EInnovator

2021

Micro-Services Suite

Apps

Core Services

Middleware

EinnoVator™

www.einnovator.org; Info: info@einnovator.org

Innovation

Build New Products Fast

Why Innovate?

Software drives the modern economy. The companies that thrive are the ones that rip the benefits of software automation and integration, and exploit the potential for scale of the Internet. They create user experiences that brings customer satisfaction, add real value, and engage users trough online and mobile interactions.

Lean Movement

Faced with the uncertainties on how to innovate and create products that add real value to users and organizations, the *Lean Movement* proposes a fast iterative approach to product development where a MVP (Minimum Viable Product) is build quickly in order to collect empirical data of what should be built in the first place. This requires not only a new management culture, but also technology that is highly reusable and can be leveraged on to experiment with new business ideas quickly.

Building new products that add value and scale is hard. It requires much experimentation and exploration till user needs and wants are truly identified, experiences optimized, and market-product fit is achieved. Pivoting across multiple business ideas is a common necessity, before nailing into a path of success and business scale.

How to Innovate Fast

Making use of battle harden solutions that address generic functionality and provide convenient programming models is the best approach for fast progress and experimentation. Developers and entrepreneurs can focus in the specific issues and solutions of each business case, without wasting precious time and resources reinventing the common wheel.

Reuse is a well understood principle in Software Engineering, with the open-source movement being the most evident social manifestation. Reuse applies to algorithms, libraries and frameworks, but applies equality to full units of modularity – independently deployed services.

EInnovator proposition and recommendation is to rely, whenever applicable, in a small set of reusable core services that solve generic functionality to bootstrap new systems and applications. This way, work can focus immediately on functionality specific to each business case.

Adding to these core services, ready made client libraries with auto-configuration makes development of new applications straightforward. Rather than relying on complex visual tooling, we advocate for elegant distributed programming models.

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Micro-Services

Leveraging Reusable Middleware

Why Micro-Services ?

Traditional *monolithic applications* present difficulties to developers and business in the ability for rapid change, continuous delivery, and experimentation with alternative business ideas. **Micro-Services** style architectures address these issues by decomposing project functionally in independently deployed components – the services.

Relying on a set of <u>reusable</u> **Core Services**, adds an additional layer of simplification that allows building of new applications quickly without waste.

Boot Your Apps

EInnovator provides seed reusable software for *Startups* and *Enterprises* to quickly build MVPs, scale fast, and focus on building the specific functionality of products.

Complex legacy monolithic applications can also be refactored quickly, by removing generic functionality and delegating competences to specialized core micro-services.

Core Services

EInnovator *Micro-Service Suite* provides a set of out-of-the box white-label services, that can be easily reused across many different use cases. For each service area, we provide a generic programming model that makes application and product building easy and fun, while maintaining the highest quality and security standards. Client libraries are provided for developers favorite language for each of the service.

- **SSO Gateway –** Signin/Signup and user profile pages available in your apps in a breeze with flexible access-control, and battle-harder security.
- **Notification Hub** – Engage your users with targeted notifications, synchronize user preferences across apps consistently, and audit user and object actions.
- **Documents Storage** – Save user and application files – from avatars to user assets – with a hybrid cloud ready solution.
- **Payments** – Simplified Payments&Invoices service ready out-of-the-box. Monetize your applications from day one.
- **Social Communication** – Let users communicate freely, comment on objects, leave impressions, and reward users as gamification for added engagement.

https://www.einnovator.org/microservice-suite

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Cloud Manager

Effective Kubernetes

Multi-Cloud World

Different Cloud Providers provide different benefits and tradeoffs, from service availability, to performance, and cost. This makes planing for a cloud strategy hard and subject to change. Proper tools and runtime should be used to avoid possible vendor lock-in, and keep options open.

Why Kuberetes ?

Kubernetes is a container orchestration and cluster management runtime. It make it possible to deploy application and services in multiple cluster and clouds in a uniform way.

Deploying application containers to a **Kubernetes** clusters is a first step to be multi-cloud ready, and have the flexibility for change if the need arrives.

