



.nl: for confidence online

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SIDN is the operator of the .nl TLD

- Objective: increase society's confidence in the Internet
- Provide secure and fault-tolerant registry services for .nl
 - Anycasted DNS services with DNSSEC support
 - Registration and domain protection services
- Increase the value of the Internet in the Netherlands and elsewhere
 - Enable safe and novel uses (SIDN Fonds, IRMA)
 - Increase security and trustworthiness of the infrastructure (SIDN Labs)
- Not-for-profit organization of ~100 FTE, based in Arnhem



.nl = the Netherlands
17M inhabitants
6.2M domain names
3.4M DNSSEC-signed
2.5B DNS queries/day
8.6B NTP queries/day



How it all began

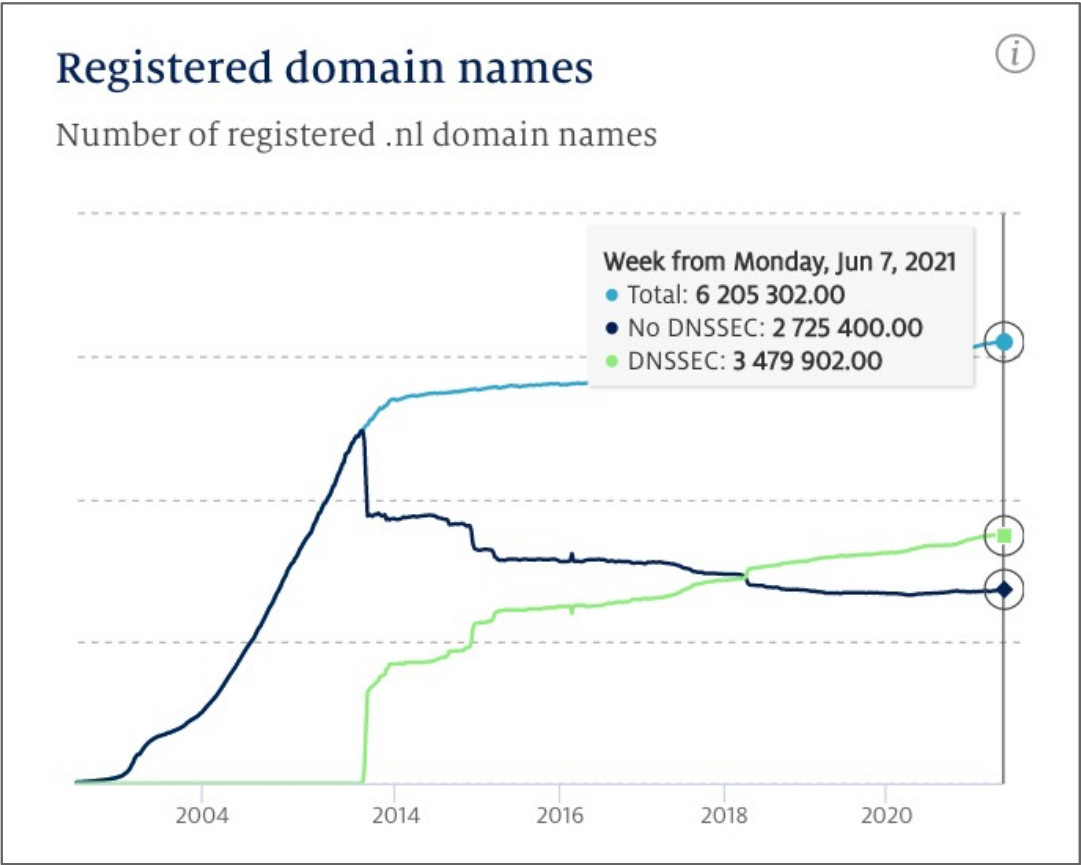


Piet Beertema, “godfather” of the .nl top-level domain

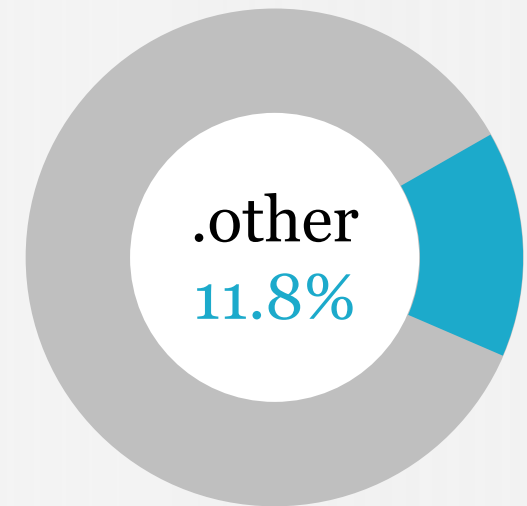
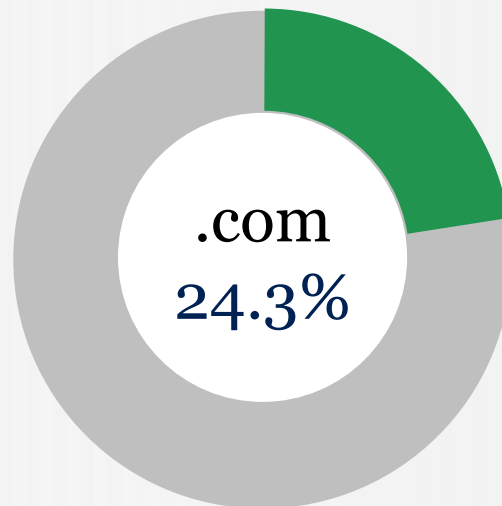
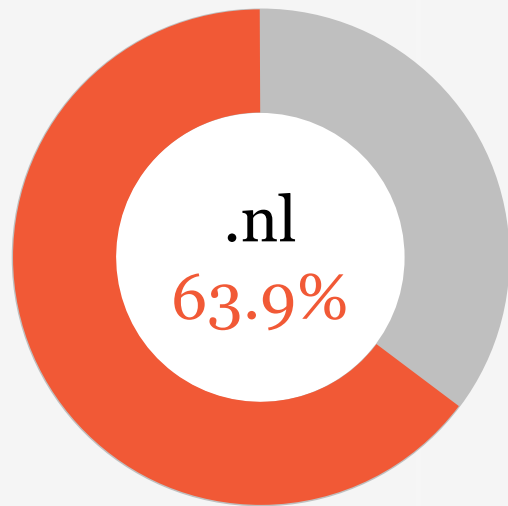
First active country-code domain outside the US in 1986

