NEXT GENERATION INTERNET

At RustFest 2019

NGI0: come work for the internet

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nlnet FOUNDATION

NGI ZERO

About me

Jos van den Oever

@NLnet since June

My crates:
Rust Qt Binding Generator
Rome RDF Triple Store
Other projects
Strigi
WebODF
ODF standard
Website
www.vandenoever.info

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Back in 1982 ...

... scientists and engineers like **Teus Hagen**, **Jaap Akkerhuis** and **Daniel Karrenberg** started building grass roots computer networks that grew into the European internet, together with their friends from the **European UNIX user groups** (like **Peter Collinson** and **Keld Simonsen**).

This is the joint history of **NLnet** and the **EUnet.**

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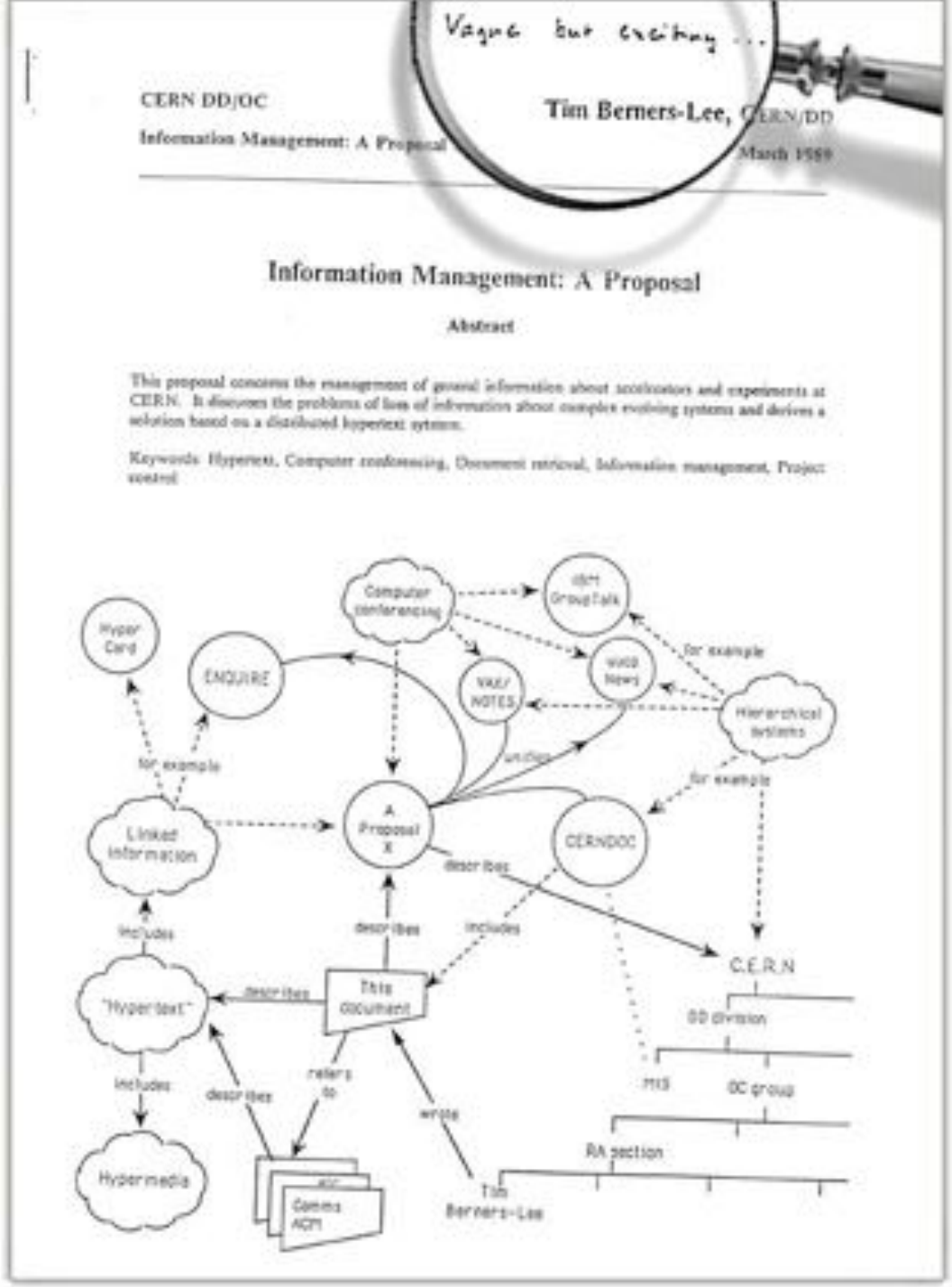

