



NEDAO

Progress analysis and technical development avenues for finalizing the project

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Summary

This document aims to serve as a guide and inventory in technical developments of the project, following the discussion session, which took place on Friday September 2, 2022, between the partners techniques of the NEDAO project.

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Introduction

The NEDAO project being faced with a blockage in its development, due to various internal and external factors, and the NPR financing rules and NECO budgets requiring that the project be completed during 2023, it is now imperative to decide on a path of development leading to the finalization of the project.

The following sections list and location of the various project components and their [git repositories](#) . respective.

The aim is to give the best possible overview so that stakeholders can decide on the best technical path to follow to finalize the project.

To save time, this document has been written in markdown / LaTeX.

The source file, [freely accessible here](#), can be converted to PDF via the following (bash) command¹, from the cloned snippet directory: # From the cloned snippet

```
directory: ./render.sh
```

Or if the document was downloaded manually (the file will be prefixed with the current timestamp, instead of the short hash of the last commit, and some images may not be visible): `cat Situation_avance-pistes_NEDAO.md`

```
| pandoc -t pdf \ -o $(date +%s*)_Situation_advancement-tracks_NEDAO.pdf \ &&  
xdg-open $(date +%s*)_*.pdf
```

1. The following packages (Debian/Ubuntu) must be installed: pandoc, texlive, texlive-extra-utils, texlive-lang-french, texlive-fonts-recommended, texlive-fonts-extra, texlive-latex-recommended, texlive-latex-extra

Project Components

Planned modules

According to the initial architecture of the project:

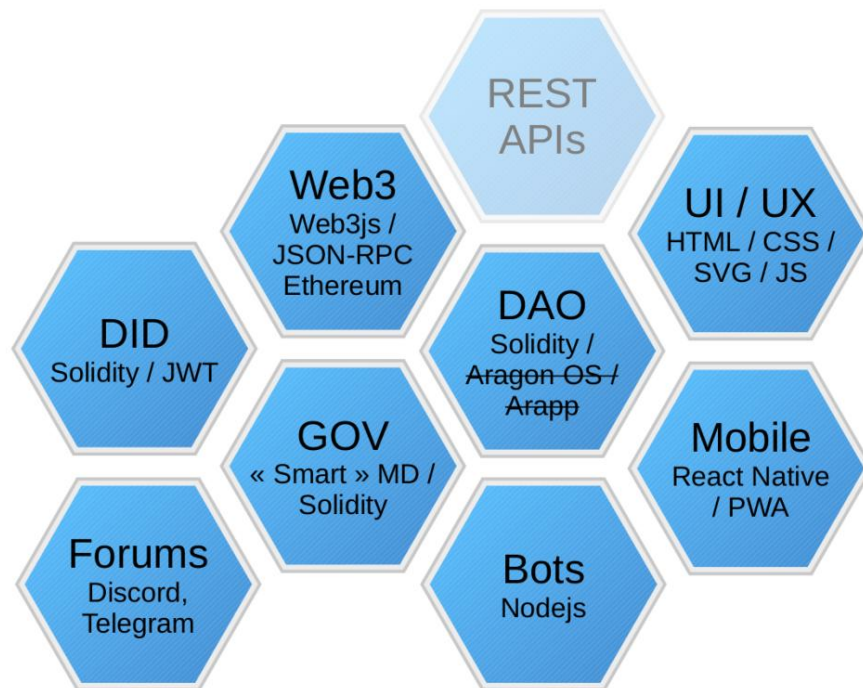


Figure 1 – *Deployables* of the NEDAO project

The corresponding and/or associated modules can be listed as follows:

Module	Description	Deposit
DID (Contracts)	The decentralized identity management module, using ZKP techniques users to ² to allow the receive certificates and certificates linked to their identities.	nedao-did-contracts
DID (Front-end)	The UI associated with DID contracts, with support for users for creation of their identities, and publication of meta-data verification on IPFS.	nedao-did-dapp
Document Management	Module allowing users to create, edit, publish on IPFS and submit, a new project proposal document or modification of governance, which will be associated with a DAO vote.	nedao-documents-platform