Co-founder of SIDN (*Stichting Internet Domeinregistratie Nederland*) in 1996

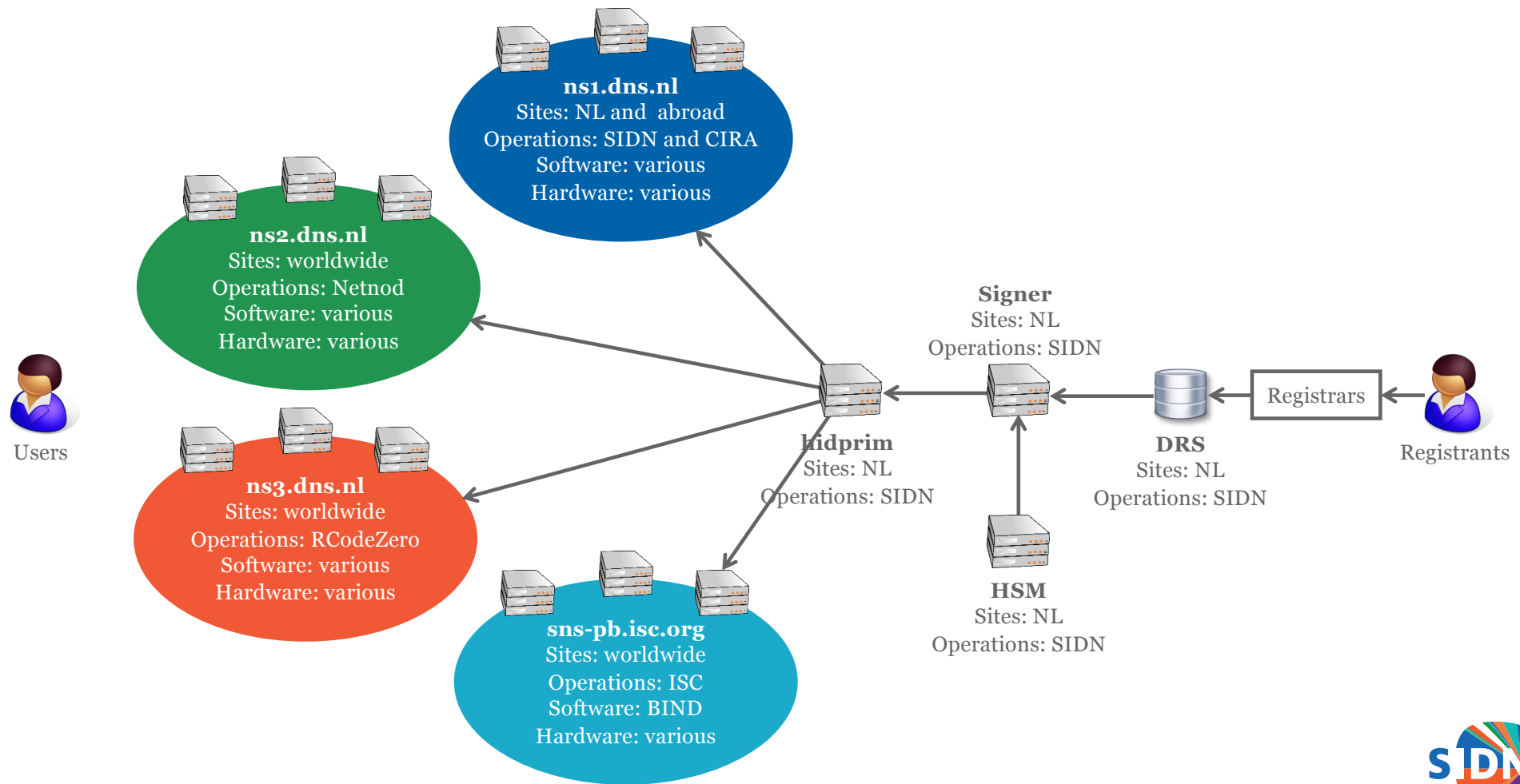
Number of .nl domain names (stats.sidnlabs.nl)