Cloud Manager

Cloud Manager is a **PaaS** for **Kubernetes** – *Platform as a Service*, which simplifies application and service deployment and management, across multiple **Kubernetes** clusters and multi cloud providers. It is the ideal tool to configure and deploy microservice architectures, enable continuous delivery, and enable developer-devops collaboration

- Multi-Cluster support
- Integration with all major cloud providers
- Uniform and simplified deployment model
- Troubleshooting and managing of deployments
- Solution marketplace with multiple catalogs
- Continuous Integration and Delivery pipelines

https://www.einnovator.org/cloud-manager

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SSO Gateway

Out-of-the-box Security for all Apps

Authentication & Access-Control

Security is a strict requirement for any application. Users need to be *authenticated* to make sure that privacy, access rules, and ownership of resources is protected. In a micro-service distributed environments, this is best achieved by having a central authority – **Single-Signon Gateway** – that handles all the complexities of authentication and manage user identify, group membership, and network connections in a safe way.

OAuth2 is the most widely used security protocol to achieve distributed authentication and access control, providing a security framework where different use-cases can be build.

Security also requires applications to have easy ways to express access control rules, with different approaches needed for different use cases. *Role and permission* based access control, and explicitly access control lists, are a common approaches for this. Group membership, organization structure, and networks of connections, further add to the complexity.

SSO Gateway

EInnovator SSO Gateway provides a white-label out-of-the-body solution to authentication in micro-services architectures based on **OAuth2** protocol. Build on top of industry recognized framework **Spring Security**, it adds additional layers of abstraction to make it adds further layers of abstraction to make security simpler and feature rich.

New applications can be made secured automatically be importing a SSO client library. Rich user profiles are supported with fancy and customizable themes. Most aspects of functionality are configurable via UI or configuration files – from API registration, to token and password management.

Multi-Level group hierarchies, structure in organizations, operations, and teams, are supported to allow for rich identity management and fine-grain access control.

Roles & permissions access-control model is provided to control global accesses, and internal organization level access to resources.

A configurable invitation mechanism is provided, for single user and bulk invites, customizable invitation templates, motives for invitation, and trigger of actions on invitation acceptance.

SSO Gateway

Feature Set & Use Cases

Feature Area	Feature	Use Cases	Community Edition	Enterprise Edition
Authentication & Account Management	Sign in/Sign up, Password Management	Out-of-the-box support for user registration and login	✓	✓
	User Identity and Profile	Fancy User Profiles and Identify with customizable themes	✓	✓
	OAuth2 support and 3th Party Provider Integration	Industry-standard for inter-app authentication and access-control	✓	✓
Group & Connection Management	Multi-Level Groups, Membership Management	Structure social space from organization to teams	✓	✓
	Connection Management	Connection based access-control		✓
Role Management & Access Control	Global and per Group Role and Permission Model	Site level and organization level access control	✓	✓
	Dynamic registration of roles and permissions	Application defined roles and access control rules	✓	✓
Invitations	User and Group Membership invitations	Application defined roles and access control rules		✓
	Invitation Motives and Custom Templates	Customize invitation messages with templates and motive objects		✓

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Notification Hub

Engaging Users & Event Backbone

Notifications

User Notifications are a mandatory feature in all applications to build user engagement and responsiveness. Notifications bring user attention to relevant events in application, shows that your business care for users, helps to build sense of community, and reduces churn rate.

Asynchronous notifications are also of critical important to maintain coordination and consistency across services in a distributed micro-service architecture. While different services should work independently as as much loosely-coupled as possible, key events often need to be know be all application to maintain state and data consistency.

Notification Hub

EInnovator Notification Hub provides a white-label out-of-the box solution to drive user notifications and distributed coordination.

Applications can send notification to users using *multiple mediums* to maximize responsiveness, including Email, SMS, and in app notifications. A *rich and generic event notification model* is provided that maps into the needs of virtually all apps. You can creat *custom notification templates*, for each event source and action.

