

Project

Evolve Newsletter



Leading the Big Data Revolution

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DDN (coordinator)

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EVOLVE: RETURN ON INVESTMENT

EVOLVE project is now more than halfway through, most of the infrastructure is up and running. The current status of the infrastructure encompasses hardware and software innovations. EVOLVE platform has to be considered as an infrastructure with hardware and its associated middle-are plus the surrounding environment of job management and orchestration. Our heterogeneous platform is now advanced enough in time to take profit from the portability investment made by the use case developers. It is the right time for the community to collect the fruits of the endeavours.

The expected improvements are manifold, speed-up obviously, scalability and easiness of deployment as well. The new workflow engine based on a PoC integration of Slurm with Kubernetes allows to deploy even complex pipelines with tightly synchronized stages (e.g MPI component). The notebook approach simplifies the development of new features and a performance dashboard helps the application developers to navigate through the complexity of performance optimization.

Future infrastructure improvements include an advanced node local storage, a more robust integration of Slurm with Kubernetes and a more cost-effective resource management.

EVOLVE project includes an array of 7 pilot applications. These pilots are diverse enough, either due to their technical origin such as HPC, Big Data, Cloud or by the requirements and the way they are stressing the infrastructure. For instance, the data management or parallelization model varied from one application to the other. Each of these pilot applications validates the overall vision of EVOLVE and furthermore bears itself significant scientific results in its field. The results can have direct impact on the European citizens with improved security, better mobility, or optimized agriculture

The current edition of our newsletter details the obtained results and the overcome challenges for each of the pilot. These pilot applications have reached different maturity in term of implementation thus each one will tell a slightly different story. An excellent reason to read them all!

Read our newsletter and get to know more about our pilot & domains:



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The aim of the maritime surveillance pilot in EVOLVE is to assess the value which the EVOLVE technologies can bring to the sector. Using the in-house-developed ACRITAS maritime surveillance platform as a starting point, Space Hellas has been adapting and re-engineering its main components in order to benefit from the EVOLVE technology propositions...

Author - G. Vamvakas, A. Priovolos, G. Gardikis

#SPACE

Machine Learning solution for Predictive Vehicle Maintenance



In this article we are going to explain our Machine Learning solution for predictive maintenance based on DTC codes. Current status of the application on the EVOLVE platform will be given as well.

Author - Alen Kopić, Sergio Ermacora, Bruno Omerović

Change Detection tool - Achievements and Ongoing challenges on the Sentinel-2 Satellite Images use case



The use case of Thales Alenia Space consists in developing an application of change detection areas on Earth Observation satellite images time series. Since the pipeline and the environment of the change detection building block have already been presented in the Newsletter 3, we will focus here on the achievements in term of performance and the current studies in the context of EVOLVE project...

Author - Michelle Aubrun

Bus Transportation optimization: everything is based on the big data

everything is based on the big data analysis



The "Bus transportation" use case is progressing according to the plan; it has already integrated its workflows onto the Evolve platform. For Real Time (RT) and No Real Time (NRT) contexts the workflows have been already defined and implemented. Several components (i.e. Apache Kafka, Spark, etc.) have been included into the data ingestion processes collecting transit data (bus events, shapefiles, etc.) through the web services implemented by MemEx / Tiemme the public transport company operating in South Tuscany...





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Author - Claudio Disperati, Saverio Gini (MemEx Srl), Mauro Pallari (Tiemme Spa), Vassilis Spitadakis (Neurocom Luxembourg)



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Anomaly detection in time-series data on Automotive Services



(...) In combination with other engine operation data and by using dedicated algorithms operating on time-series data it is possible to detect numerous fault symptoms and respective root cause information. In this article we discuss the main entities of our pilot workload and present first empirical results on running times for anomaly detection obtained on EVOLVE's NOVA cluster...

Author - Konstantinos Xylogiannopoulos, Bernhard Peischl

Optimizing Agri Production yield using numerical models and massive historic data



A main problem that is challenging today is anticipation of yields potentials to make better agri-food decisions. In this scope, CybeleTech developed automated tools to identify crop lands in a region from satellite images and then to predict crop growth for accurate in-season forecast of the total agricultural production in one region, e.g. Europe or the Corn Belt. Currently, we are faced with the problem of storing data from the Sentinel-1, Sentinel-2 and ERA5 satellites. We do not have the computational capacity to execute our codes...

Author - Teddy Debroutelle

Estimating the efficiency of a ride hailing service

(Mobility Services)

<u>∛</u>CybeleTech

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In the first phase of the project algorithms to analyse the efficiency of a city for establishing a ride hailing or pooling use case have been developed. Recently, parallelization has been implemented to split up parts of the algorithm that can run in parallel as well as the usage of libraries able to use the HPC capabilities of the Evolve cluster. The remaining project time will be used to deploy the improved algorithms to the Evolve platform, to feed in the needed data in an efficient manner and to evaluate different platform usage strategies and analyse their increase of performance.

Author - Gordon Isaac, Marvin Erdmann



Be part of EVOLVE Ecosystem

The EVOLVE ecosystem aims to establish and nurture a network that will empower open innovation based on the platform that the evolve project is building. The EVOLVE ecosystem brings together all the policy makers, research organizations, engineers, developers and companies acting as end-users that are actively working on the fields of high-performance computing, big data and cloud.

The EVOLVE ecosystem will also facilitate innovative enterprises (large industries, SMEs, creative start-ups and university students – bachelor, master, PhD level) to develop and test their novel solutions.

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