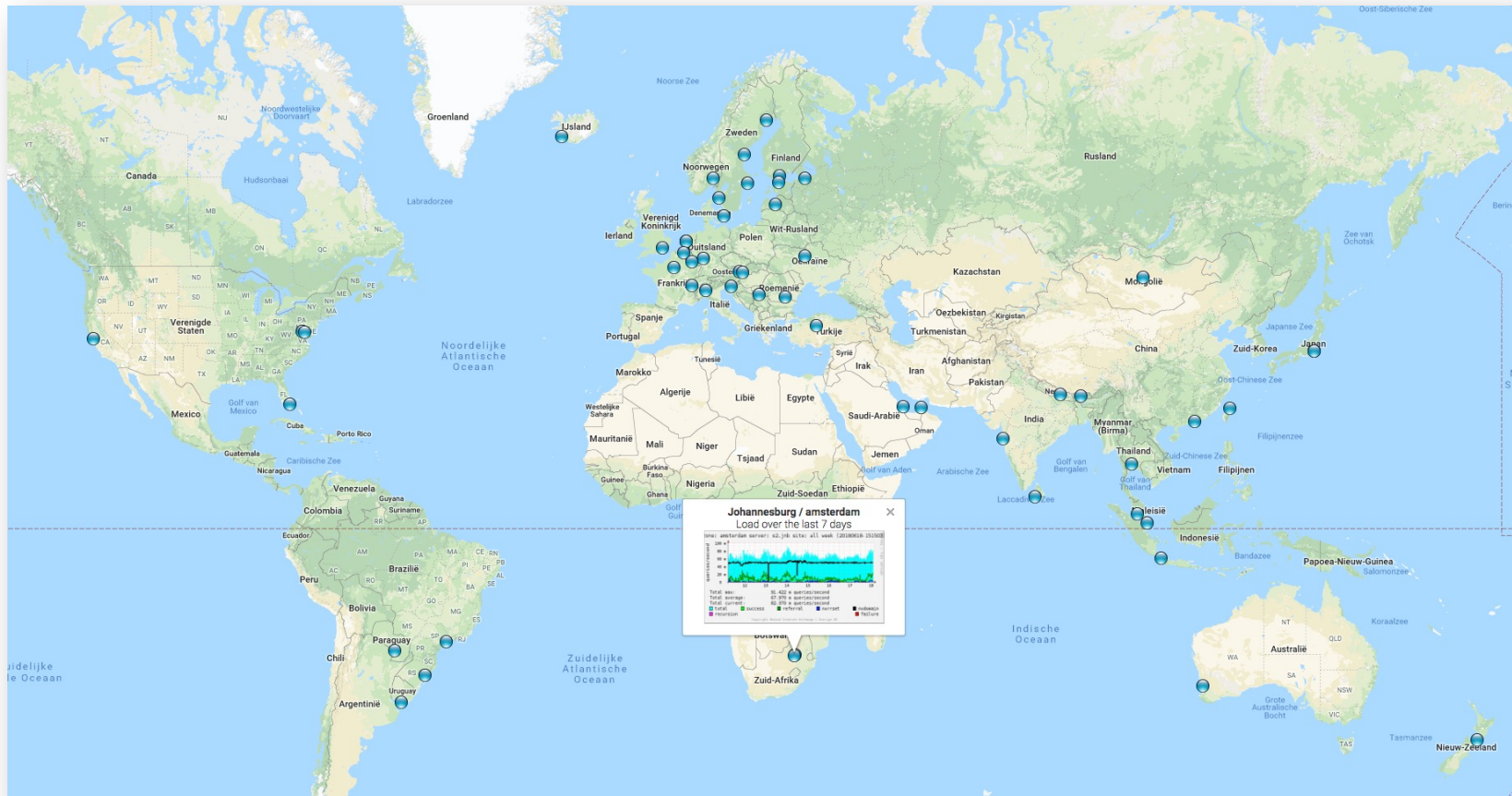
.nl usage in the Netherlands



