userfriendlyness*

*J. Cheng, CTO RStudio on shiny in Production:*
https://www.rstudio.com/resources/rstudioconf-2019/shiny-in-production-principles-practices-and-tools/

# How to get into production?

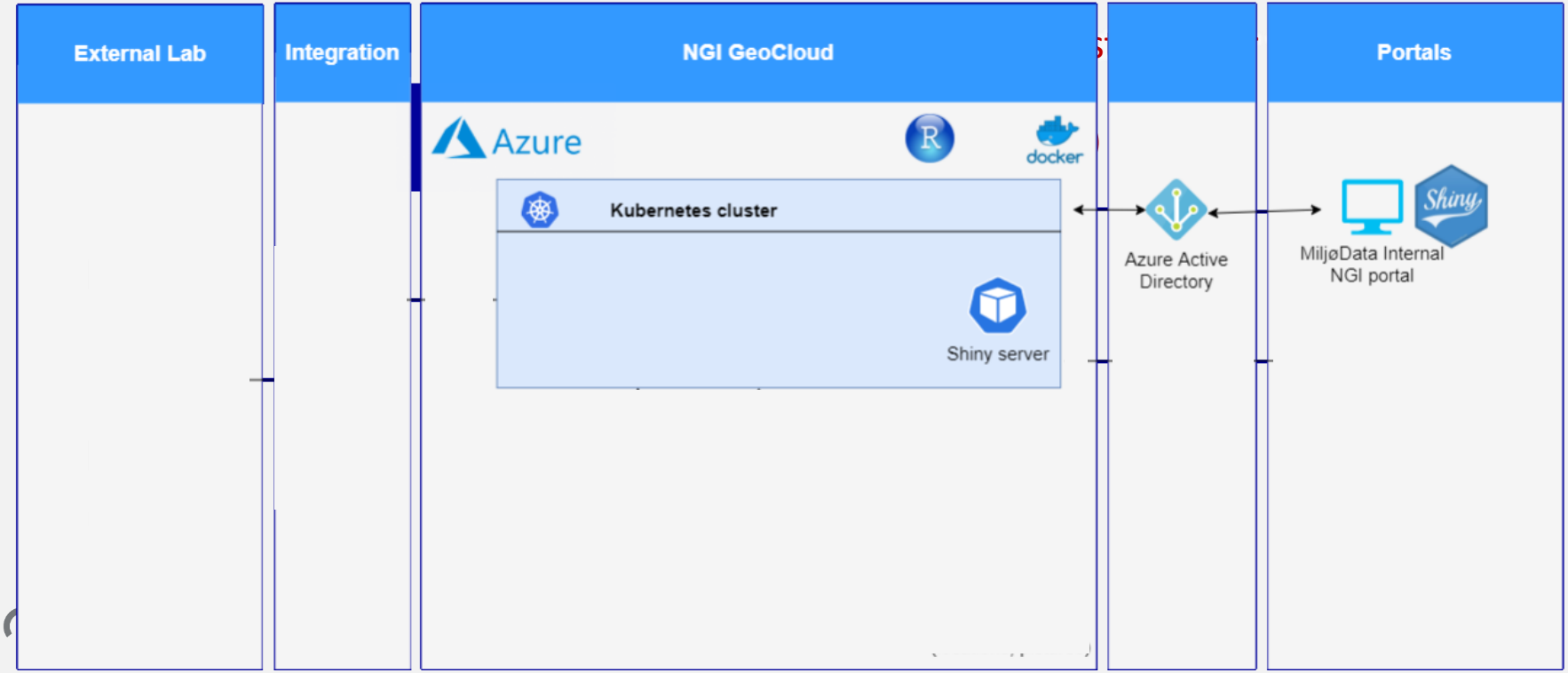

- If you can, use free* hosting @ shinyapps.io
- NGI are a proud **paying** customer of RStudio
- Pros
  - Robust hosting environment (scaling etc)
  - Easy to meet goals (monitoring, staging etc)
  - Low costs and low maintainance
- Cons
  - Integrations towards other services
  - Multifactor authentication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