Client libraries are provided out of the box, including **Java/Spring Boot Starter** library, and **JavaScript** library. A test framework is provided to develop, test, and visualize notification templates before being used in the app.

Notification Hub

Feature Set & Use Cases

Feature Area	Feature	Use Cases	Community Edition	Enterprise Edition
User Notifications	Email, SMS, InApp Notifications	Send notification to users using multiple mediums	✓	✓
	Notification Preferences	Notification preferences UI with multiple themes	✓	✓
	Rich Programming Model	Custom templates,provided client libraries, test framework	✓	✓
User Preferences	Inter-App Preference Synchronization		✓	✓
	Preferences Customization		✓	✓
Follower Management	Relation Management and Dissemination of Events		✓	✓
	Custom Business Rules			✓
Auditing	User and Object Actions Tracking			✓
	Centralized Access Monitoring			✓

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Notification Hub

Integration & Support Technologies

Integration & Extension Points

EInnovator Notification Hub internal architecture define a set of adaptors that make it straight-forward to customize how events are processed and propagated.

Rabbit MQ$_{TM}$ is the default message broker to propagate events asynchronously between application backends. Other message brokers can also be used in alternative (e.g. **Redis** channels, **Kafka**, **JMS**, **NATS**). Notifications are further propagated to web browser using **Web Sockets** and/or **Push Notifications**.

Redis is used as default database to persist user notifications and store user preferences. Additional or alternative stores can be used, including Relational and NoSQL Databases (eg. **Apache Geode**, **Pivotal GemFire**).

Email messages are propagated to users using standard **SMTP** connections with configurable cloud providers. Likewise, **SMS** are propagated using configurable cloud SMS providers.

Data analytics on events and access can be store in distributed file-systems such as **Hadoop/HDFS**, and distributed analytics databases (e.g. **HawQ/HDB** and **Greenplum**). *Enterprise Integration Pattern* frameworks can be also integrated to further process events in a customized way (e.g. **Spring Integration**, **Camel**) .

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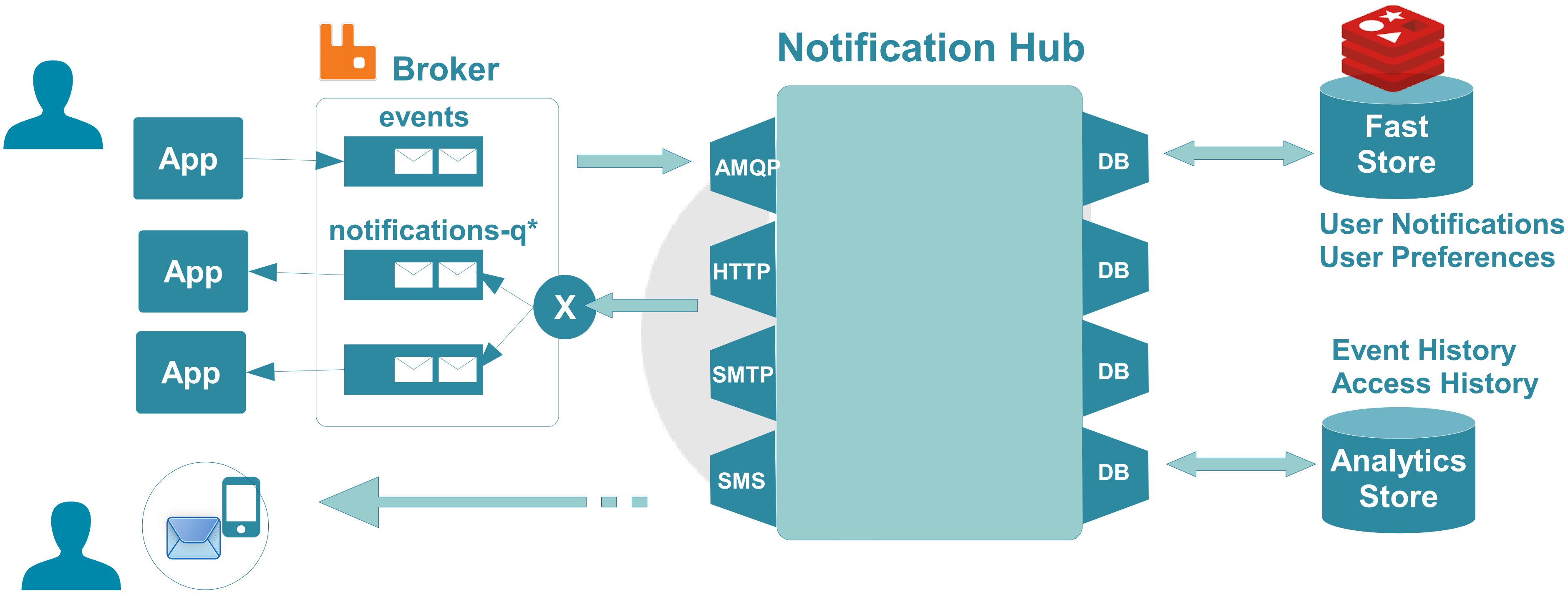
Notification Hub

