EOSC DIH
DIGITAL INNOVATION HUB

2019 PUBLICATION

BUSINESS PILOT SUCCESS STORIES

CyberHAB: USING DATA CLOUD SERVICES TO MANAGE HARMFUL **ALGAE** BLOOMS

VAMOS: ANALYSING **SPORTS** PERFORMANCE THROUGH A CLOUD HOSTED PLATFORM

ACTION Seaport: **SMART-PORT** TECHNOLOGIES FOR IMPROVED SAFETY AND OPERATIONS

Guardomic: SECURING ONLINE SERVICES FROM **BOTNET ATTACKS**

DS-DRACO: A CLOUD FRAMEWORK FOR STATE-OF-THE-ART **SPACE WEATHER** DATA

DataFurn: PLATFORM-AS-A-SERVICE DATA ANALYTICS FOR THE **FURNITURE** INDUSTRY

eosc-dih.eu

EOSC DIH

The EOSC DIH is a publication of the EOSC DIH project, edited to showcase major results and achievements of the project, collaborations ongoing with other initiatives and updates from the communities. The publication also provides an overview of the latest highlights from the European Open Science Cloud (EOSC) landscape.

Table of contents

Services for Business

Digitising Industry through the European Open Science Cloud

The EOSC Digital Innovation Hub (DIH) is the mechanism for private companies to collaborate with public sector institutions within the European Open Science Cloud in order to access technical services, research data, and human capital.The EOSC DIH kick-started with six business pilots that were pre-selected during the project's preparation phase. Over the last 18 months, these pilots have worked to mature their service offering and achieved incredible success. The EOSC DIH is open for more collaborations and has already started to onboard new pilots. If you are looking for new opportunities to advance your business, we invite you to contact us now to identify how you can become part of the European Open Science Cloud.

Business Success Stories

SY HOLSINGER
EGI Foundation
EOSC DIH Coordinator

The success of these initial business pilots demonstrates the tangible value that the EOSC DIH can bring to the private sector industry, especially start-ups and SMEs.

These kinds of joint ventures prove that we are stronger by working together, leveraging the services, skills and knowledge available in the public sector, coupling with the innovation and business acumen of the private sector to directly stimulate economic growth and impact.

We are proud of both the results produced by the SMEs as well as the dedicated team working to support them.

We are confident that these success stories are only the beginning and excited to build on the momentum generated to bring new business pilots into the European Open Science Cloud.

MARCIN PLOCIENNIK
PSNC
EOSC DIH Business Pilot Manager

It has been a great pleasure to work so closely with such highly innovative SMEs that took part in the EOSC DIH, who were committed from day one. An example of the many new innovative services was shown by one of the pilots winning the best demo at the EOSC-hub Conference 2019.

In addition, three of the pilots have decided to become service providers for the research community through the EOSC Marketplace, which we believe will enrich the overall offer for research communities.

We give many thanks to these initial pilots that not only delivered on their objectives, but helped shape and mature the DIH itself with their pragmatic business-oriented view and requirements.

Through this experience, and lessons learned, we are well-positioned to support further pilots.

CyberHAB

Using data cloud services to manage harmful algae blooms

BACKGROUND

Harmful Algal Blooms (HABs) happen when toxic microalgae proliferate beyond control and take over rivers, lakes or ponds with costly environmental and socioeconomic impacts, for example: on fisheries, or on the availability of drinking water. At sea, this phenomenon causes red tides. Managing algal blooms is a challenge for local governments, environmental agencies and the people that depend on healthy water bodies for their livelihood. Despite the investment in waste management and monitoring systems, current methods and processes are still far from ideal. Ecohydros believes that new technologies and big data can pave the way for better and more efficient ways to manage harmful algal blooms.

ACHIEVEMENTS

As part of their collaboration with EOSC-hub, Ecohydros developed CyberHAB - a platform to process and analyse ecological data related to algal blooms. The CyberHAB prototype is a platform with a Jupyter Notebooks interface that integrates software components transparently and provides direct access to cloud computing resources. This platform can be used to extract information from monitoring data, converting hundreds of variables and parameters into visualizations to support decision-making.

WHICH EOSC-HUB SERVICES DID YOU USE?

CyberHAB uses Notebooks as an interface and processes analysis with the EGI Cloud Compute service. The user is able to access different data sources by selecting ranges of dates and locations. The data is stored in a cloud storage solution (Onedata, Datahub) and whenever they need to launch a new model or simulation it is deployed using PaaS Orchestrator.

WHAT MAKES YOUR PRODUCT STAND OUT? WHAT IS YOUR VALUE PROPOSITION?