NGI

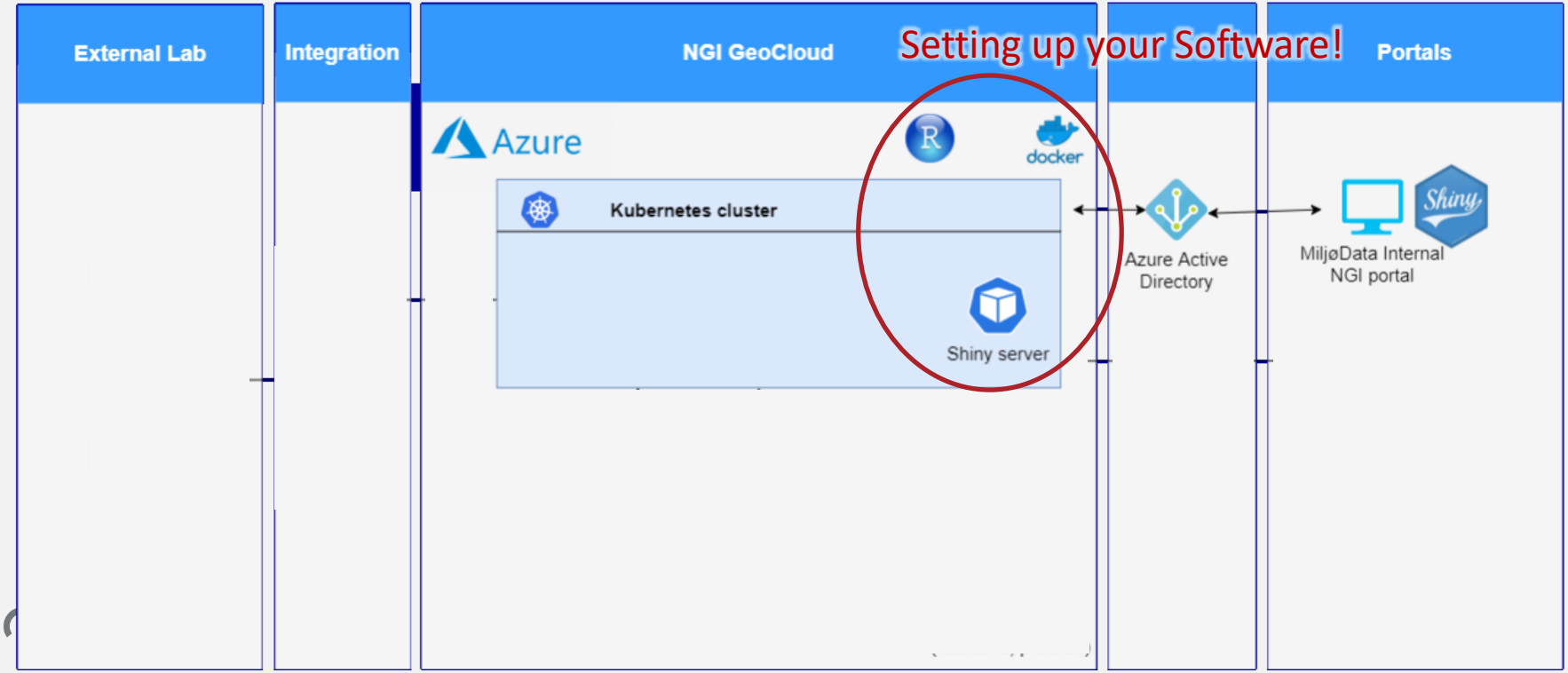
# Full-blown Production in Your Own Cloud!