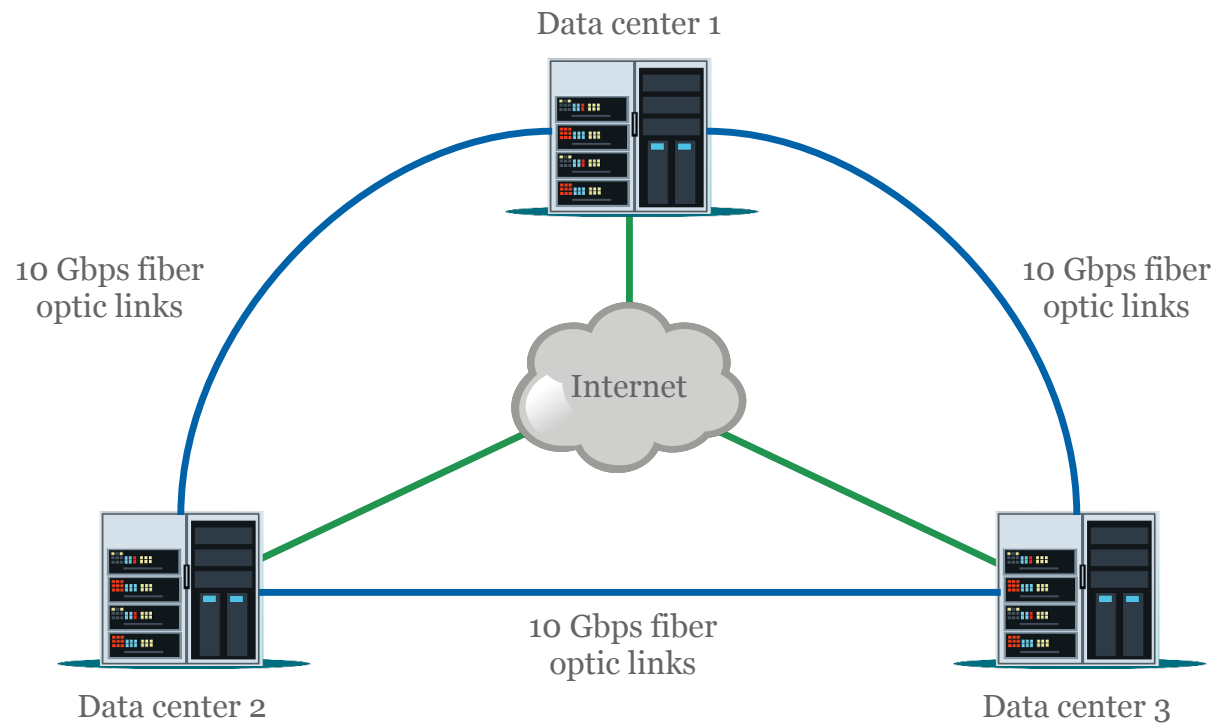
Heterogeneous and fault-tolerant DNS infrastructure



