



ARCTIC PORTAL.org

ARC DATA

**Expert IT Development & Data Management**  
**Introduction to the Arctic Portal IT team!**

April 2023.

halldor@arcticportal.org

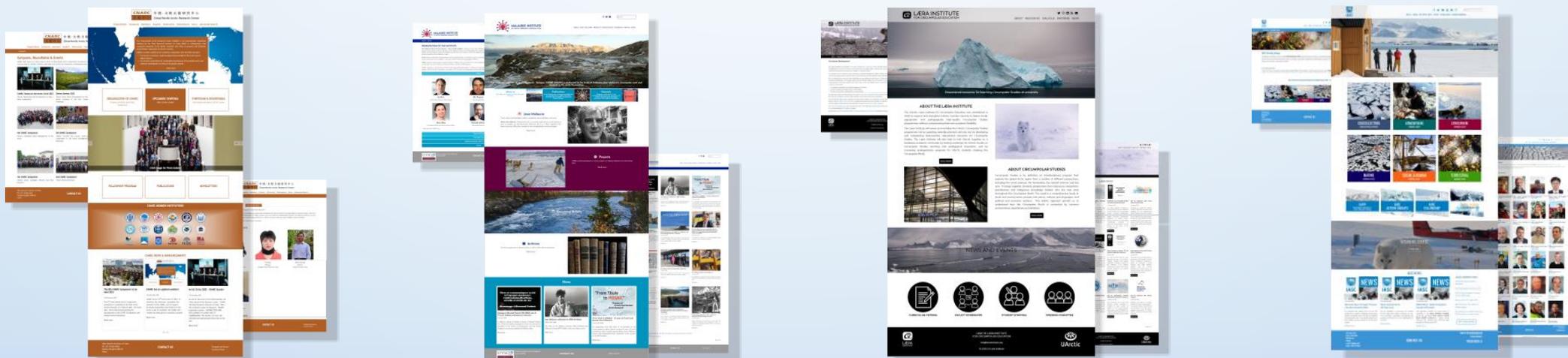


# ARCTIC PORTAL.org

A division of and the outreach name of Arctic Foundation

**Consulting and Outreach - The Gateway to Arctic Information and Data – [www.arcticportal.org](http://www.arcticportal.org)**

- ✓ AP is one of the most-established organizations in Arctic-related outreach, communication, consulting, mapping and data systems in a Global context. Officially registered Media.
- ✓ AP is actively involved in stakeholder engagement, policy making, planning and advising at local, regional and international levels with over 20 years of experience.
- ✓ AP provides IT services, design, hosting and long-term support to multiple international organizations, institutions, networks and participates in projects of Arctic and Global relevance.



# Expert IT Development, Outreach Data Management & Systems

Registered LTD company in good standing in Iceland



- IT System design and consulting services
- Mapping and Data Management Systems
- Consulting, Hosting and Outreach Services
- Backend and Frontend specialists
- Data Presentation
- Data Analysis

Provider of expert IT development, data management and consulting services focusing on specialized collection, processing, evaluation, interpretation and presentation of information and data through specialized communication products and tools with related consulting services for business, governments, policymakers, educators and organizations. Highly experienced, professional and scalable team.

Participating in international cooperation on data systems, management, metadata, and standards and actively developing systems, tools and service protocols, providing data, data presentation and data interpretation services.

## Development Methodologies

At Arctic Portal we have used various methodologies depending on the project size and developer count. The following are examples of their use.

- **SCRUM** During the Arctic Risk collaboration, the meetings were SCRUM-like, where new development tasks were set up, we motivated each other and demoed our progress. The intervals started off once per week, but approaching release date / phase end, everyday or even twice a day. Separate meetings were held for technical, communication, design, etc.
- **Pair Programming** Since late 2022, Anseok and Mateusz have been pair programming for the Arctic Business Directory project.
- **Waterfall** We partnered in the GTN-P project where the software component was only one of multiple work packages. The project management was done most similarly to the waterfall model with deliverables specified. Internally, we held weekly meetings demoing the progress.

We like certain aspects of SCRUM, such as frequent meetings to validate (demo) and motivate progress. Also, pair programming has worked out well for us, especially when debugging.

We feel that as important as the choice of the development methodology is the competence of the project manager: the ability to motivate and glue team(s) together, document every development phase, assign reasonable tasks, ability to quickly understand and go through problems and solutions.