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



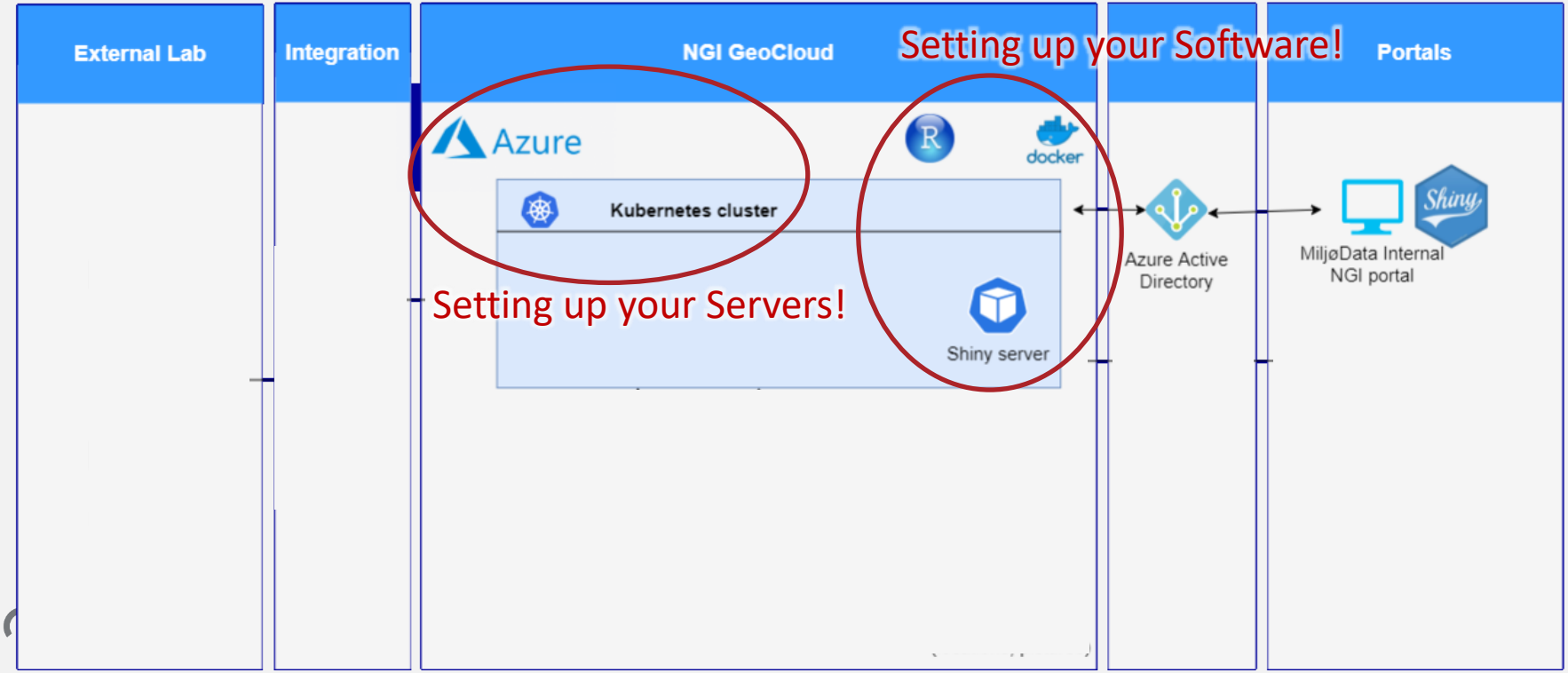
# Full-blown Production in Your Own Cloud!