ns2.dns.nl (Netnod)



Registration infrastructure (DRS, RDAP, WHOIS, ...)



99.96% availability
Full-automatic failover

Other security areas

- System monitoring and patching (with NCSC-NL and others)
- Secure software development
- Infrastructure penetration testing
- Large-scale and collaborative DDoS mitigation drills (Dutch Anti-DDoS Coalition)
- Security Operations Center (ISO 27001)
- Proactive and collaborative abuse mitigation (phishing, malware, fake shops, etc.)

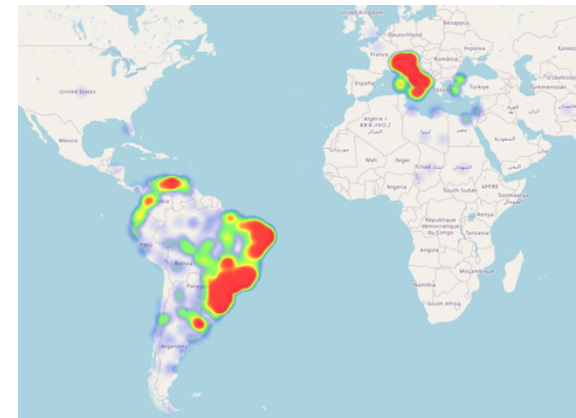


A more flexible DNS infrastructure (in progress) [1][2]

- Virtual machines at cloud providers
- Vultr, Packet (Equinix), Heficed
- Control over VMs and operating systems
- Complements “as a service” and owned infra
- BIRD-based BGP sessions to cloud providers
 - Path pre-pending
 - BGP communities



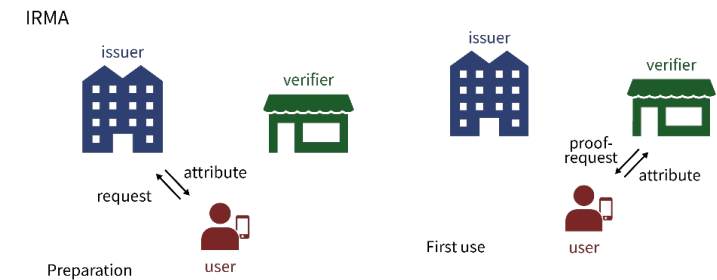
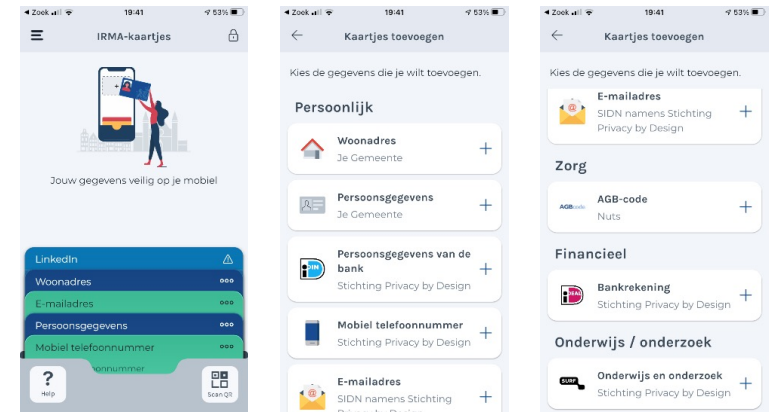
Anycast2020 sites