A mere thirty years ago..

... the world wide web was still a “vague but exciting” proposal inside CERN to manage information
... Stichting NLnet formally became a legal entity (a foundation), in an effort to scale up the adoption of the early internet in Europe (after 7 years of informal operations)
... and it caught on

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“From utopia to dystopia in just ~~29~~ [30] short years”

“We demonstrated that the Web had failed instead of served humanity, as it was supposed to have done, and failed in many places. The increasing centralization of the Web ended up producing—with no deliberate action of the people who designed the platform—a large-scale emergent phenomenon which is anti-human.”

Tim Berners-Lee

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TODAY WE CREATE THE

INTERNET

OF TOMORROW

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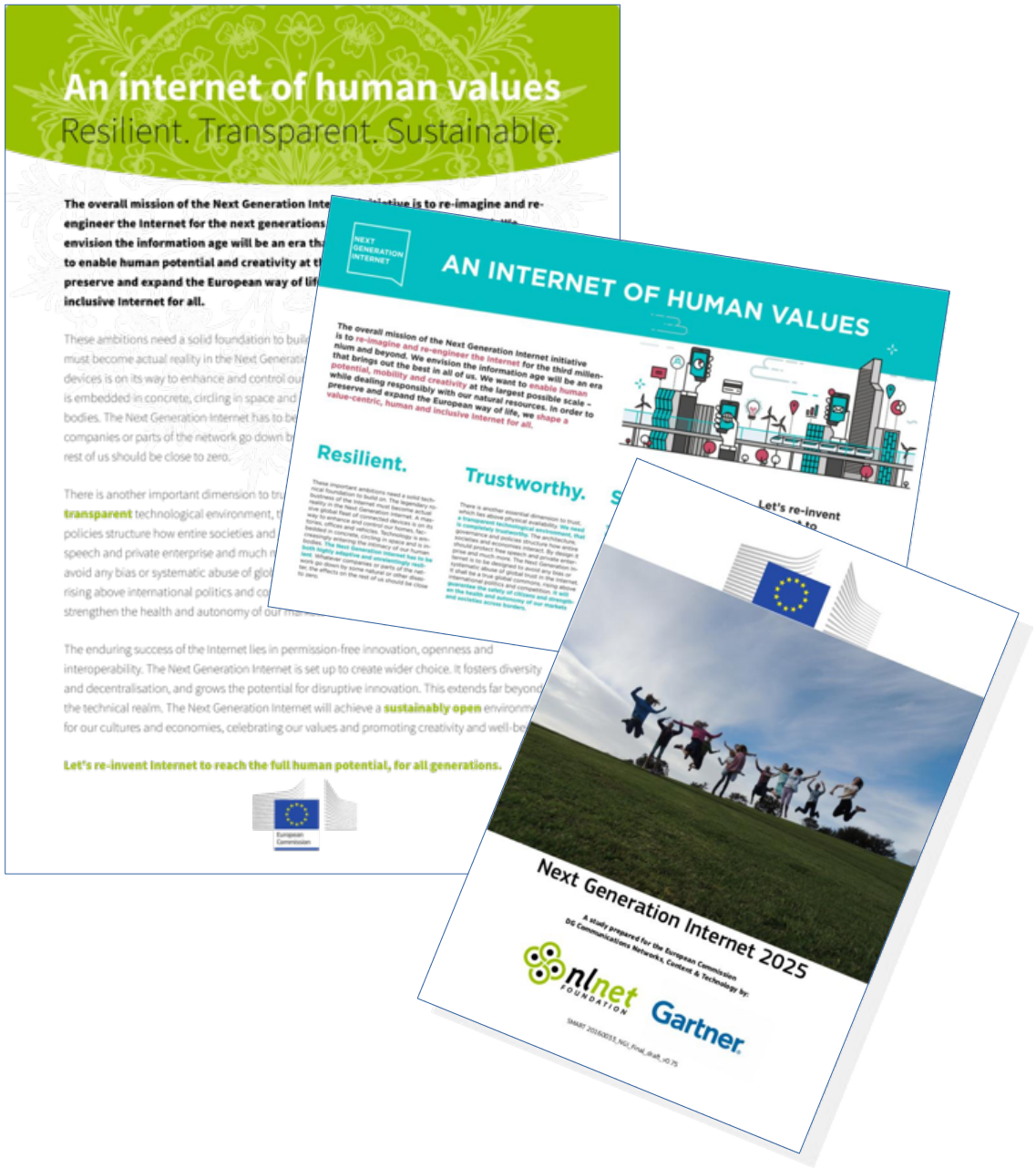