## Tools we use to support development

### Task organizers

- *Taskade* - collaborative outliner; we use it to plan work and to take meeting notes, which makes the work progress self-documenting
- *Github's Projects* - github issues organizer; tasks can be assigned, organized and solved by commit/merging using git commands. Participants can view, add comments, and tags

### Communication channel

- *Discord* - organized channels for text messages, voice & video calls, screen sharing; its original target users were gamers, but it is increasingly being used by other organisations, especially development teams
- *Slack* - organized text communication channels (limited in free plan), video calls (not free)

### Meetings

- *Zoom* - like Discord, but only for calls and can be scheduled
- *MS Teams* - like Slack, but can also upload documents

### Other

- *tmux* - terminal multiplexer for concurrent access to terminal sessions; used for remote pair programming



## Development tools we comfortably use / prefer using

The tools we prefer are *in red*.

**GIS:** PostGIS, GeoServer, GeoDjango, OpenLayers, Cesium

**DB:** PostgreSQL, MySQL / MariaDB

**Backend:** Django (old ABD), FastAPI (new ABD),  
Wagtail CMS (Django) + GraphQL (ArcticRisk)

**Frontend:** AngularJS, Angular, React, Gatsby

**Wireframe:** Figma, Penpot

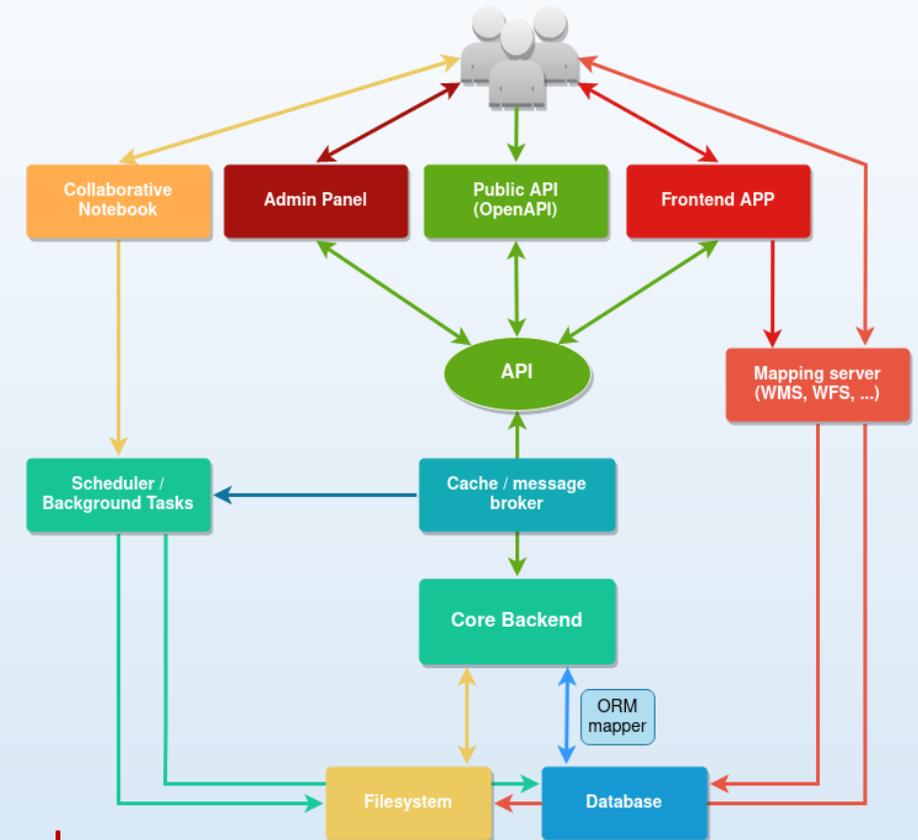
**Other:** Jupyter Notebook, Celery

**Communication:** MStTeams, Slack, Discord

**CMS:** Most of our “standard” websites are developed in Joomla.

For the most part, no preference; we pick most appropriate toolset before each project.

Anseok prefers Angular over React due to maintainability and adherence to Model-View-Controller (MVC) pattern.





## IT Security

### Standard

We have been looking into implementing ISO/IEC 27001 since 2021 as public tenders increasingly expect ISO/IEC 27001 certification from the supplier. As it has not been a pressing issue for us with our current project portfolio we have not yet started the auditing / certification process or have done penetration testing but are ready to do so asap if client requires.