BGP tuning based on catchments

I Reveal My Attributes (IRMA)

- Solution for decentralized identity management
- Increases users' data autonomy
- Reduces big tech user profiling
- Enables security verification through open source
- Development at SIDN (from University of Nijmegen)



<https://www.sidn.nl/en/theme/online-identity>

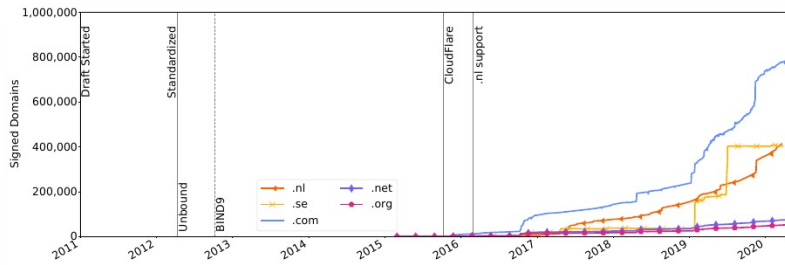


SIDN Labs = research team

- Goal: increase trustworthiness (security, stability, resilience, and transparency) of our society's internet infrastructure, for .nl and the Netherlands in particular.
- Strategies:
 - Applied technical research (measurements, design, prototyping, evaluation)
 - Make results publicly available and useful for various target groups
 - Work with universities, infrastructure operators, and other labs
- Three research areas: network security (DNS, NTP, BGP), domain name & IoT security, trusted future internet infrastructures.



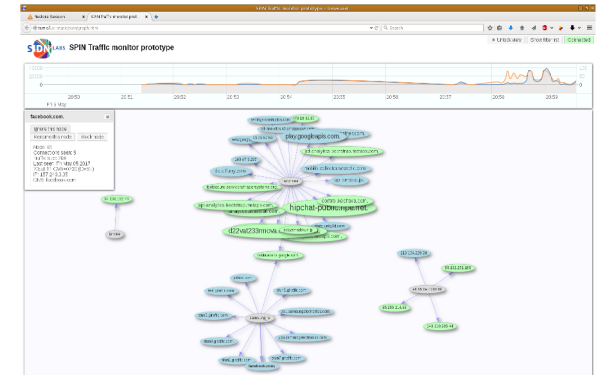
Example projects



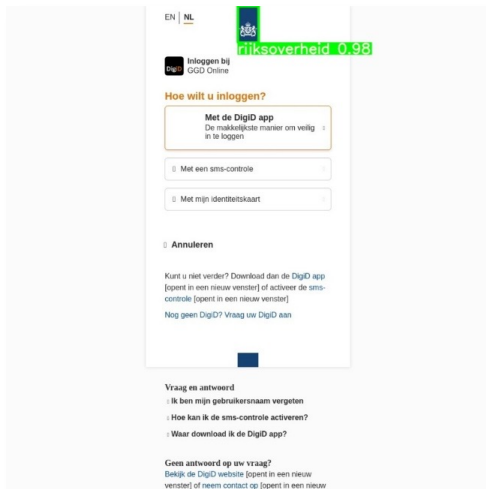
Measuring the deployment of newly standardized DNSSEC algorithms [3]