In 2016 the **European Commission** took up the idea for the **Next Generation Internet** initiative:

"The overall mission of the Next Generation Internet initiative is to re-imagine and re-engineer the Internet for the third millennium and beyond. **We envision the information age will be an era that brings out the best in all of us.** We want to enable human potential and creativity at the largest possible scale. In order to preserve and expand the European way of life, we shape a value-centric, human and inclusive Internet for all."

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NGI is a moonshot **++** effort

- The internet is the **largest** and **most pervasive** technical construct ever made by humans
- And we need to change it with 3.8+ billion people ‘on board’.
- High political stakes. High economic stakes. Highly critical users users. Overloaded with expectations. From everybody.
- Work consistent and forward-thinking. No time to lose.

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The vision: Preamble

"The overall mission of the Next Generation Internet initiative is to re-imagine and re-engineer the Internet for the third millennium and beyond. **We envision the information age will be an era that brings out the best in all of us.** We want to enable human potential and creativity at the largest possible scale. In order to preserve and expand the European way of life, we shape a value-centric, human and inclusive Internet for all."

An internet of human values

Resilient. Transparent. Sustainable.

The overall mission of the Next Generation Internet initiative is to re-imagine and re-engineer the Internet for the next generations third millennium and beyond. We envision the information age will be an era that brings out the best in all of us. We want to enable human potential and creativity at the largest possible scale. In order to preserve and expand the European way of life, we shape a value-centric, human and inclusive Internet for all.

These ambitions need a solid foundation to build on. The legendary robustness of the Internet must become actual reality in the Next Generation Internet. A massive global fleet of connected devices is on its way to enhance and control our homes, factories, offices and vehicles. Technology is embedded in concrete, circling in space and is increasingly entering the intimacy of our human bodies. The Next Generation Internet has to be highly adaptive and **resilient**. Whatever companies or parts of the network go down by some natural or other disaster, the effects on the rest of us should be close to zero.

There is another important dimension to trust, which lies above physical availability. We need a **transparent** technological environment, that is trustworthy. The architecture, governance and policies structure how entire societies and economies interact. By design it should protect free speech and private enterprise and much more. The Next Generation Internet is to be designed to avoid any bias or systematic abuse of global trust in the Internet. It shall be a true global commons, rising above international politics and competition. It will guarantee the safety of citizens and strengthen the health and autonomy of our markets and societies.

The enduring success of the Internet lies in permission-free innovation, openness and interoperability. The Next Generation Internet is set up to create wider choice. It fosters diversity and decentralisation, and grows the potential for disruptive innovation. This extends far beyond the technical realm. The Next Generation Internet will achieve a **sustainably open** environment for our cultures and economies, celebrating our values and promoting creativity and well-being.