### Firewall

Our ports exposed to the outside are HTTP and HTTPS ports generally, 8080 on GeoServers, IMAP and SMTP ports on the mail server. OpenVPN port on the VPN server, and SSH port on a single ssh server only loginable with RSA key pairs. All other ports are kept closed by firewall managed by the ISP. On the software-side, we use Fail2ban and custom ModSecurity rules.

### Physical Security

Our physical servers are located at a premise monitored by security cameras, motion and fire sensors and private security. We also use cloud server services for extra backup and to secure uptime of our web services.

### Backup & Updates

We make daily DB and weekly file backups. The hosted websites' CMS frameworks are kept up to date.

Non-updatable websites (due to dependence on outdated libraries) are hosted on dedicated web and DB servers isolated from the rest of the network.

Data that are not restricted to be kept on our servers are also backed up to a cloud service, currently in continental Europe.



## Github workflow, CI/CD pipelines & container orchestration

Recent project that required cloud deployment was Arctic Risk. With our colleagues we set up the automated system for deployments and cloud resources monitoring (we describe here Django's).

Project tiers were divided into three categories:

- Local (Docker Compose) - local development, usually spawned new git branches to develop locally
- Staging (Kubernetes) - testing env, "develop" branch reflects code, push or pull request triggers Github Actions
- Production (Kubernetes) - production env, "main" branch reflects code, push or pull request triggers Github Actions

Automatic build steps on Github Actions:

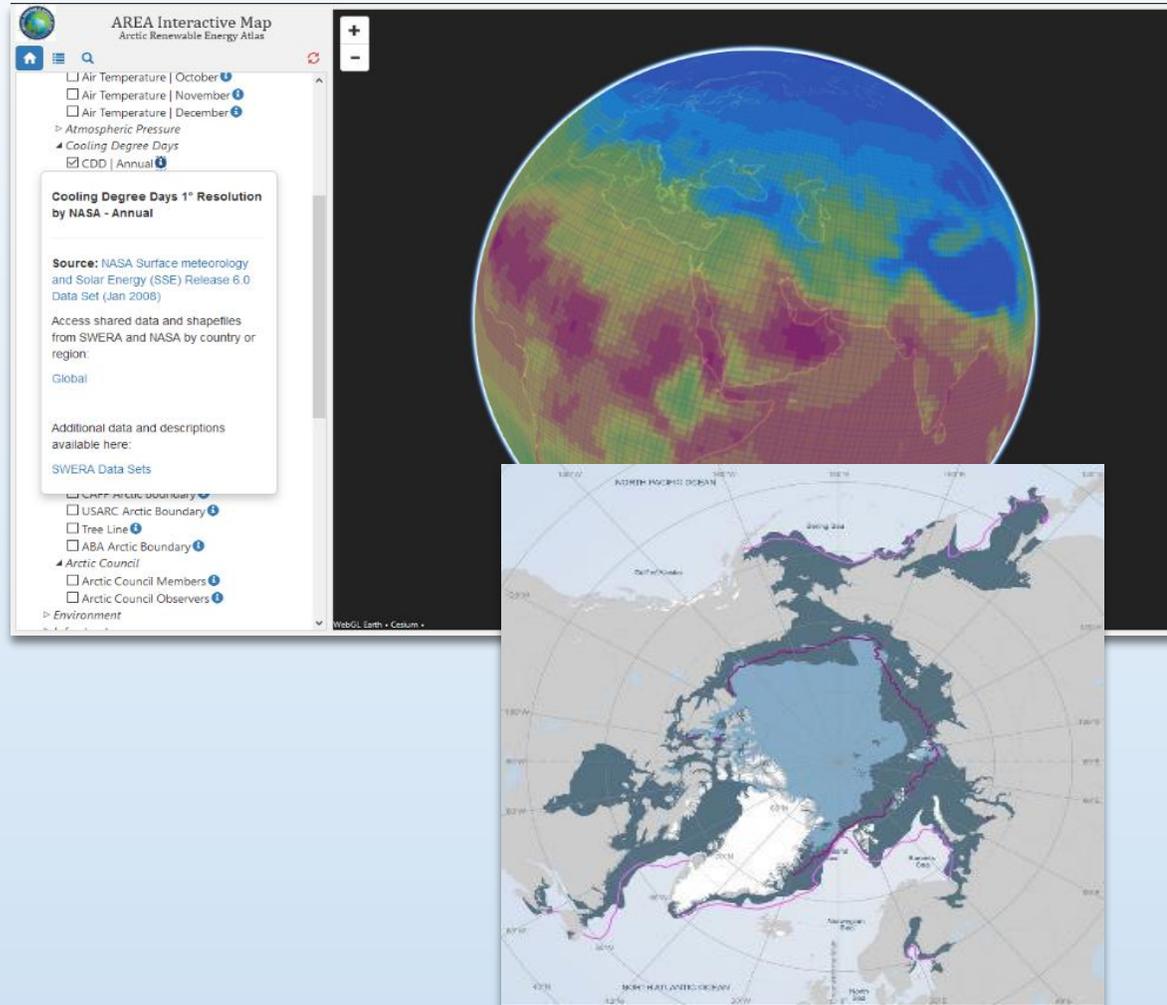
1. Create Image to run tests, code checkers, linters
2. When above passed, build staging/production image and push onto Microsoft Azure
3. Depending on the platform tier create Kubernetes context
4. Deploy to Kubernetes cluster from definitions declared in .yaml manifests files