Architecture



Document Store

File Storage for the Cloud

Document Storage

Storage in cloud-native applications and cloud environments require a different approach from traditional applications, as the permanence of the local storage can not be assumed. Application containers come and go, and thus file resources need to be treated as remote DB-like resources. Emulating file-system like storage is a need that most application can benefit from.

Some application further benefit from additional features beyond the basic API of traditional file-system. Including, custom attributed and rich meta-data, attachments, and version control.

The semi-open nature of the internet and networks, requires new model of collaboration, document sharing, and access control, including: per user individual sharing, group sharing, shared views of a file tree across an organization and teams, and integration of roles&permissions access-control model with the document access.

Additionally, hybrid solutions for file/document persistent are often desired. For example, with some resources stored in on-premisses data-centres, and others stored in a variety of cloud storage providers.

EInnovator Document Store

EInnovator Document Store provide a flexible and reusable solution to storage of user and application assets in a cloud environment

A single uniform folder-file tree data model is provided similar to traditional Unix file systems, with mount points that allow integration of multiple cloud and traditional file providers.

A rich sharing and permission model is provided, which allow for collaboration, shared views, and fine-grained access control.

The service UI can be used directly by users as a cloud storage and sharing of data across applications. Or the API can be used transparently by other app to store user assets, from avatars, to documents, and application resources.

Document Store

Feature Set & Use Cases

Feature Area	Feature	Use Cases	Community Edition	Enterprise Edition
Document Management	File-System like Operations	Read/upload and write/download, folder operations in the Cloud	✓	✓
	Meta-Attributes	Enriched document model with custom attributes	✓	✓
	Attachments and Versions	Optional attachment and versions	✓	✓
Permissions	Document Shares	Allow user to share documents with others	✓	✓
	Group based visibility and access	Allow users to access documents in common group document trees	✓	✓
Hybrid Storage	Unified Folder Tree with mount Points	Application defined roles and access control rules	✓	✓
	Multiple storage providers – cloud and traditional	AWS/S3, Google Storage and Drive, Box, (S)FTP, Local and Network		✓
Reliability	Backup Policy	Define custom backup policy with filtering		✓
	Replication Policy	Increase availability with replication strategies		✓

Payments

Fiat & Crypto

Payments & Monetization

Virtually all application and platforms require payment processing to be done within the system for monetization, and/or enabling business transaction. Thus what ever the industry, or business model, payment processing and management is required at some point in application workflows.

While variation in detail are possible, the benefits of making use of a reusable payment infra-structured for payments, rather than reinventing the wheel should be self evident.

Credit/Debit cards management and payments are a minimal required capability to have. Security and compliance mandates that specific practices are followed in order to ensure the integrity of transaction and security of the the data.

Integration with Bank transfer networks, like PLAID in US and SEPA in Europe, are also a often add on to support many business cases.

Proper invoicing, tax handling, fee structures, and purchase order management, are other nice to have features and sometime essential to some business model.

Finally, non-traditional payment models, like pre-paid wallets, and crypto-currencies tokens, can provide a cutting edge advantage to realize specific business models.