Let's re-invent Internet to reach the full human potential, for all generations.

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First goal: resilience

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Second goal: Transparency and trustworthiness

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Third goal: Sustainably open.

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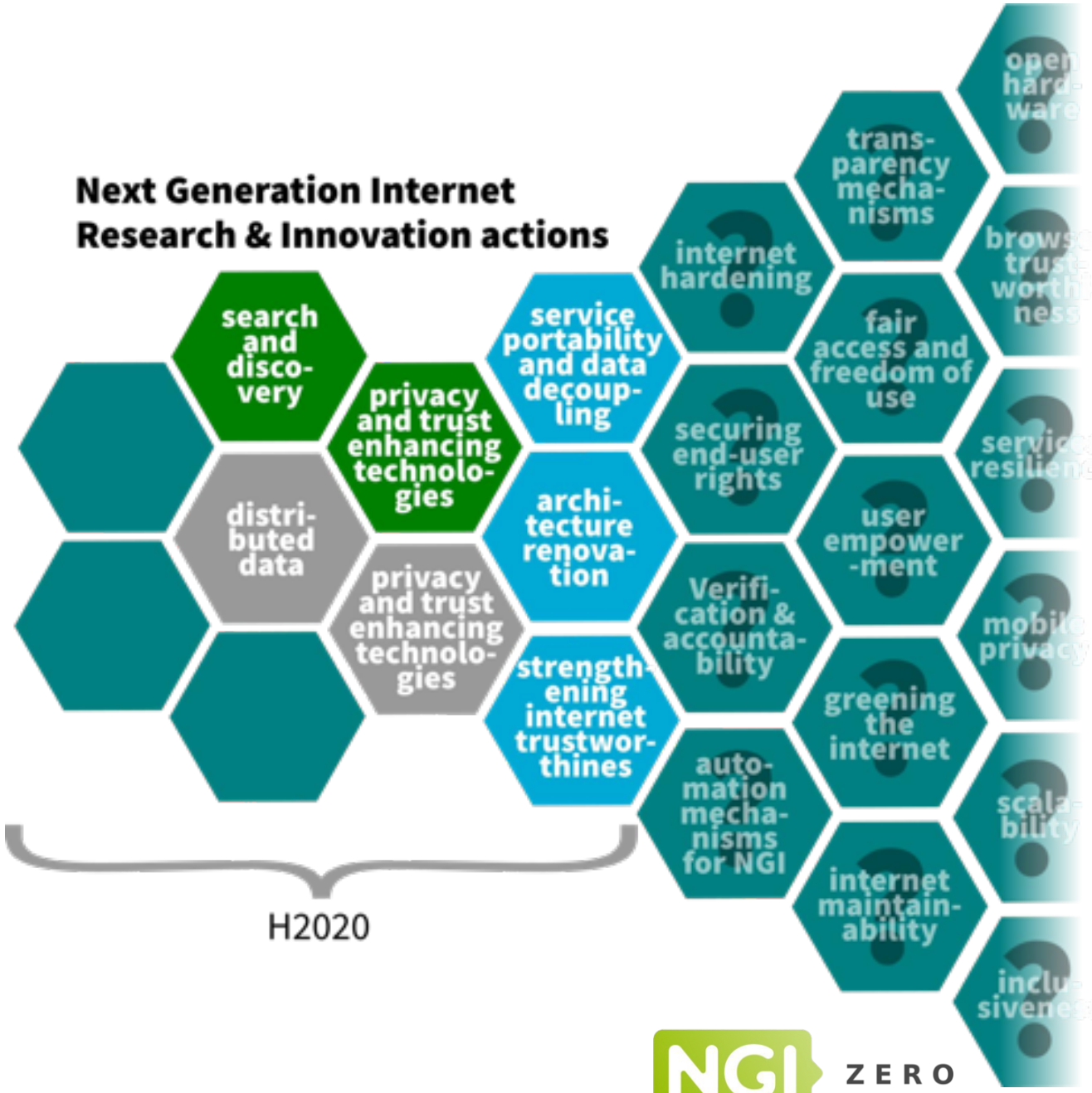
Next Generation Internet
Research & Innovation actions
search and discovery
distributed data
privacy and trust enhancing technologies
privacy and trust enhancing technologies
service portability and data decoupling
architecture renovation
strengthening internet trustworthines
internet hardening
securing end-user rights
Verification & accountability
automation mechanisms for NGI
transparency mechanisms
fair access and freedom of use
user empowerment
greening the internet
internet maintainability
open hardware
browser trustworthiness
service resilience
mobile privacy
scalability
inclusiveness
H2020
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NixOS
APC
ifrOSS
p.s::
fsfe
Translate House
ETH zürich
nlnet
Packaging
FOSS legal issues
Security scan
FOSS licensing
Accessibility
Calls, coordination, other...
Diversity management
Community building
Documentation
Localisation/i18y
Standardisation
Secure software guidelines