Besides Github, we have also experience with Gitlab's CI/CD.

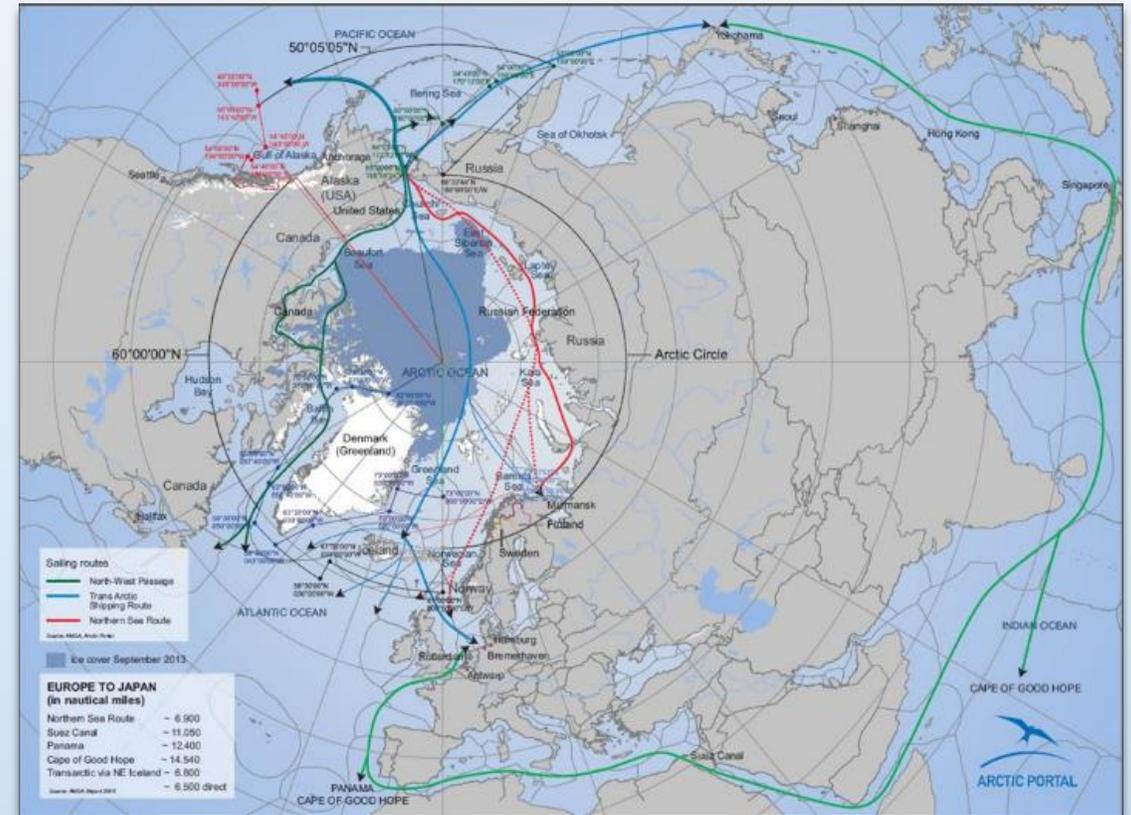
However, as we are not devops engineers, we do not have expertise working with cloud systems such as AWS.



## State of the Art Mapping & Data Systems and Tools - Decades of Experience



Developer of complex web based interactive GIS mapping systems and data presentation applications - applicable and scalable worldwide!