EInnovator Payment Gateway

EInnovator Payment Gateway provides an out-of-the box solution to enable Payments in your applications. In provides a customizable UI that can be used by users to manage their payment data, make payments, obtain invoices, and get money back. Administrators can also use the UI to manage payments, and perform auditing activities.

It contains a variety of feature that makes it suitable to only for billing, but also to support complex marketplaces involving multiple parties and roles.

It has support for configurable multi-currency handling, and country-specific tax configuration.

By default, the **Payment Gateway** uses **Stripe** and **PayPal** as cloud payment gateways. But integration with others can be added on demand.

Etherum Blockchain based tokens solutions can also optionally be used for innovative business models.

Payments

Feature Set & Use Cases

Feature Area	Feature	Use Cases	Community Edition	Enterprise Edition
Card Management & Payments	Personal and Organization Cards	Manage User and Organization cards with PCI Compliance	✓	✓
	Stripe and PayPal Integration	Interface with Stripe and PayPal	✓	✓
	Country Taxes	Configurable Country Taxes	✓	✓
Bank Transfers	PLAID, SEPA bank payments and transfer	Automate direct payments with transfer bank transfers		✓
	Customizable fees	Implement marketplaces with platforms fees		✓
Invoices & Purchase Orders	Invoices	Issue invoices to buyers and sellers	✓	✓
	Purchases Orders	Manage Purchase Orders and Limits		✓
Ethereum Blockchain Tokens	Solidity Contract Tokens	Create Token Wallets backed by Blockchain		✓
	Fiat and Crypto Exchange	Enable Token Purchase and Marketplace		✓

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Social Hub

Communication & Gamification

Social Communication

Humans are social creatures by nature, and all human activities involve communication and coordination. Thus, most if not all applications and business use case benefit from allowing inter-user communication, such as *comments* and *chat channels* attached to each managed object, and posting of reactions (*likes* and *votes*).

In addition to notifications and social communication, *user rewards* are also a great way increase user contributions and engagement. This can take a form of *reputation points* for accumulated actions, and *badges* and prices for performing specific categories of actions.

EInnovator Social Hub

EInnovator Social Hub is an out-of-the box service providing an API and UI for inter-user communication, commenting, and other human communication, coordination, and participation aspects.

Any object manage by applications can have a dedicate social channel for comment posting and reactions. Discussion and question-answer spaces or forums, can also be created using provided abstractions and UI.

Inter-user communication is supported via private messaging, and group chats.

Several gamification elements are provided to enhance user engagement, including reactions, such as likes and votes, reputation points, and multiple types of badges for performed actions.

Social Hub

Feature Set and Use Cases

Feature Area	Feature	Use Cases	Community Edition	Enterprise Edition
Embeddable Comments	Comment List, Post, Edit, Reply	Embedded comments and discussion for any object in your app	✓	✓
	Discussion forums	Help-Center, Share discussion spaces, community building	✓	✓
	Contributors access control	Control who can post, and managed posts and users		✓
Messaging	Inter-user messaging	User work coordination and communication.	✓	✓
	Group messaging	Team work.	✓	✓
Impressions	Votes, Likes, and Other Impressions	Impressions over message posts		✓
Rewards	User Badges	Rewards users for milestone achievements		✓
	Reputation Points	Compute user ranks.		✓

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Building Apps

Languages, Frameworks, Samples

Technologies

Micro-service enabled applications can be build with the best-of-breadth stacks and become simpler than traditional monolithic applications. All aspects related to common functionality, from security to notification to storage to payments, are available out-of-the-box. Client libraries are provided to simplify application building.

A commonly used stack is **Java/Spring Boot**, with provided libraries for auto-configuration and fast setup. Polyglot programming is also possible, which different application services build in different stacks while benefiting from a clear programming model and well defined service APIs.