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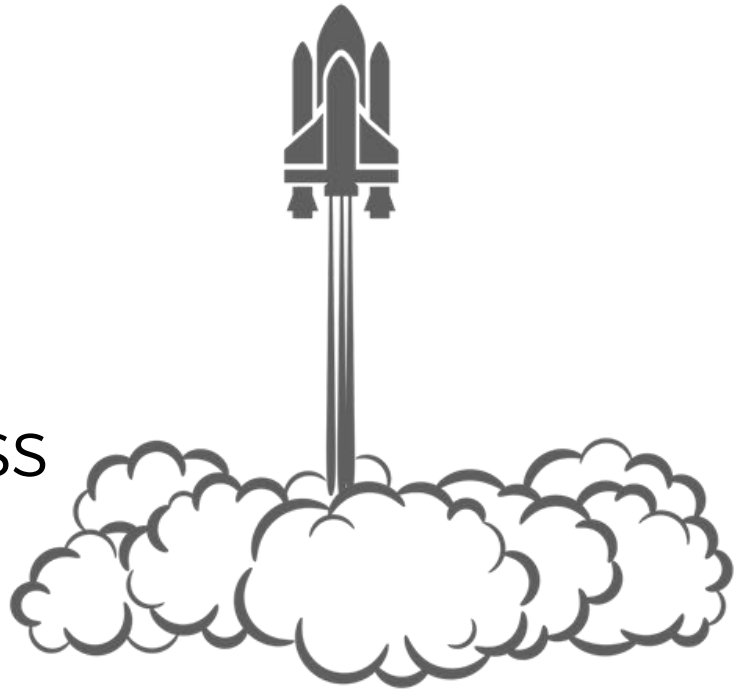
What we wanted to achieve

Design a light-weight and confidential application procedure providing adequate insight into technical capabilities as well as the urgency, relevance and relative cost effectiveness of the projects proposed at a low cost to the **applicants**.



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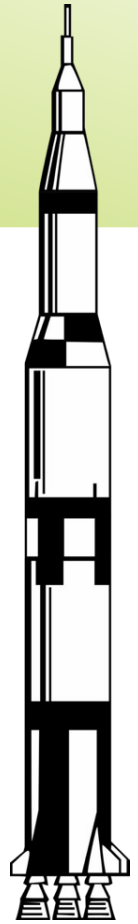
Low barrier to entry



- .. we use a **staged approach** which identifies and amends missing or inadequate aspects of the proposals prior (and conditional) to the start of a project.
- ... and **guide** and **support** projects with essential QA and strategic aspects that require additional expertise

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5.6 million euro
in small grants
until 2021

47 active projects already running

> 90% new to H2020

1.6M€ allocated so far

Competitive calls every **two months** until the budget is allocated.