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



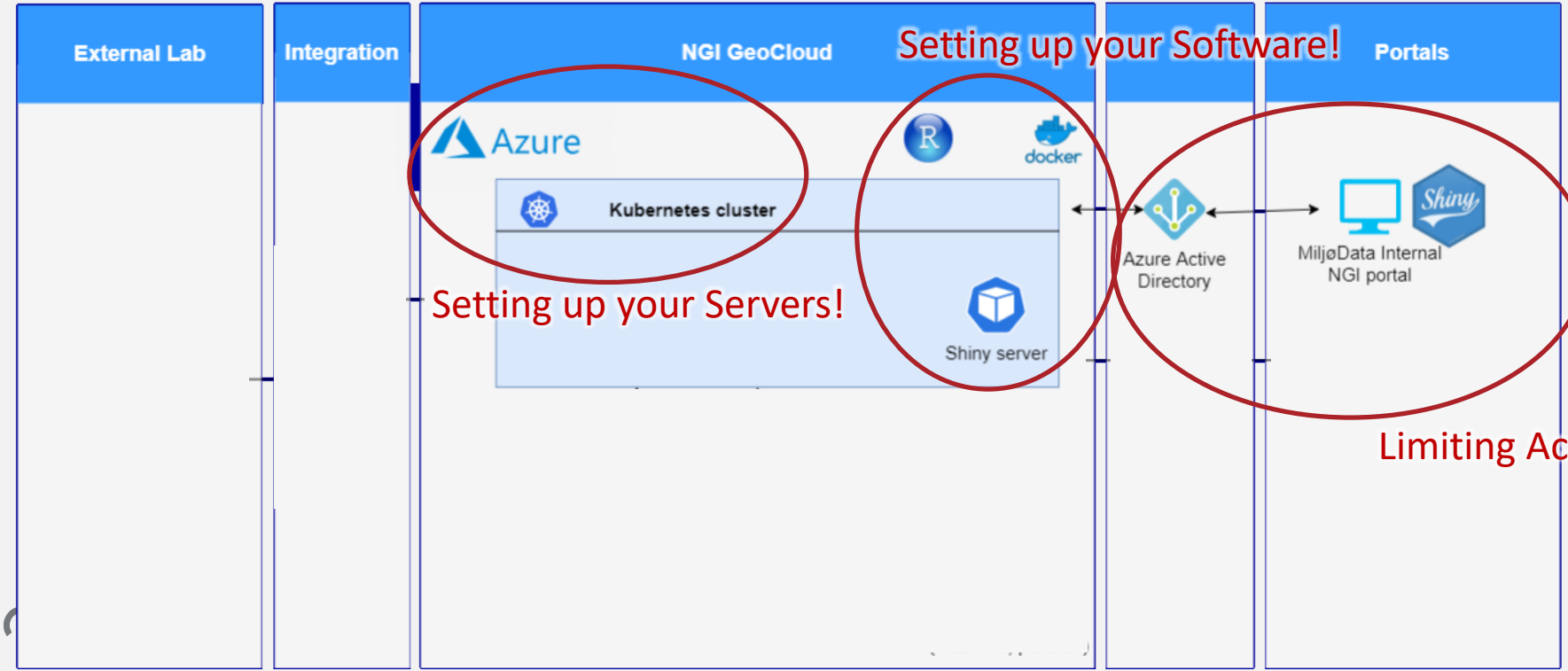
# Full-blown Production in Your Own Cloud!