Client Libraries

The following client libraries are currently available for all core services:

- **Java**, **Spring Boot**
- **Javascript**, **Node**
- **GoLang, C#, Rust** (upcoming)

Sample Apps

Several sample application are provided for demonstrating the use and power of levering the set of core micro-services. Hosted in GitHub public repositories:

https://github.com/einnovator

Partners & Clients

Enabling Startups, Transforming Enterprises

Partners

Partnerships with leading technology companies ensures that **EInnovator** delivers out-of-the-source authority and quality, following best-of-bread technologies and industry standards.

vmware®

Google Cloud
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Pivotal™

CERTIFIED

Clients

Startups and **Enterprises** that benefited from reusable **Core Micro-Services**.

greenfence

greenfence
consumer

CAUSEPLAY

Digital Pilgrim

EInnoVator™

People

Leadership

Jorge Simão, Ph.D.

Director (Product, Consultancy & Education)

Software Engineer, IT Trainer, Consultant

Ph.D, M.Sc., B.Sc., Computer Science and Engineering

People

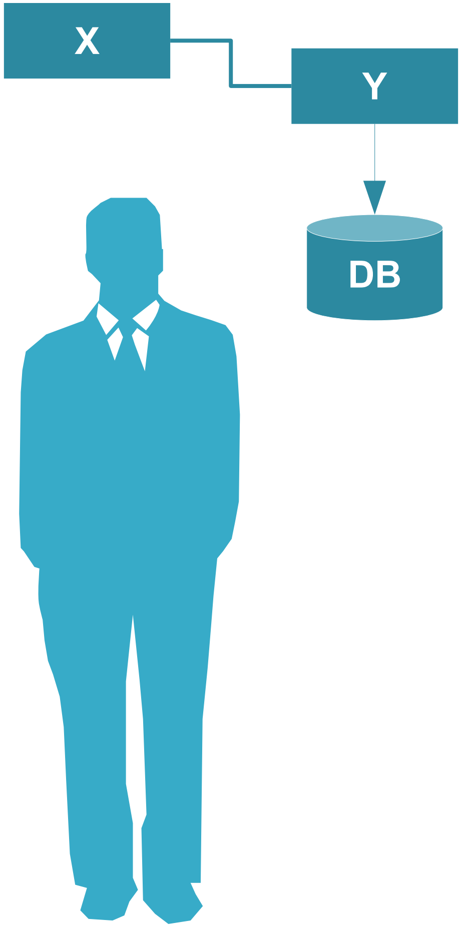
Developers & Consultants

Our Developer Team

Our developers are accomplished IT professionals and software engineers, with combined background in the industry scale complex system and academic research. A hard-won and long experience of enterprise software development and/or innovation research, they combine the ideal skills and knowledge to add value to your projects and company.

- Full-Stack Java/Spring/Web
- Android, iOS Mobile Devs
- Quality Assurance

How can EInnovator Help ?



A long and difficult road is harder to follow when alone or under prepared.

EInnovator brings technology, accumulated experience, know-how, man power, a pro-active and constructive mind-set to help your organization in the path of software-driven innovation. With **EInnovator** you get all this one package:

- **Reusable White-Label Core Services**
- **Configurable UI/UX**
- **Rich and Flexible Programming Model**
- **Client Libraries for Multiple Languages**
- **High-End Consulting and Architectural Design**
- **Application Design Consulting**
- **Micro-Services Expertise**
- **Best-of-breed Technology**
- **Software Development & Professional Services**
- **Trainer Lead Class Room Training**

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Contacts – Ask How We Can Help...

Ask for More Info

Want to know more details about how **EInnovator** can help your company to achieve software development goals ?!? Contact us... or send a request to be contacted by phone, or email.

Our mission statement is to ***enable your next step***, and bring in all our expertise and accumulated experience to focus your particular business idea and technical challenges ahead.

Contacts

Email: jorge.simao@einnovator.org

Website: **www.einnovator.org**

Phone/Whatsapp: +351 916 631 916

Zoom: https://zoom.us/j/4770185074

LinkedIn:
https://www.linkedin.com/in/jorgesimao71einnovator/
https://www.linkedin.com/company/10575964/admin/

Medium:
https://einnovator.medium.com/

Twitter: @jsimao71, @e_innovator

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