Projects between 5k-50k
Follow-up possible

Walk the talk:
Inclusion
Security
Localisation
Open Standards
Free & Open Source
Deliver to deploy

Key characteristics

5.6 million euro
in small grants
until 2021

82 active projects already running

> 90% new to H2020

2.8M€ allocated so far

Betrusted software and BetrustedOS

Betrusted is a **cryptoprocessor** with a dedicated display and keyboard. It's a protected place for your private matters.

https://betrusted.io/

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A proof of concept of identity-based encryption

https://nlnet.nl/project/IBE/
https://privacybydesign.foundation/en

Extend the existing attribute-based identity platform IRMA with **easy-to-use encryption**. The kind of encryption is called Identity-Based. Its main advantage is that key management is simple, so that encryption becomes easy to use, via a plugin to an email client (only Thunderbird in this proof of concept project).

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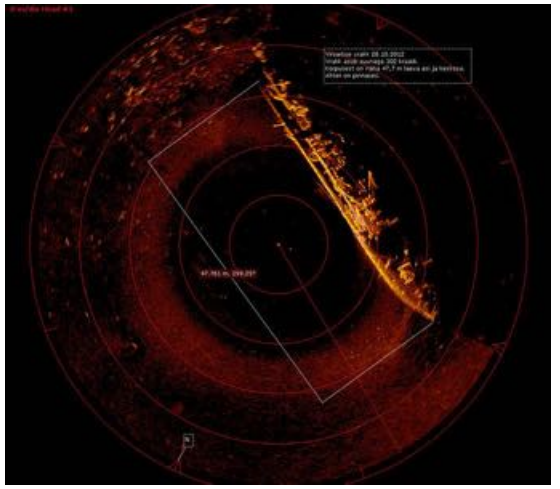
Sonar

https://nlnet.nl/project/Sonar/
https://arso.xyz/sonar



Sonar is a **p2p database and search engine** running on top of the dat stack. The search index is created with **sonar-tantivy**, specialized javascript bindings to **tantivy** – a search engine library written in Rust.

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Wireguard Rust Implementation

https://nlnet.nl/project/Wireguard-Rust/

A fast and modern VPN that utilizes state-of-the-art cryptography

Oxidize!

WIREGUARD

FAST, MODERN, SECURE VPN TUNNEL

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More Rust projects

Noise Explorer-VerifPal **Nadim Kobeissi**

Noise Explorer is a framework for designing, formally verifying and generating secure implementation code for arbitrary secure channel protocols based on the Noise Protocol Framework.

Opaque Sphinx Server and Clients

Stefan Marsiske

password storage, has Rust bindings

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Support different layers

End user applications

- Searx, Plaudit, Blink RELOAD, Sonar, El Repo, Transparency Toolkit, Nextcloud
- **Technical building blocks**
- GNU Name System, Software Vulnerability Discovery, IPFS Search, DID Resolver/Registrar,
- **Community infrastructure**
- StreetComplete, Fediverse.Space, SCION Geotagging, DeltaBot,
- In Common, SCION-SWARM, Fediverse Space
- **Explorative search and discovery**
- Neuropil, librarian