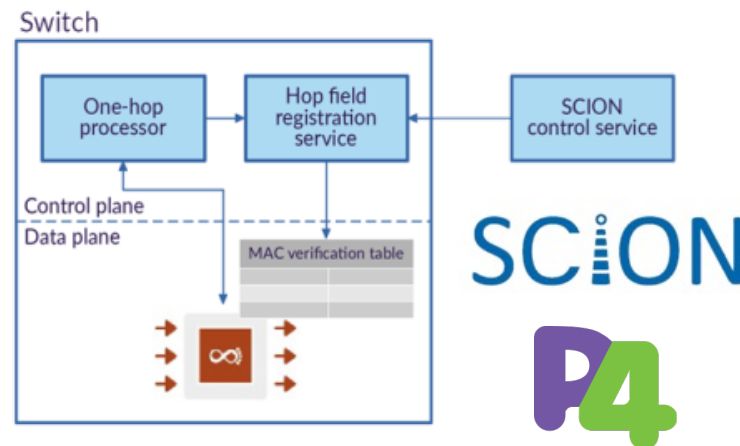
Provide well-managed and secure time services [4]



Making the IoT more secure and transparent and measure its evolution [5]



Logo detection technology to identify malicious .nl websites [6]



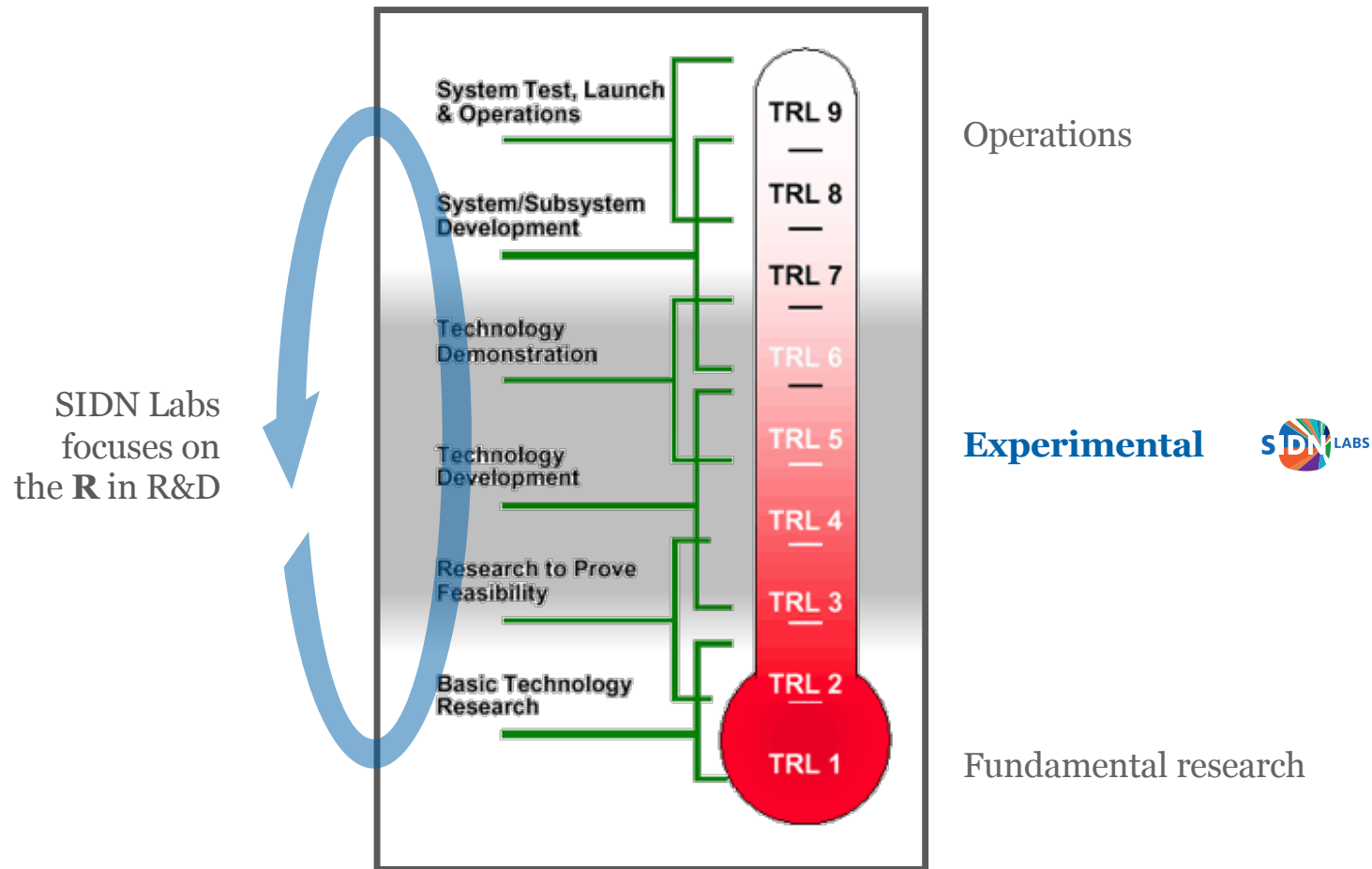
Experimenting with secure future networks and programmable networks [7][8]