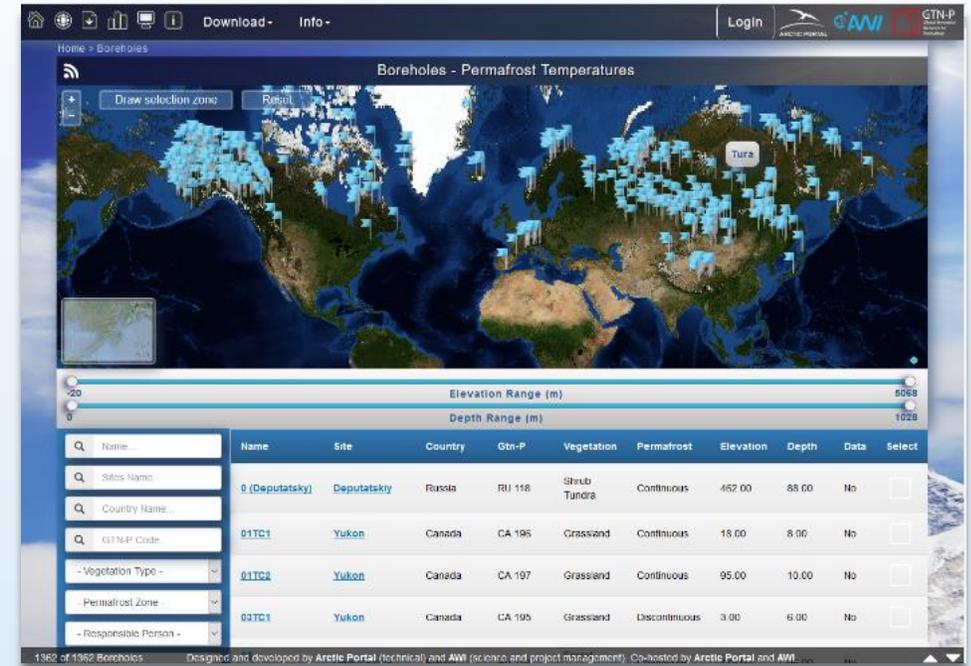


## Data systems and projects, some examples:

- ✓ **Our GIS system is available at** <https://arcddata.is/cesium-dev/>
- ✓ **GTN-P:** Global Terrestrial Network of Permafrost – 2011 + <http://gtnpdatabase.org>  
Development, Hosting and Maintaining - EU Funded
- ✓ **AMATII:** Arctic Marine and Aviation Transportation Infrastructure Initiative - Arctic Council <http://arcticinfrastructure.org> - 2014 +  
Development, Hosting and Maintaining
- ✓ **Arctic Renewable Energy Atlas (AREA)** - best practices and local adaptation actions in the Arctic – Arctic Council SDWG project 2015+ <http://arcticrenewableenergy.org> Leading Outreach, Data management and Data visualization - Hosting and Maintaining

### Other include:

- ✓ PPR – Arctic Council EPPR project
- ✓ Arctic Languages and Cultures - Arctic Council - 2021 +
- ✓ Northern Forum - Arctic Business Directory
- ✓ Icelandic Graveyard database - all deceased Icelanders ! - 2001+
- ✓ Tourism in Iceland - Public Roads Administration - 1998 -
- ✓ and many more.....

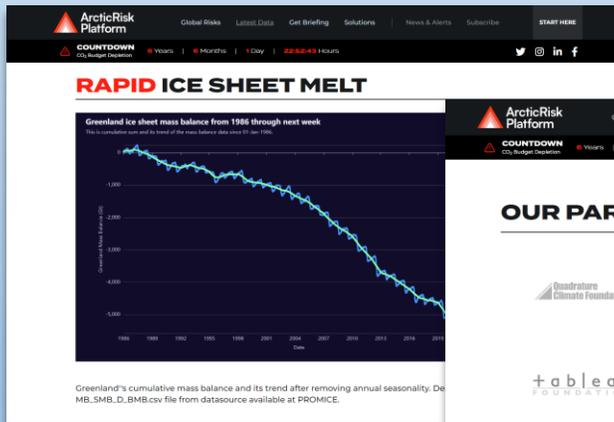




## Highlighted project of relevance: **Arctic Risk Platform**

+ ArcticRisk – active participants in overall design, developer of backend and data tools!