CyberHAB is the first cyberinfrastructure of its kind – a versatile platform powered by cloud computing able to combine large volumes of data for the management of harmful algal blooms. Users can interact with CyberHAB in different ways, via Web or mobile interfaces. With a registered free account, users can try basic functionalities with their own data. Subscriptions give access to the full range of tools, including models to forecast scenarios or methods to generate additional data for a given case.

WHAT WAS THE VALUE OF WORKING WITHIN THE EOSC-HUB PROJECT?

CyberHAB manipulates data covering hundreds of variables that need to be treated, processed and analysed before being used in visualizations. The predictive models also require calibration. The computing demands are beyond what a standard company or a standard computer center can provide. EOSC-hub gave us a chance to overcome this barrier.

Services:
EGI Cloud Compute, PaaS Orchestrator, Jupyter Notebooks

Output:
A working prototype of CyberHAB

EOSC Providers:

IFCA Instituto de Física de Cantabria

CSIC Consejo Superior de Investigaciones Científicas

Business Partners:

ecohydros

VAMOS

Analysing sports performance through a cloud hosted platform

BACKGROUND

Top-level athletes often record training sessions for review and analysis, looking for weak spots to address with specific training. Continuous improvement in sports also implies having a way to keep track of an athletes performance over time. As of today, that is chiefly done by hand and depends on the athlete's and the coach's interpretation of the training videos. The amount of data can be huge, since every athlete or every player of a team can be recorded in a training session at least at 50 frames per second, and from every frame many patterns can be identified and tracked. And to optimize the analysis, performance must be monitored during the entire season. The idea for VAMOS comes from this need for a smart video processing tool able to extract KPIs in a data-driven and automated way.

ACHIEVEMENTS

As a EOSC-hub business pilot, Moxoff developed VAMOS - Video Analysis for Movement Optimization and Statistical analysis – a web-application where each authenticated user can analyze and monitor performance of an athletic gesture. VAMOS is scalable and automatic, i.e. there is no need for human supervision: the final user will upload one video per gesture, together with some additional information and will receive as output a report with advanced statistics on his training sessions, such as consistency, best repetition, quantitative indicators.

WHICH EOSC-HUB SERVICES DID YOU USE?

Moxoff deployed two virtual machines (VMs) using the EGI Cloud Compute service: one for the front-end of VAMOS, the other for the back-end requiring more computational resources. The specs were:

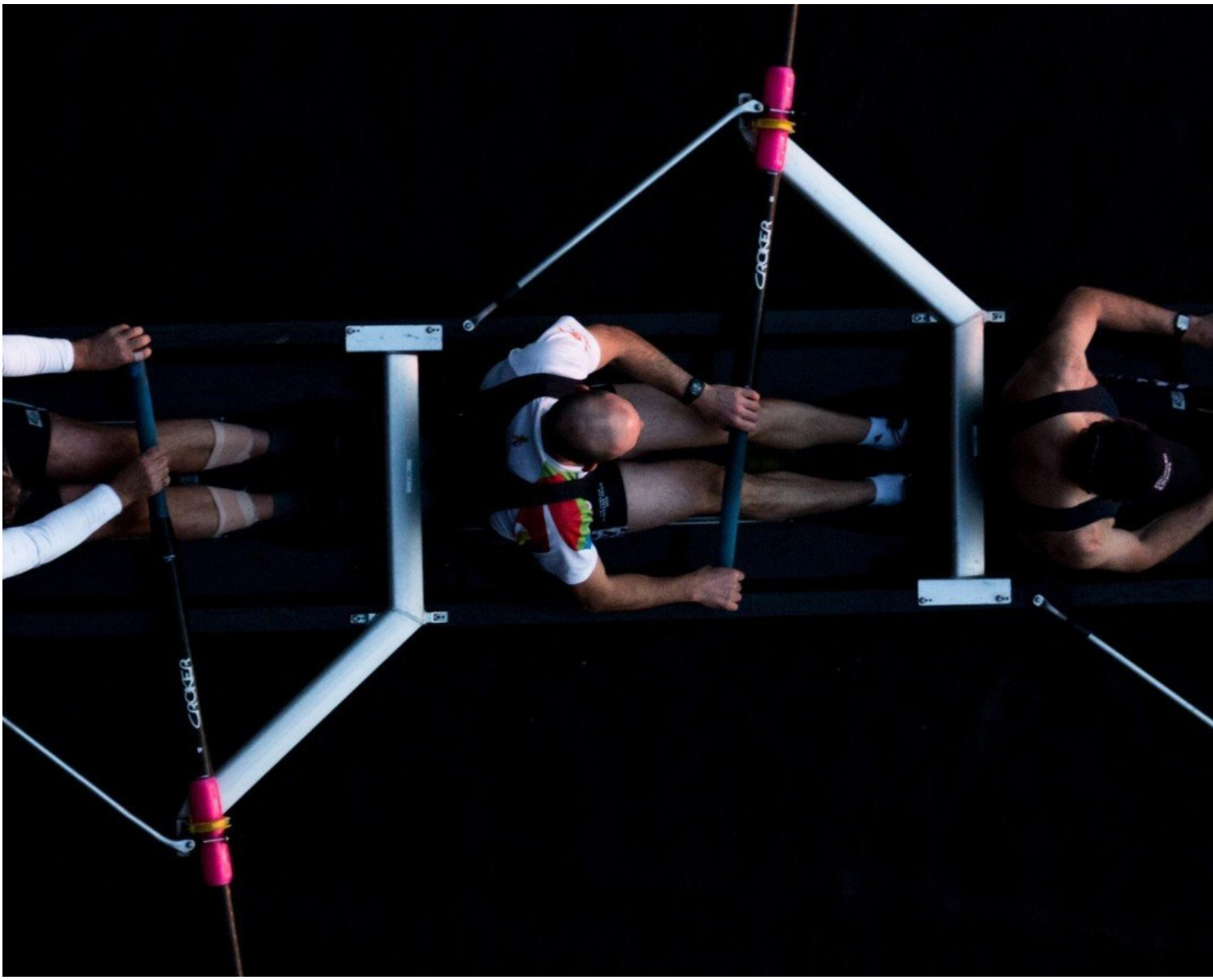
- Back-end VM:
  12 vCPU, 22GB RAM, 1 GPU 1080Ti
- Front-end VM:
  4 vCPU, 7.3GB RAM, Disk 30GB