Developing a new Internet security and autonomy paradigm [9]



SIDN Labs and Technology Readiness Levels



https://en.wikipedia.org/wiki/Technology_readiness_level

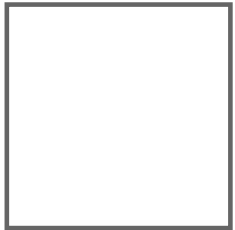
O'Reilly, C. A., & Tushman, M. L. (2013). Organizational ambidexterity: Past, present, and future. *Academy of Management Perspectives*, 27(4), 324-338



Examples of our research partners



SIDN Labs team



SIDN Labs
Vacancy
Research Engineer



SIDN Labs
Thymen Wabeke
Research engineer



SIDN Labs
Moritz Müller
Research engineer



SIDN Labs
Marisca van der Donk
Managementassistente



SIDN Labs
Marco Davids
Research engineer

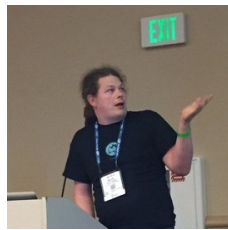
- Technical experts, divers in seniority and nationality
- Help SIDN teams, write open-source software, analyze large amounts of data, conduct experiments, write articles, collaborate with universities
- M.Sc students help us advance specific areas



SIDN Labs
Maarten Wullink
Research engineer



SIDN Labs
Thijs van den Hout
Research Engineer



SIDN Labs
Ralph Koning
Research Engineer



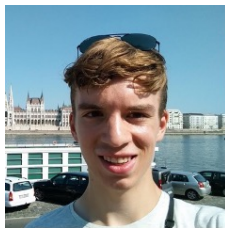
SIDN Labs
Jelte Jansen
Research engineer



SIDN Labs
Giovane Moura
Data Scientist



SIDN Labs
Elmer Lastdrager
Research engineer



SIDN Labs
Christian Scholten
Afstudeerder (UT)



SIDN Labs
Caspar Schutijser
Research engineer



SIDN Labs
Cristian Hesselman
Directeur SIDN Labs



Check out our blogs for more!

1. <https://www.sidnlabs.nl/en/news-and-blogs/inside-line-on-our-anycast-testbed>
2. <https://www.sidnlabs.nl/en/news-and-blogs/anycast-performance-monitoring-with-anteater>
3. <https://www.sidnlabs.nl/en/news-and-blogs/dnssec-the-long-and-bumpy-road-of-algorithm-deployment>
4. <https://www.sidnlabs.nl/en/news-and-blogs/all-good-things-take-time>
5. <https://www.sidnlabs.nl/en/news-and-blogs/increasing-the-transparency-of-the-iot-with-the-spin-pcap-reader>
6. <https://www.sidnlabs.nl/en/news-and-blogs/using-logic-detection-technology-to-identify-malicious-nl-websites>
7. <https://www.sidnlabs.nl/en/news-and-blogs/a-practical-demo-of-scion-a-new-internet-architecture>
8. <https://www.sidnlabs.nl/en/news-and-blogs/future-internet-at-terabit-speeds-scion-in-p4>
9. <https://www.sidnlabs.nl/en/news-and-blogs/three-more-things-you-need-to-know-about-the-responsible-internet>



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