- Site [<https://arcticrisk.org>]
- Data Explorer [<https://api.arcticrisk.org>]
- Code Viewer [<https://charts.develop.arcticrisk.net>]



**OUR PARTNERS**

Woodwell Climate Research Center

ARCTIC PORTAL

MOON RABBIT

**THANKS TO...**

COPIERNICUS

BERKELEY EARTH

CLIMATE ACCOUNTABILITY INSTITUTE

**ArcticRisk Platform**

Global Risks | Latest Data | Get Briefing | Solutions | News & Alerts | Subscribe | **START HERE**

**COUNTDOWN** CO<sub>2</sub> Budget Depletion | 6 Years | 6 Months | 1 Day | **22:55:49** Hours

**GLOBAL CLIMATE RISK.**

The Arctic early-warning system is flashing red. Extreme Arctic warming is triggering a cascade of risks across the rest of the planet. Explore the Arctic Risk Platform to find out what the Arctic climate crisis means for you.

**HELLO** My ArcticRisk name is: **RAINN FREAKISH FLOODING WILSON**

**NEW - CREATE A NAME. MAKE A CHANGE.**

Rapid Arctic warming has global impacts. If you become an Arctic name changer, it can be a real game changer. Once you have created your Arctic name, make it your name on social media to create an impact.

**Live Arctic Risk Indicators**

<b>% DAYS   DAYS</b> THE ARCTIC (66°N+) SURFACE TEMPERATURE <b>15 % days</b> in 2023 are above 90th percentile of 1981-2010	<b>1970S   1980S   1990S</b> WORLDWIDE NUMBER OF DISASTERS <b>265 disasters</b> more events in 2022 in comparison to 1970s	<b>KM<sup>2</sup>   MI<sup>2</sup></b> ARCTIC SEA ICE EXTENT <b>996,000 km<sup>2</sup></b> below 1981-2010 average on 17-Jan-2023
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Global Risks | Latest Data | Get Briefing | Solutions | Arctic Risk Calculator

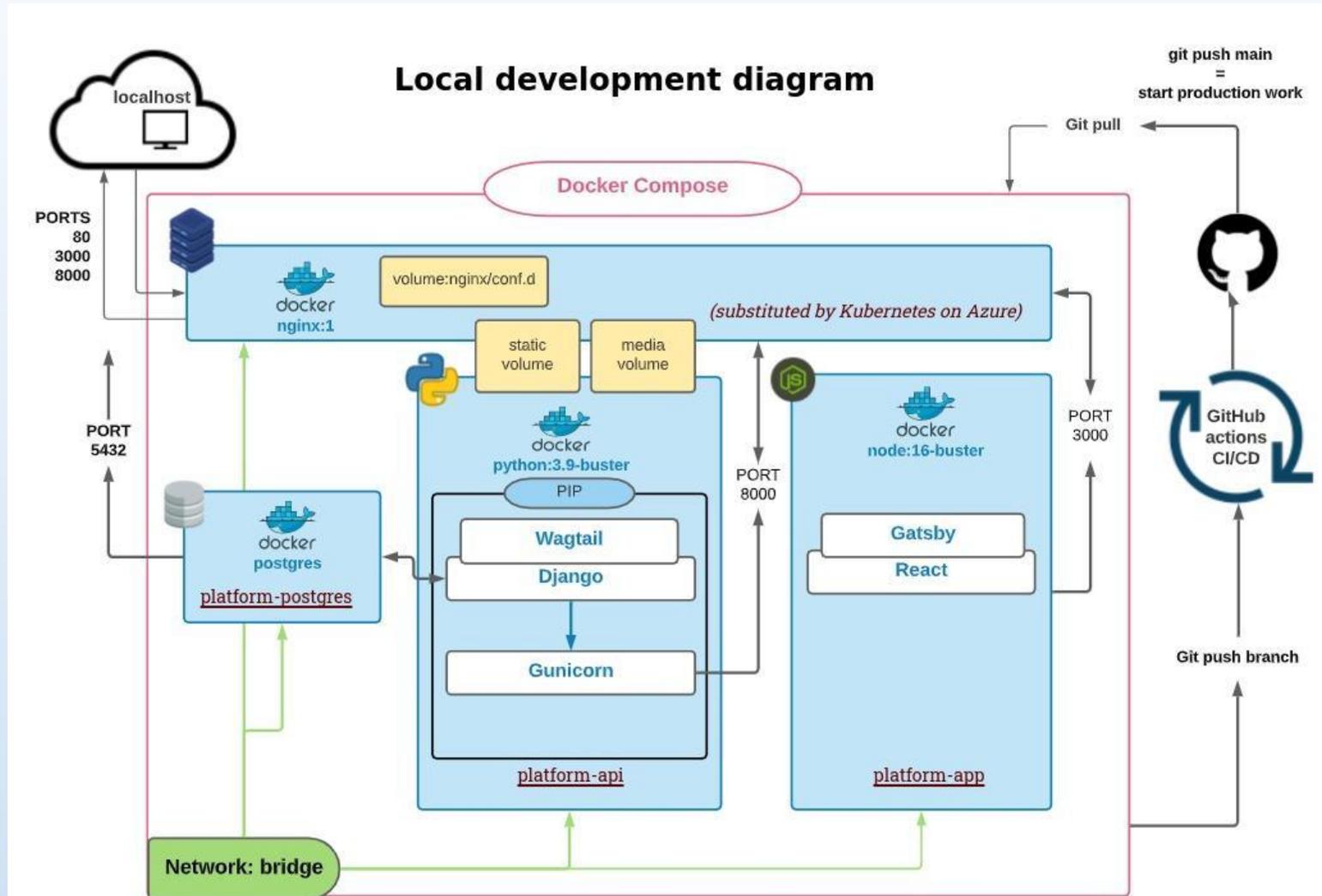
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**ArcticRisk Platform**