WHAT MAKES YOUR PRODUCT STAND OUT? WHAT IS YOUR VALUE PROPOSITION?

VAMOS allows coaches and athletes to save time and increase their efficiency as the data is processed by advanced algorithms and methods (such as functional data analysis) automatically, extracting all the KPIs they need in standard reports.

WHAT WAS THE VALUE OF WORKING WITHIN THE EOSC-HUB PROJECT?

Working within the EOSC-hub project gave Moxoff the possibility to reach a wide audience and a very active network working on mathematical modelling, data science and optimization. The international experience allowed created new opportunities for the future. From the technical point of view, the cloud infrastructure which has been made available increased Moxoff's computational capability, necessary to scale up and to process huge amount of data.



Services:
Cloud Compute

Output:
A working prototype of VAMOS (winner of the best demo prize in the EOSC-Hub Week 2019)

Business Partners:

MOX-OFF MATHEMATICS FOR INNOVATION

math&sport

Yottacle

EOSC Providers:

IFCA Instituto de Física de Cantabria

CSIC Consejo Superior de Investigaciones Científicas

ACTION Seaport

Smart-port technologies for improved safety and operations

BACKGROUND

With 74% of goods coming to Europe by sea, ports are vital elements of the economic machine. Increased traffic and ship size add pressure on their productivity and can cause congestion and delays, burdening shippers, transport operators, and ultimately consumers with extra costs. As a consequence, a seaport's efficiency, competitiveness, and reputation can decline. Luckily, new digital solutions taking advantage of the Internet of Things, big data analytics and numerical models might not only ease their daily operational activities, but also boost seaport performance in the long-term.

ACHIEVEMENTS

In this context, Bentley Systems designed and implemented ACTION Seaport, an advanced cloud-based and mobile-friendly platform to support decision-making for port authorities. ACTION Seaport helps port authorities and operators to improve maritime situational awareness, provides early-warning notifications for adverse conditions, and delivers piloting and navigation support. ACTION Seaport can also be used by other parties, such as coastguards, search and rescue forces, or maritime offices.

WHICH EOSC-HUB SERVICES DID YOU USE?

The ACTION Seaport pilot used Cloud Computing provided by PSNC for implementation of different tiers (presentation, business and data) with redundancy, using Windows environment. The pilot deployed two Virtual Machines with 20 VCPU and 40 GBytes of memory to perform scalability tests and get perspective for the increasing number of potential customers.

WHAT MAKES YOUR PRODUCT STAND OUT? WHAT IS YOUR VALUE PROPOSITION?

Using an innovative, holistic, accurate, and cost-effective approach, ACTION Seaport improves port efficiency, competitiveness, and safety, particularly their environmental, navigational, and operational/logistical aspects. ACTION Seaport makes it possible to minimize port congestion and optimize berth planning by using continuous and dynamic AIS-based operational port performance indicators (geospatial data analytics) computed in real-time or for user-specified periods.