Module	Description	Deposit
DAO	The core contract of the DAO of the NEDAO project, acting as manager of funds and votes on submitted projects. Replaced nedao-aragon-dao .	nedao-core-dao
On boarding	Home and onboarding site for the NEDAO platform. Including Web3 provider detection, triggering explanation pop-ups, etc. UX for absolute beginners but also allowing veterans to navigate quickly without being disturbed.	nedao-onboarding
NEDAO Mobile	A mobile application allowing you to transport, use and/or verify identities and associated certificates.	nedao-mobile
Validator bot	Webservice and DID validation bot, off-chain and/or on-chain, for automatic verification of prerequisites (fee payment, other certificate, etc.) and automatic or semi-automatic certification.	nedao-bot-validator
NEDAO governance	The governance documents of the DAO (and not of the NEDAO Association) also containing the tags and meta-data allowing them to be linked to smart contracts.	nedao-governance
NEDAO Branding	The general graphic charter of the project, used as a dependency by most UI / front-end repositories.	nedao-branding

All the repositories (some of which have been made obsolete, such as [nedao-aragon-dao](#)), are located in the Gitlab [nedao-devs](#) group on the instance hosted by [FBO Developments Sàrl](#).

Advancement

DID (Contracts) - [nedao-did-contracts](#)

— **Version:** [v0.1.0-alpha.5](#) —

Contributor(s): [FBO Developments Sàrl \(Fabio Bonfiglio\)](#)

— **Progress:** Completed. In alpha. Unaudited.

— **Reference branch:** [develop](#) — **Tests:**

Coverage at [90.32%](#) — **Deployed:** [On](#)

[Goerli testnet \(0x3f3926D79CaB337cA9e45FAD3223c3C47b6eB8b0\)](#)

Contracts managing decentralized identity, validation and certification methods, as well as verification associated with identifiers, implemented according to a logic/data segregation model. They are ready to use, deployed for testing on the Goerli network or to be deployed on an EVM usable in production.

DID (Front-end) - [nedao-did-dapp](#)

— **Version:** [v0.1.1-alpha.4](#)

2. Zero Knowledge Proof (https://fr.wikipedia.org/wiki/Preuve_%C3%A0_divulgaration_nulle_de_connaissance)

— **Contributor(s):** FBO Developments Sàrl (Fabio Bonfiglio), Talk To Me Sàrl (Mattia Torselo, Alexander Bianchi, Bryan Coupy), Arcantel SA (Yannick Mauray, Alexandre Bianchi)

— **Progress:** Demonstrator. UX in alpha, UI at ~80% progress, IPFS library to be updated.

— **Reference branch:** [develop](#) — **Tests:**

Coverage at [49.94%](#) — **Deployed:** [https://](https://staging.nedao.ch/did/v0-1-1-alpha-4)

staging.nedao.ch/did/v0-1-1-alpha-4 (discontinued)

The front-end of the DID platform. Remained practically as is following the [demonstration given during the Digital Days 2020](#). In addition to the finalization work, in the case of deployment of DID contracts on an EVM other than Ethereum Main Net, UI/UX and integration adaptations are to be expected.

Document management - [nedao-documents-platform](#)

- **Version:** -

— **Contributor(s):** Uditis SA (Gianni Scarnera, Christophe Bolinhas), FBO Developments Sàrl (Fabio Bonfiglio)

— **Progress:** UI/UX ~60%, DAO integration ~20% — **Reference branch:** [18-structural-redefinition](#) (MR !11 opened)

— **Tests:** - —

Deployed: -

Finalization work necessary to make the UI operational. Integration with IPFS and DAO contracts remain entirely to be done.

DAO - [nedao-core-dao](#)

- **Version:** -

— **Contributor(s):** FBO Developments Sàrl (Fabio Bonfiglio)

— **Progress:** Repo created to replace nedao-aragon-dao

— **Reference branch:** [master](#)

— **Tests:** -

— **Deployed:** -

Repository created to replace nedao-aragon-dao when it became clear that Ethereum's transaction fees would be a big barrier to adoption.

This repository was intended to contain the source code for the *EVM-compatible* replacement solution that would be selected.

Onboarding - [nedao-onboarding](#)

— **Version:** [v1.0.5](#) —

Contributor(s): FBO Developments Sàrl (Victor Audétat, Fabio Bonfiglio)

— **Progress:** Ready for use. Access portals (with active identity detection) to the UI of the DID and the DAOs ready to integrate.

— **Reference branch:** [master](#) — **Tests:**

[0%](#) coverage — **Deployed:** [https://](https://nedao.ch)

nedao.ch

The articles are published statically (MD / MDX pages). A documentary/educational section can be added quickly.

NEDAO Mobile - [nedao-mobile](#)

- **Version:** -

- **Contributor(s):** Arcantel SA (Alexander Bianchi)
- **Progress:** MVP operational locally. CI/CD < 20%.
- **Reference branch:** [fetch-data](#) (MR !3 opened)
- **Tests:** -
- **Deployed:** -

The application allows you to present identity, certificates and verifiability data.