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## Development Diagram for the project, Arctic Risk Platform, used internally

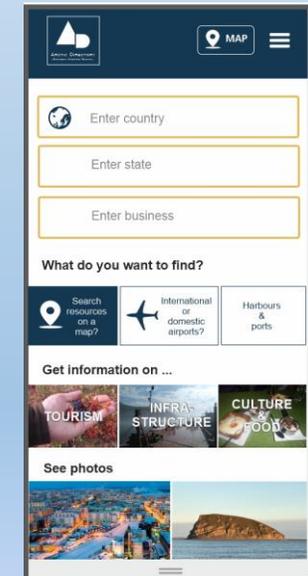
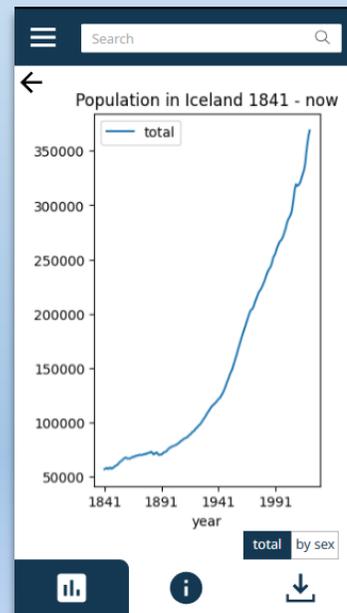
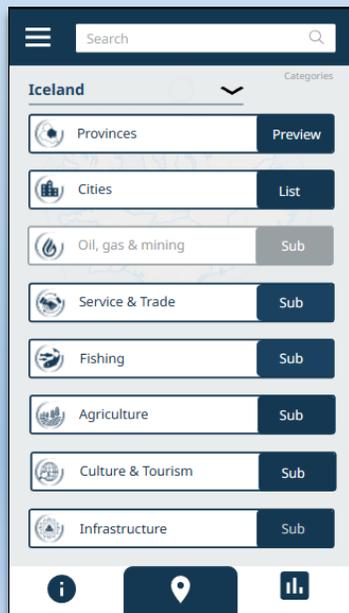