WHAT WAS THE VALUE OF WORKING WITHIN THE EOSC-HUB PROJECT?

Thanks to the EOSC-hub business pilot, ACTION Seaport assessed the pros and cons of hosting its system on a cloud service.

Services:
Cloud Compute provided by PSNC

Output:
A cloud-deployed ACTION Seaport platform

Business Partners:

Bentley Advancing Infrastructure

EOSC Providers:

PSNC

Guardomic

Securing online services from botnet attacks

BACKGROUND

Web services owners struggle daily to protect their websites from bot traffic and their users from fraudulent digital ads or cryptocurrency web mining. The problem is not going away: recent years show an increasing number of bot attacks in the global network. For example, considering just online ads, the Association of National Advertisers and White Ops estimates that in 2016, bots were responsible for seven billion dollars of wasted resources. The solution is to "know thy website" via analytics and in-depth statistics that provide insight on the website traffic, and turn those insights into defenses from botnet attacks.

ACHIEVEMENTS

As part of their collaboration with EOSC-hub, Koma Nord and Idego designed and developed Guardomic – a tool suite to protect online services from botnets attacks. Guardomic also allows to analyze and block unwanted traffic (i.e. from specified country, specified ISP, IP range) without decreasing performance for the reader. With Guardomic, consumers can decide between two types of installation: PaaS and on-premise. Both are transparent for the user. Web-site administrators can also choose only to analyze the traffic, or block the hostile bad-bot infiltration. Regardless of choice, the administrator has full access and control and can decide which options to enable and which statistics to see.

WHICH EOSC-HUB SERVICES DID YOU USE?

The team needed a flexible server and storage platform that they could remotely access, configure and manage during the development of Guardomic. As a EOSC-hub pilot, they were able to use the Compute Cloud resources provided by PSNC, namely their OpenStack cloud platform, as a development environment and a production platform for the clients testing the prototype.

WHAT MAKES YOUR PRODUCT STAND OUT? WHAT IS YOUR VALUE PROPOSITION?

Hackers move fast, but Guardomic keeps up with the pace. The development team behind Guardomic is very flexible and can act quickly to add new features according to new market demands. The team is also focused and efficient, which allows Guardomic to be marketed at a competitive price without compromising on quality.

WHAT WAS THE VALUE OF WORKING WITHIN THE EOSC-HUB PROJECT?

Working within EOSC-hub has allowed Koma Nord and Idego to develop and implement Guardomic quicker and more efficiently. As part of the EOSC Digital Innovation Hub, they are also now part of large European consortia of science institutes, companies and other organizations, which brings added opportunities for business and extended collaborations. Koma Nord will also take advantage of the EOSC Marketplace as a platform to promote Guardomic as a solution to mitigate botnet attacks.

Services:
Openstack Compute Cloud platform, with IaaS resources provided by PSNC

Output:
A fully-functional release of Guardomic – a solution to secure online services from botnet attacks

Business Partners:

idego

koma nord

EOSC Providers:

PSNC

DS-DRACO

A cloud framework for state-of-the-art Space Weather data

BACKGROUND

Space Weather concerns the phenomena that arise from the changing physical conditions of the Sun and its effects at Earth. It may seem an abstract topic, but events such as Geomagnetic Storms have actual practical and economic consequences at Earth, especially as our economies are increasingly dependent on technology and satellite communications and services. The possible consequences and damages due to Space Weather can be mitigated with appropriate protocols that rely on accurate forecasts. The DRACO project will establish a planetary network of observatories capable of generating high-resolution cosmic ray Space Weather data with an unprecedented level of detail. An advanced cloud infrastructure is essential to manage the distribution and ensure the availability of this Space Weather data. The DS-DRACO pilot, developed by Hidronav as an EOSC-hub business pilot, is the first step to develop such data infrastructure.

ACHIEVEMENTS

The underlying DS-DRACO pilot infrastructure is currently storing and providing access to high-resolution data from and for early adopters. The database currently includes data from the MuTT (Muon ToF Tracker) detector. The TRISTAN detector of the ORCA Antarctic Cosmic Ray Observatory provided by the University of Santiago de Compostela is also confirmed to use this platform for its data distribution. The research-facing web portal www.spaceweatherhub.eu is now online, as a hub of interoperable data for Space Weather modelers and forecasters. Future Space Weather products derived from raw data will be distributed through this platform.

WHICH EOSC-HUB SERVICES DID YOU USE?