Bot validator - [nedao-bot-validator](#)

- **Version:** - —
- Contributor(s):** FBO Developments Sàrl (Fabio Bonfiglio)
- **Progress:** On-chain automatic validation ready, off-chain automatic validation at ~80%, semi-automatic (and hybrid) validation \$ ~80%, back-end off-chain validation at ~60%, UI manual validation at ~ 60%.
- **Reference branch:** [2-implementation-back-end-bot](#) (MR !3 opened)
- **Tests:** Coverage at 89.19% —
- Deployed:** -

Ready to deploy (*EVM compatible*) for validators using full-auto and on-chain certification. Work mainly on the UI side for the off-chain validator, which will come in the form of a package to be deployed locally by the validator.

NEDAO governance - [nedao-governance](#)

- **Version:** -
- **Contributor(s):** HEG / IDO (Steve Berberat), FBO Developments Sàrl (Fabio Bonfiglio)
- **Progress:** Documentation of initial DAO governance schemes. Metadata linking to governance smart contracts to be carried out.
- **Reference branch:** [8-define-the-formalisms-of-representation-of-governance-rules](#) (MR !3 opened)
- **Tests:** - —
- Deployed:** -

If a governance solution other than EVM / smart contract (e.g. [snapshot](#)) is chosen, these governance models will be inapplicable.

NEDAO Branding - [nedao-branding](#)

- **Version:** [v1.5.0](#) —
- Contributor(s):** Arcantel SA (Alexandre Bianchi), FBO Developments Sàrl (Fabio Bonfiglio, Victor Audétat), Talk To Me Sàrl (Mattia Torselo)
- **Progress:** Graphic charter and common React components that can be used as dependencies.
- **Reference branch:** [master](#) — **Tests:**
- Coverage at 77.34% — **Deployed:** [Git package](#)

NPR Deliverables

According to the NPR financing agreement, below are the planned deliverables and indicators, as mentioned in the agreement, as well as their current status.

Deliverable	Indicator	Status
Creation of a type platform Participatory and citizen DAO for Neuchâtel residents	First MVP deployment of the DID platform, DAO and documentary and social platforms, planned for the end of January 2020, then deployments according to plan.	DID ready and deployed for testing, DAO pending, documentary platform pending, social platforms (Discord , Telegram , Twitter , Youtube , LinkedIn) ready, API links with Telegram and Discord. 14 official partners to date, including 3 academic, 2
Establishment of a strong and experienced ecosystem of partners specialized in the creation of decentralized, traceability, or universal verifiability applications, for implementation in any sector of activity, including public administrations. + Networking and validation of the quality of partners. + Participation in academic research programs associated with these new technologies.	10 partnerships of indefinite duration, and 1 communication partnership (Digital Days) fixed term to date ³ .	institutional, 5 technical (IT - infrastructure), and 4 from the legal or financial sector.
Training for the general public on these new technologies and their paradigms Demonstrator	He-arc HEG / UNINE / LexTech conferences, Blockchain training.	Onboarding conferences have not yet taken place.
of the reliability of these new technologies and their possible applications. + Project financing via the DAO (40,000 CHF allocated for launch) ⁴	-	Unrealized
Positioning of the Canton as a pioneer in the field	A few articles already published in the press, but still none covering a concrete opening to the general public	Incomplete

Development avenues

According to the NPR financing rules and NECO budgetary requirements, the final deadline for finalizing the project is 12/31/2023. The scenarios described below meet this condition.

3. November 13, 2020 4.

Deducted from the last tranche of funding!

Scenarios

The following avenues should be considered.

Variant	Description
01	MVP released in demo (pre-alpha, some features simulated, such as for example the financing of a project following a vote), and submission of a report explaining that the technology is functionally ready, but the Ethereum platform presents transaction costs that are still too high for enable adoption by the general public.
02	Finalization of the project on Ethereum, as planned by the project initial.
03	Finalization of the project with use of the DID such than exists, and the use of an off-chain system for votes. Not really a DAO because there is no financial automation and decision-making (e.g. changes to governance rules). ⁵
04	Finalization of the project as planned by the initial project, but on another <i>compatible EVM platform</i> . This scenario is to be preferred to that of simply deploying the project on an Ethereum testnet, because the work required is practically identical.
05	Finalization of the project as planned by the initial project, but with complete migration to <i>the Internet Computer (Dfinity)</i> .