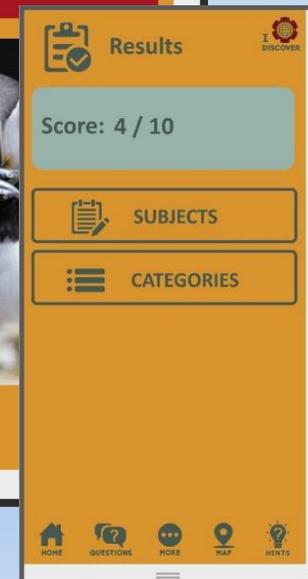
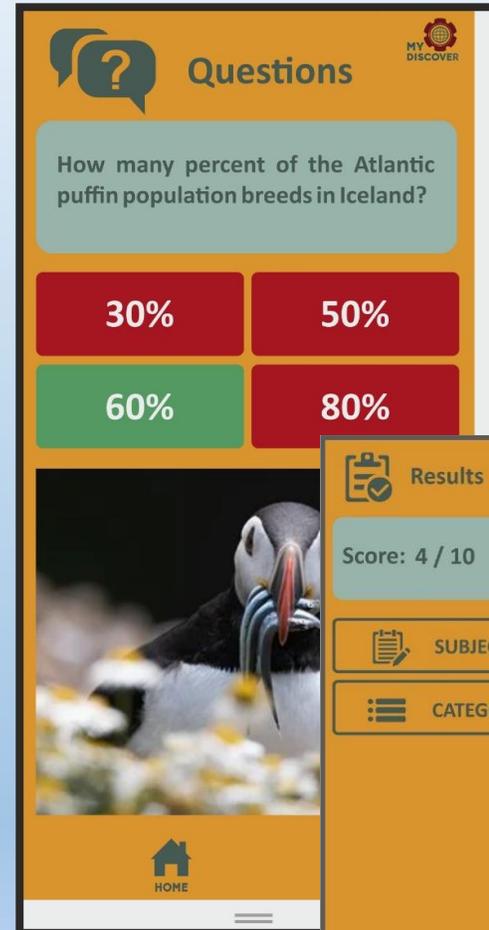
## Highlighted project of relevance: Arctic Business and Cultural Directory (work in progress)

A complex application programming interface developed in mobile and desktop format for the exchange of business and culturally related information and data.

Goal: To increase knowledge, facilitate knowledge transfer and communication, data overview and exchange, for responsible intelligent policy making for sustainable regional development to advance economic and cultural partnerships through its information cooperation tools.



# Highlighted project of relevance: I DISCOVER – Application and tools for education at various levels and citizens science engagement in a “gaming style” format – Student Field School and public / tourism outreach and entertainment approach. (work in progress)



## The leadership of ArcData – Arctic Portal.org

**Halldór Jóhannsson**, the executive director of the Arctic Portal.org and Chairman of ArcData.

Has long and vast international experience in cooperation, communication, IT system development, data interpretation and management, outreach, policy, planning, and project management.

Member of and leading participant in multiple international committees, projects and initiatives.

Attended, presented and chaired at numerous international meetings, seminars and conferences of relevance.

## The IT leadership of ArcData – Arctic Portal.org

### Anseok Joo – Chief Programmer

**Background:** MSc computer science, BA mathematics, been working at Arctic Portal for 7 years as IT specialist (web development, system admin, DB admin)

### Projects include:

*Before Arctic Portal:*

Parsing / text transformation tools (e.g. [PHP code minimiser](#))

Web & Android mapping app at [Epsidon](#) (site is offline)

*At Arctic Portal:* Most coding projects since 2015 including *GTNP*, *GIS System*, *ArcticRisk*, *AREA*, *AMATII*, as well as network support and support to specialized functions for websites and portals

**Interests:** Programming languages, design patterns, optimisation (both in formal sense and real-life “good enough” stochastic / heuristic solutions)



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## The IT leadership of ArcData – Arctic Portal.org

**Mateusz Mielniczuk – full stack programmer**

**Background:** MSc electrical engineering, working at Arctic Portal for 2 years

**Projects Include:** development and consulting in *ArcticRisk* platform with emphasis on data presentation applications, Design and development of the *Arctic Business Directory*.

**Interests:** Electronics, Embedded Programming, Traveling



## The IT leadership of ArcData – Arctic Portal.org

### Aevar Karl Karlsson – Web Programmer / Administrator

**Background:** BSc Computer Science from the University of Akureyri, Working at Arctic Portal Since late 2010

**Projects Include:** [gtnpdatabase.org](http://gtnpdatabase.org) (CakePHP framework) , Various websites in the Joomla CMS (such as [cnarc.info](http://cnarc.info) , [iasc.info](http://iasc.info) , [miarctic.org](http://miarctic.org) ), have been living in and around the Joomla CMS since my start at Arctic Portal

**Interests:** Spending time with family, Brazilian Jiu Jitsu (BJJ), computer games, working out & healthy lifestyle



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## The IT leadership of ArcData – Arctic Portal.org

**Faney Ingvadottir – Designer, user interface and outreach expert**

**Background:** Languages, psychology and graphical design, working at Arctic Portal since its initiation

**Projects Include:** responsible for designing the interface of most of Arctic Portal websites, data and outreach tools.

**Interests:** Culture, literature, healthy lifestyle and traveling.