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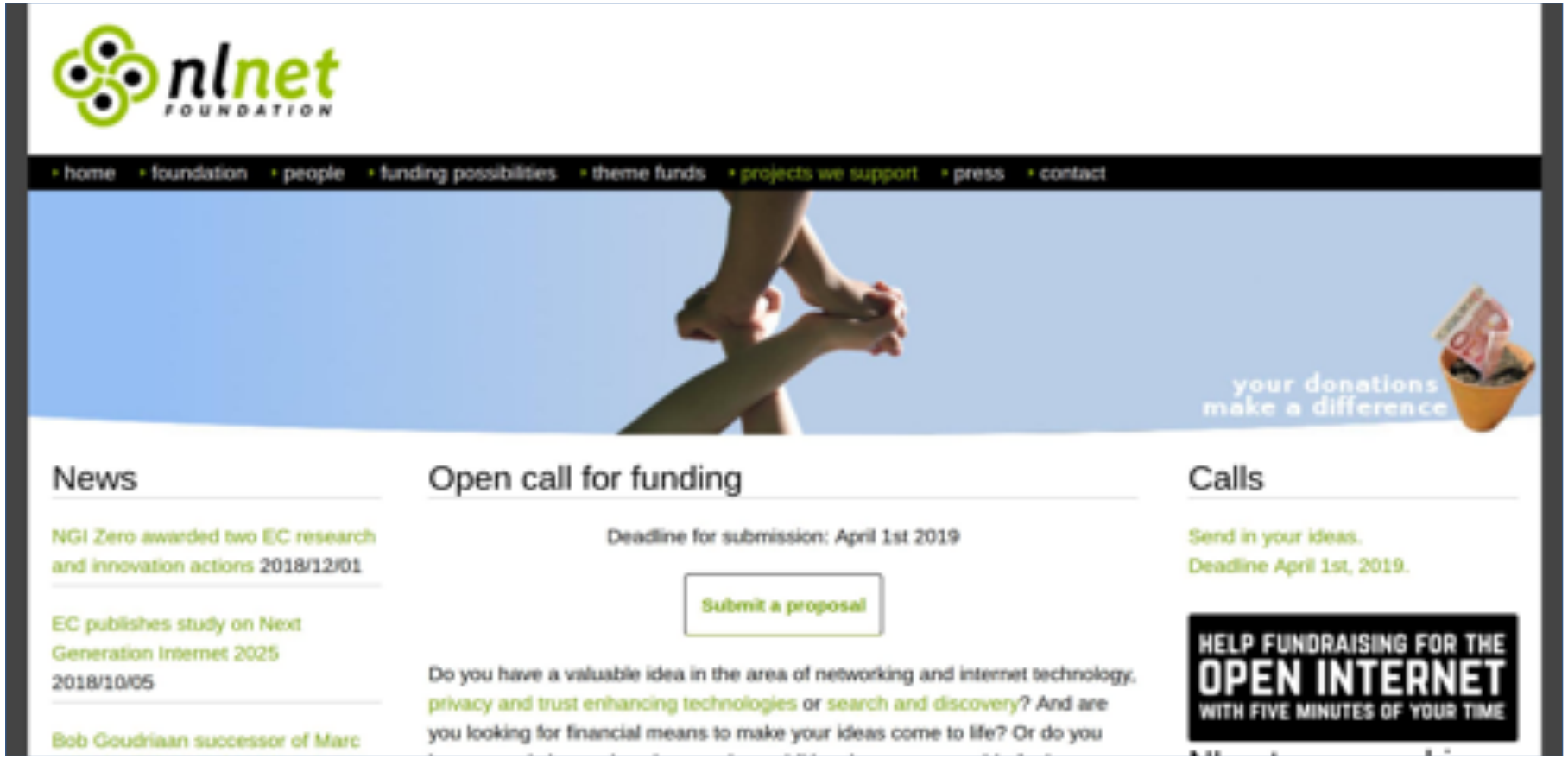
the next generation internet initiative cordially invites you to

work for the internet

Full time and part-time paid and unpaid positions available.

- Work from home (or anywhere you like)
- Collaborate with people from all over the world
- Challenge your talents to the extreme
- Help save future generations

European Commission



Calls are open ...
https://nlnet.nl

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join us and help discover and shape the next generation internet

and claim your spot in human history

Full time and part-time paid and unpaid positions available.

Read all about it on
- https://nlnet.nl/discovery
- https://nlnet.nl/PET
- https://ngi.eu

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European Commission

Where does **your** idea fit?

Image courtesy of VerifPal

We are searching for awesome projects to fund → https://nlnet.nl

The next deadline is December 1st...

What can you do for the open internet, for the privacy and security of users? What better alternative can you create, or add to?

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Questions?

If not, enjoy RustFest!

Tell your friends!

NGI Zero project has received funding from the
European Union's Horizon 2020 Research and Innovation
Programme under Grant Agreement No 825322 and 825310.
Visit: https://NLnet.nl for more information.