Response to NPR criteria and possible funding

Variant Demonstration criterion		Usability criterion	Exportability criterion	Funding NPR
01	Completed	Unfilled	Unfilled	Partial ⁶
02	Completed	Completed	Completed	Complete ⁷
03	Partial (not really a DAO)	Partial	Partial (DID uniquely)	Partial to complete ⁸
04	Completed	Completed	Completed	Complete
05	Completed	Completed	Completed	Complete

Feasibility and costs

The following development times are estimated for each track:

5. Like snapshot.org

6. Around 20-25 KCHF could still be obtained. Insufficient to cover open invoices

7. 108 KCHF remaining - 40 KCHF to be allocated to the first projects financed by the DAO = 68 KCHF

8. Depending on acceptance under the first deliverable described above.

Variant Summary of the work to be provided		J/H	% NPR financing coverage	9
01	Adaptation and upgrade of the libraries used (notably IPFS, etc.). Writing a detailed report explaining the situation and the reasons for the impossibility of completing the development of a complete CAD.	~25	0%	
02	Adaptation and upgrade of libraries + development of DAO contracts (1 <i>vault contract</i> , 1 proposal-voting contract, 1 governance rules contract) + finalization of proposal interface (nedao-documents-platform), onboarding finalization (nedao-onboarding), communication and organization of launch conferences Adaptation of the UI/UX of the document management platform (nedao-documents-platform),	~120	~40%	
03	and finalization of the latter, to generate votes on snapshot or equivalent platform, establishment of an administrative organization to execute decisions and transfers in crypto. Adaptation and finalization onboarding (nedao-onboarding).	~80	~45%	
	Communication and organization of launch conferences.			
04	Same work as for scenario 02, with some adaptation in terms of UI/UX. This variant would make it possible to choose a chain with lower transaction fees and thus promote faster adoption. A <i>Layer 2</i> such as Optimism could be used, but the maturity of this type of network is not yet high enough, and in terms of UX, users must notably transfer their ETH .	~130	~36%	
05	Important work of complete rewriting of contracts, in Motoko or compiled in WASM from Rust or C++ instead of Solidity. Using Internet Identity instead of the DID. Adaptation and finalization onboarding (nedao-onboarding).	~200	~20%	

Evaluation of variants

Variant	Evaluation
01	This solution could be accepted by NECO as the conclusion of the project. However, since not all targets would be met, only a small part of the final tranche of funding could be awarded. This amount would possibly be sufficient only for the payment of open invoices.
02	Although meeting practically all the criteria and indicators for finalizing the project as provided for by the convention, adoption by the general public will encounter the obstacle of transaction fees still too high on Ethereum. THE next upgrade of Ethereum, which will activate sharding, is planned for ~2023 deployment for now. Sharding is the upgrade that , without further precision in this date of should ultimately solve the problem of transaction fees that are too high for non-financial uses of Ethereum.
03	This solution would avoid the obstacle of high transaction fees. However, although voting and cryptographic security of decentralized identities would be demonstrated, there will not actually be a DAO capable of funding projects to vote and/or execute governance rules. This would therefore require continuous administrative monitoring for the operation of the platform, which will therefore need to be financed.
04	At the cost of a few UI/UX adaptations, a DAO meeting all the criteria, as would be the case with variant 02, but with less of the problem of transaction fees. However, additional research work must be done to choose the <i>EVM</i> platform or <i>Layer 2</i> that would be used.
05	This solution would make it possible to publish a DAO completely <i>on-chain</i> . The transaction costs would be zero for the user, but operational costs are necessary for the operation of the <i>canisters</i> ¹⁰ , which must be passed on to the user via participation contributions for example.

Conclusion

If a rapid project completion solution is indeed possible administratively and technically speaking with variant 01, the resulting funding granted would not make it possible to pay for the technical, documentary and communication work that would be necessary.

The best balance between financing coverage, response to the criteria (in particular having a functional CAD), and necessary development time, is offered by variants 02 and 04.

9. Taking into account invoices still open, as well as NPR financing conditions (45% financed - 55% provided by partners). 10. Equivalent of smart contracts on the IC. See <https://smartcontracts.org/>.

Solution 03 is the one that was put forward during the last general assembly. Following this detailed evaluation, it appears that the administrative monitoring that would result from it for its long- term operation would cancel out any demonstrator effect of the advantages of DAOs and the financial automation that can be offered by *smart contracts*, while requiring a permanent source of financing.

Variant 05, while fulfilling this demonstrator function, would however also require a source of financing (contributions or fees taken from project financing). This last solution is also the one that would require the most development work to see the light of day.

To unblock the project and reach a satisfactory conclusion for all partners, a precise plan of the resources that can be made available, as well as their respective skills, and the funding that could still be allocated, must be established.

Depending on this, the members of the NEDAO Association will then be able to decide on the path to follow.