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



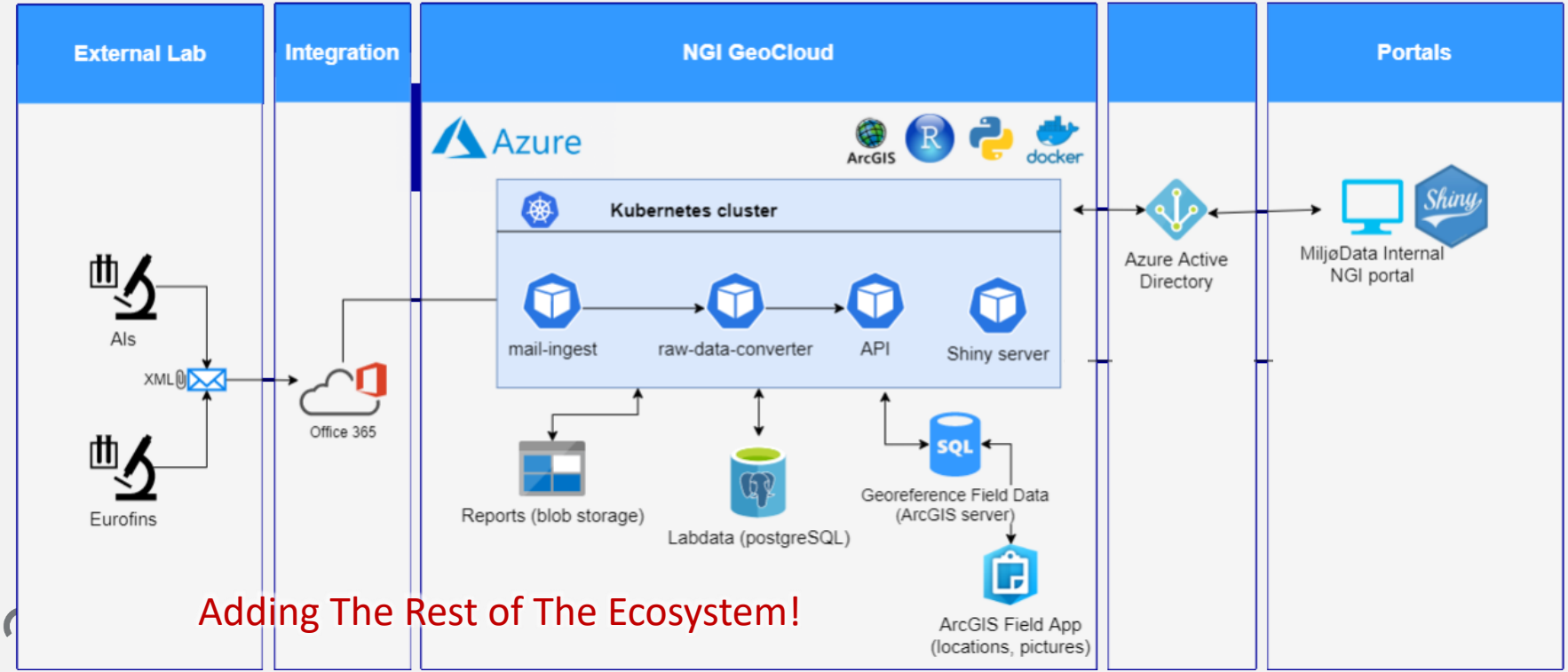
# Full-blown Production in Your Own Cloud!

