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Community-oriented Sharing Platforms in Space 4.0

A Marin¹, I Alonso¹, A Romeo², J Patruno², F Barchetta², M Leonardi², P Sacramento¹, G Landgraf³, Prof. E P M Vermeulen⁴

¹ Solenix supporting ESA/ESRIN - Operations Services department

² RHEA Group supporting ESA/ESRIN, Professional Engineering Services department,

³ European Space Agency - Science Applications & Climate department,

⁴ Tilburg Law School- Business Law department.

Abstract. Space 4.0 will bring an enormous wealth of data about our Earth that needs to be well exploited. But how do we bring this wealth to citizens? Space 4.0 is also about the best use of Big Data approaches and the use of the digital information economy as a powerful tool to bring information to citizens. Digital platforms have to excel on 3 main pillars [1]: Technology, Content and Culture. The Thematic Exploitation Platforms (TEPs) are operational today for the Urban, Forestry, Coastal, Hydrology, Food Security, Polar & Geohazards communities. These platforms provide scientists, commercial operators and citizens with an environment where they can share their questions, analysis, results through their investigation, algorithms, products to find new solutions for a better and safer world.

1. Introduction

A significant development in the global economy over the last two decades has been the emergence of businesses that organise and define themselves as “platforms”.

There are several definitions of platforms but, in this context, platform refers to any organisation that uses digital or other emerging technologies to create value by facilitating or coordinating connections between two or more groups of users [2].

An Earth Observation (EO) Exploitation Platform (EP) is a virtual, open and collaborative environment, which brings together EO and non-EO data, computing resources, tools to support data exploitation, algorithm development, collaboration and communication, and market place functionalities where different stakeholders perform different tasks to achieve their objectives (e.g. Scientist and Researchers, Software Vendors, Service Providers, Infrastructure Providers, Data Owners, End Users). The success and sustainability of EO platforms will depend on their capability to offer these stakeholders an environment that will simplify and speed up connections between them.

2. A platform in the EO application

In the last years, the Sentinel missions, the Copernicus contributing missions, Earth Explorers and other national and commercial missions have provided routine monitoring of our environment at global scale, delivering an unprecedented amount of data which combined with data from long-term EO archives, in-situ networks and models will provide users with unprecedented insight into how the Earth System.

In this context, ESA started the EO Exploitation Platforms initiative with the aim to create an ecosystem of interconnected Thematic Exploitation Platforms (TEPs) on European footing, addressing Coastal, Forestry, Hydrology, Geohazards, Polar, Urban and Food Security communities. Like other EO



platforms -e.g. the Datacube- one of their goals is to support each community in the data, algorithm and knowledge sharing process, establishing best practices on the use of cloud-based infrastructure.

ESA EO platforms have set the state of the art for the provision of general capabilities to exploit EO data in a cloud environment and have deployed a set of functionalities to enable the various stakeholders to share different types of content. In addition the platforms enable the application of different policies, which gives to the owner full control of his/her own contents.

3. Platform challenges beyond technology

The success of a platform depends not only on the available technology and functionalities but also on additional elements [2], which are less discussed than the underlying technologies driving a platform, but which are crucial in transforming a platform into an ecosystem and ensuring that the platform is successful in the medium-to-long term. Five additional pillars, which will bring sustainability to the platforms, are:

1. Platforms must facilitate the collection, creation, curation, consumption and sharing of meaningful **content** which needs to have value and be authentic for platform-users.
2. Continuous platform update , driven by users feedback, availability of functionalities which can be exploited in “everyday life”, possibility to verify other users reputation, the availability of a trusted communication channel between users, are key elements to establish networks and connections which create (and leverage) a sense of belonging to a **community**.
3. A clear mission, an inspiring vision and creativity, as well as the ability to get the message across (e.g. via story telling) makes a platform strong in **leadership**
4. The capability of the platform to prove that its usage is secure, safe and reliable, the on-boarding of key stakeholders and its openness are key elements to create and build a sharing **culture**.
5. The capability to attract key stakeholders in a trust **relationship** where synergies can be built to achieve common objectives, in order to on-board new and complementary scenarios, is a key for innovation.

4. A concrete example of platform-enabled success

What follow is an example of international collaboration enabled by Hydrology TEP.

The Niger, Africa’s third longest river, snakes across nine West African countries. After months of heavy rainfall left soil saturated and unable to drain, flooding became a threat along susceptible parts of the river system, especially near the inland Niger Delta. Consequences: thousands of people homeless, hundreds of lives taken, damages to agricultural, breeding and buildings. Early warning of flood events would allow people and livestock to evacuate to higher ground, but with the Niger River Basin extending so far beyond individual national boundaries, reliable and actionable data is lacking.

Recently representatives from 17 countries from the Niger River Basin are accessing the Hydrology TEP to exploit services like flood monitoring, water level, hydrological modelling and share their analysis, results, data, experiences and knowledge.

5. Conclusion

After developing the technology which is a prerequisite to enable EO exploitation in a cloud based environment, EO platforms like the TEPs or Datacubes are now facing the challenge of becoming an ecosystem where content providers (of data , algorithms and knowledge) will be able to get in touch with content consumers faster.

References

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