

Palaamon

Two Pager

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Introduction

Palaamon is a new platform that finally solves the thorny issue of reproducibility in complex data analysis. Pharmaceutical Research and Development, for example, requires stable, reproducible processes for large and complex datasets. Yet any variation in the original configuration, whether operating system, software or libraries, input parameters, or even required security updates can negatively affect reproducibility over time. Palaamon addresses this with cutting-edge containerization and distributed ledger technologies (DLT).

We have developed a framework to distribute jobs on a scalable cluster infrastructure (cloud-native running on private and public cloud).

The system is a distributed workflow engine wherein each step is implemented by a worker on a node of the cluster. Each worker is a container including all dependencies (from OS to libraries or code). The system keeps container images in its own registry, hence ensuring ultimate reproducibility of analysis. The system also produces Merkle trees using hash codes for every participating element: from container to data. Hash codes and metadata can then be saved in a distributed ledger.

The result is stable, storable, reproducible, incorruptible, and lightning-fast execution of complex data analysis no matter your software and hardware configuration over time.

Regulatory authorities, health tech providers or publishers of scientific journals will be able to use Palaamon to ensure guaranteed reproducibility of data analysis.

A Distributed Platform

Scientific research should be reproducible. That means performing identical processes on immutable objects to get immutable results.

When researchers perform data analysis on Palaamon, the system records the full series of actions taken on that data, which provides consistency and maintains a full audit trail and history. This is called event sourcing, and it's possible via distributed computing. Event sourcing is ideal for quality control and compliance, because there is an immutable record of all processes, for purposes of both audit and replication.

Palaamon is a cloud-native distributed platform running on cluster facilities with no limitation on the number of nodes, enabling horizontal and vertical on-demand scaling. We use containerized software deployment (currently Docker) for transform workers to provide guaranteed reproducibility of data analysis.

Palaamon uses cryptographic hash functions at every level of processing to guarantee final traceability and reproducibility of workflows. Users of Palaamon will be able to compare results of transforms based on similarity scores of Merkle trees. Finally, results signatures are pushed to distributed ledgers.

We plan several other features for Palaamon to be implemented as smart contracts using distributed ledger technologies (otherwise known as the blockchain), which will allow researchers to specify which results to share with which parties, and for what duration. We also plan a two-way marketplace in which algorithm developers can upload their code to Palaamon, and researchers can lease that code to perform transforms on their own data on the platform.

Stack

Palaamon is written in Scala using Akka and Spark. Its UI is built using React and Redux. The whole system is deployed using Kubernetes or/and DCOS. All work together to ensure speed, accuracy, reproducibility, and immutability.

Palaamon Distributed Ledger Technology Strategy

Palaamon crowdfunds its next phase of development. The platform is built, and in beta testing. We'd like to be faster and more efficient ramping up to our token offering phase.

Any funds raised in the initial crowdfunding effort will be reinvested into the Palaamon, both in product development and preparation for the token market.

This will include software engineering, quality and compliance engineering, marketing, legal consultation, infrastructure, and support staff.

Our second and final token will be an Analysis Market Software Token. This token can be redeemed to perform transforms within Palaamon itself, or can, after a vesting period to be determined by the launch date of Version 1 of the platform, be traded on major cryptocurrency exchanges.