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



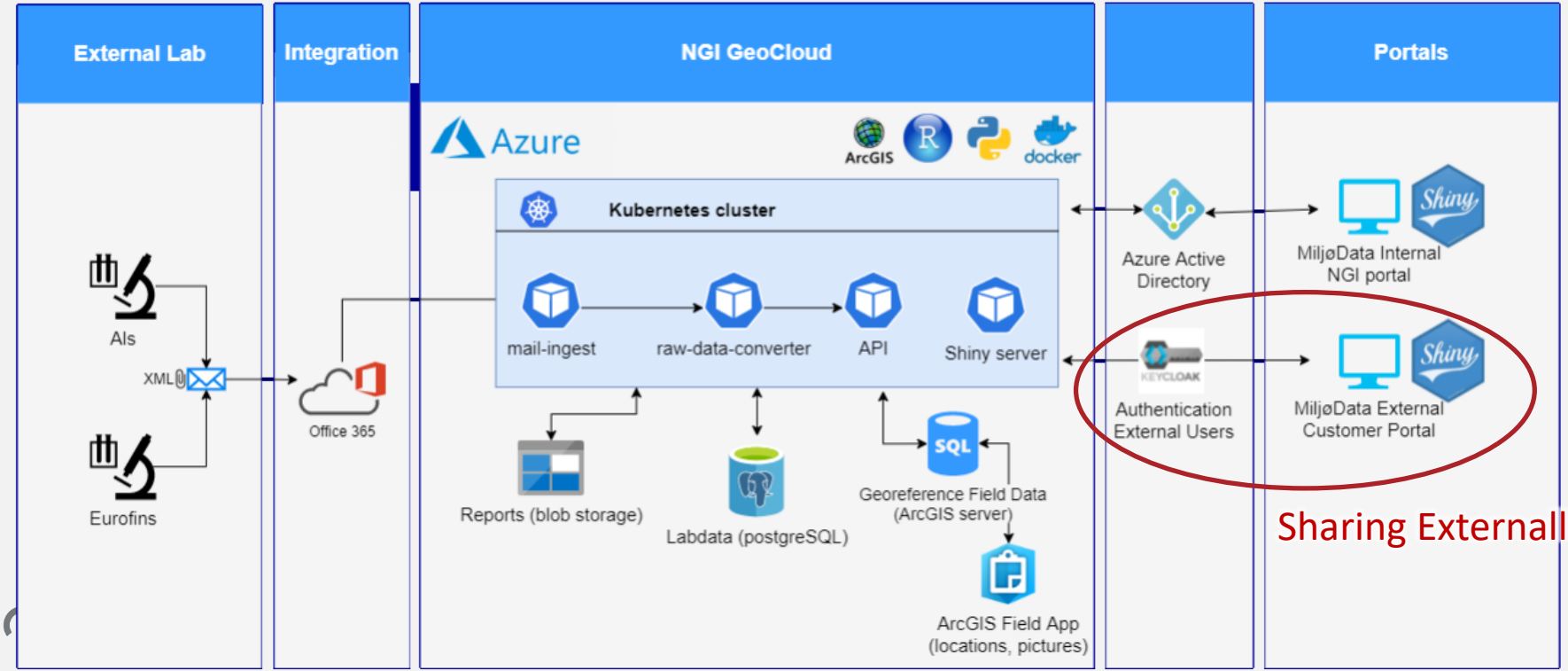
# Full-blown Production in Your Own Cloud!