Hidronav used the Cloud Compute service, with dedicated resources provided by CESGA, for the back-end of their data management platform. Cloud Compute ensures the scalability they need for a growing global detector network and the high-availability mechanisms such as system redundancies (electrical power, air conditioning) and IT infrastructure redundancies (server redundancy, processors and storage in high-availability cabins, redundant internet service, etc.).

WHAT WAS THE VALUE OF WORKING WITHIN THE EOSC-HUB PROJECT?

Joining forces with EOSC-hub means that DS-DRACO can access the Cloud Computing resources needed to meet increasing processing, storing and high-availability requirements. This ensures that the service can safely be used in applications such as Space Weather extreme event warning and forecasting models.

Services:
EGI Cloud Compute

Output:
An online portal with data for Space Weather modelers and forecasters

Business Partners:

HIDRONAV
HIDRONAV TECHNOLOGIES SL

RL ITC
informática profesional

EOSC Providers:

CESGA
Centro de Supercomputación de Galicia

DataFurn

Platform-as-a-Service data analytics for the furniture industry

BACKGROUND

Thanks to the spread of social media and on-line communities, furniture manufacturers now have access to a pool of readily available data on end-users' preferences, opinions about brands and products, as well as to users willing to provide new ideas, assess solutions and co-design new products. Manufacturers can extract a lot of value from contact with their customers, moving away from an outdated mass manufacturing scenario towards a more individualized production. Furniture designers can now take customers' opinions into account in the design of innovative, more customized and trending products that customers demand. In other words, companies will produce better products for more commercial value if they have a broader and clearer view of what their customers are discussing online. However, despite the tremendous data overflow around, the furniture industry lags behind due to several inherent challenges:

- Social media tools monitor the global trends, but they do not provide actionable insights to the domain's SMEs;
- Furniture SMEs have a limited online presence and therefore the current content is biased towards larger brands;
- Trend prediction methods cannot easily distinguish between promotional and genuine content while facing significant difficulties when it comes to image recognition.
- Lack of a formalized digital strategy in the majority of furniture manufacturers.

ACHIEVEMENTS

With EOSC-hub, Suite5 and AIDIMME designed, developed and deployed DataFurn - a furniture analytics platform-as-a-service. DataFurn collects, analyzes and visualizes online content (e.g. from social media platforms, blogs), detects useful product-related content, extracts relevant furniture product-service topics/features, monitors brand influence and customer interactions and forecasts furniture trends for the upcoming seasons.

WHICH EOSC-HUB SERVICES DID YOU USE?

DataFurn used EGI Cloud Compute to deploy its architecture using ten virtual machines, 80 vCPUs and 160 GBs RAM. Until June 2019, the platform consumed approximately 170 thousand virtual CPU hours and about 340 million RAM hours.

WHY DATAFURN STANDS OUT AND WHAT IS ITS VALUE PROPOSAL?

DataFurn stands out in relation to the generic social media analytics platforms by providing intuitive dashboards that have been already created and curated by furniture domain experts. In this way, DataFurn reduces the necessary effort and time to entry (for setting up, understanding and maintaining the relevant reports of interest). Through a pay-as-you-go business model, SMEs can benefit from a dashboard that leverages untapped information, transforms it into actionable knowledge through intuitive and user-friendly (not requiring any technical background) interfaces and acts as a decision support system (e.g. by allowing for different comparisons in time and in content, better understanding how the discussions and weak signals from other neighbouring domains influence the furniture domain).

WHAT HAS THE EOSC-HUB PROJECT GIVEN TO DATAFURN?

EOSC-hub has provided to DataFurn the necessary infrastructures in order to quickly and efficiently test and deploy its various platform releases. Through the computing power of the EOSC-hub services, DataFurn had the opportunity to experiment on different

resource-intensive algorithms for analyzing and indexing the related content that has been curated for manufacturing SMEs.

NEXT STEPS FOR DATAFURN AND FUTURE PLANS

Fifteen companies are currently in the process of testing the DataFurn platform. Each company has received a personalized email to access the platform. The AIDIMME market experts have prepared a dedicated dashboard to present to the companies the numerous benefits that the DataFurn platform offers them. Future plans also include to attract more companies in the sector, and possibly expand to other domains.

Business Partners:

Suite5 We Deliver Intelligence

AIDIMME METAL-PROCESSING, FURNITURE, WOOD AND PACKAGING TECHNOLOGY INSTITUTE

EOSC Providers:

RECAS BARI

UNIVERSITÀ DEGLI STUDI DI BARI ALDO MORO

INFN

Services:
Cloud Compute

Output:
DataFurn platform prototype, being tested by 15 furniture companies

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