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

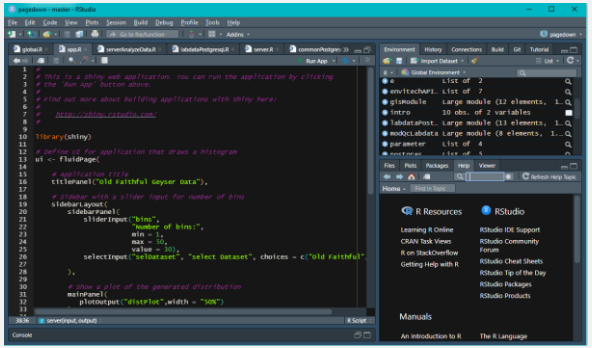


# Full-blown Production in Your Own Cloud!

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

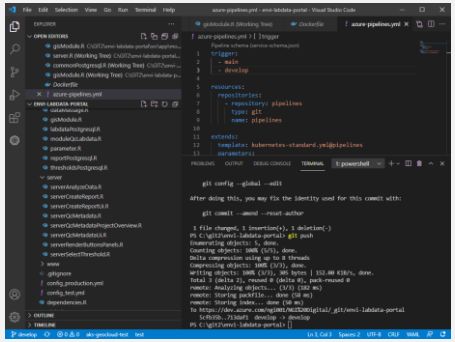


# Our Work Flow for App Development



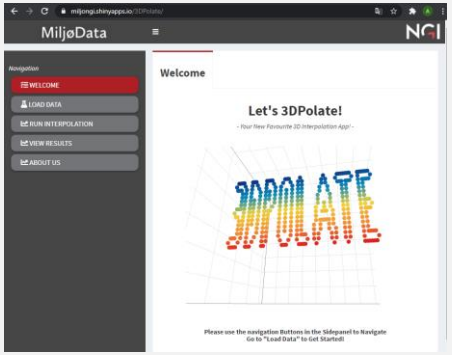
*Develop App Locally*

*- 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


**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

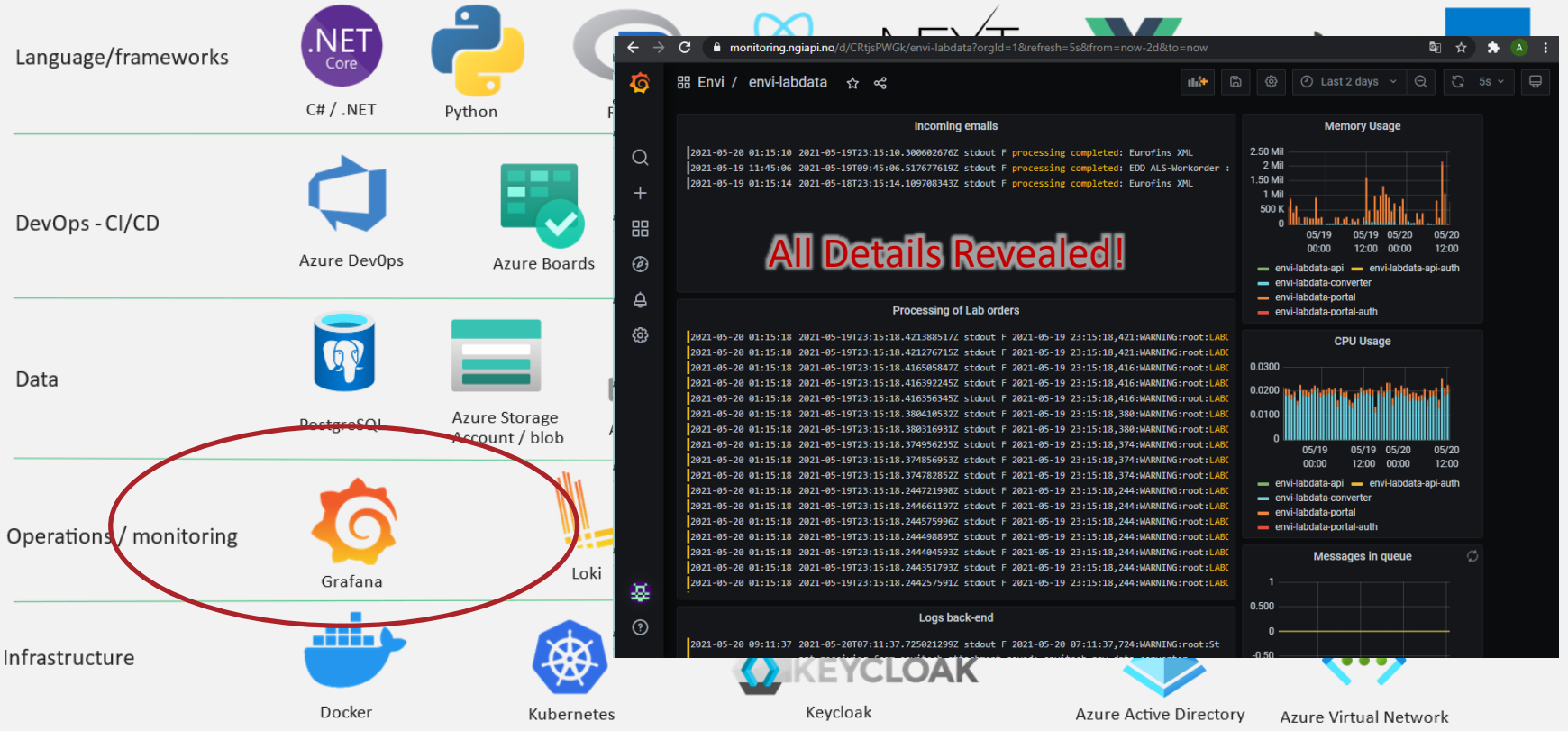
NGI

# Tech stack: Increase Your Productivity!

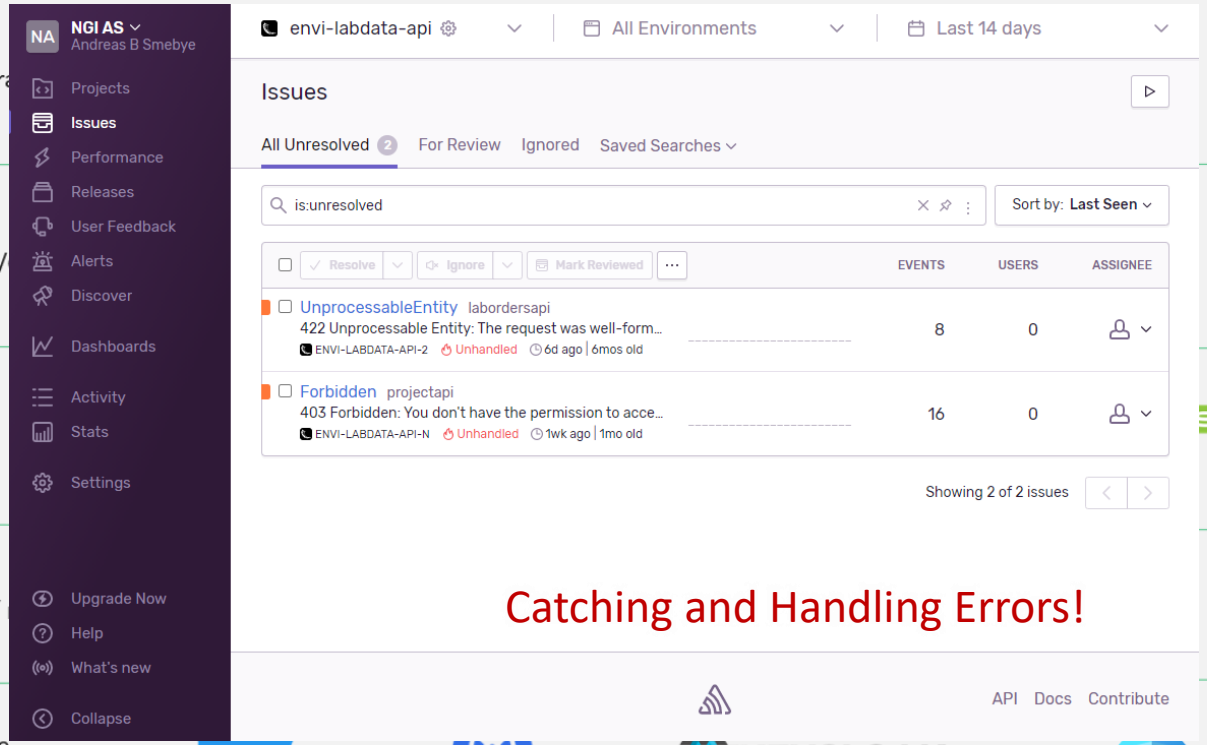
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Language/frameworks |  C# / .NET |  Python |  R / Shiny |  React |  Next.js |  Vue |  Node.js |  TypeScript |
| DevOps - CI/CD |  Azure DevOps |  Azure Boards |  Azure Repos |  Azure Pipelines |  Azure Artifacts |  Azure Container Registry | | |
| 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 | | | |

NGI

# Tech stack: Increase Your Productivity!



# Tech stack: Increase Your Productivity!




Catching and Handling Errors!

Language/fra

DevOps - CI/

Data

Operations /

Infrastructure

Node.js

TypeScript

Azure Container Registry

Azure Keyvault

Redis

Sentry

Docker

Kubernetes

Keycloak

Azure Active Directory

Azure Virtual Network

NGI

# Thank you for listing!

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


NGI

#påsikkergrunn

NORGES GEOTEKNISKE INSTITUTT
NGI.NO