Opening of the Cybersecurity Laboratory

Milestone 9

Work Package WP6 – Promote Cybersecurity Educational Programmes

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Executive Summary

The Frostbyte cybersecurity laboratory, a joint laboratory of the University of Iceland (UoI) and Reykjavik University (RU), has been successfully established to advance cybersecurity education and research in Iceland. As part of Work Package WP6 of Eyvör, i.e. the National Coordination Centre for Cybersecurity in Iceland (NCC-IS), the Frostbyte cybersecurity laboratory provides students, researchers, policy makers, and industry stakeholders with hands-on experience in cybersecurity monitoring, incident handling, and defense strategy development. The Frostbyte cybersecurity laboratory has already been described as a research and teaching environment in Deliverable D6.1 “Cyber Defence Laboratory”.

The Frostbyte cybersecurity laboratory has been opened at three events, for three different target groups: experts from SMEs (7 Feb 2025 at IT fair “UT messan”), the general public (8 Feb 2025 at IT fair “UT messan”), and students (23 May 2025 at the Frostbyte Cybersecurity Workshop). The general reaction to the Frostbyte Cybersecurity laboratory is good. This document provides evidence that Milestone 9 “Opening of the Cybersecurity Laboratory” has been achieved.

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1. Introduction

In support of Work Package WP6 “Promoting and disseminating cybersecurity educational programmes in Iceland”, the University of Iceland (UoI) and Reykjavik University (RU) are leading the development of a joint cybersecurity laboratory for cybersecurity defense education and research for various stakeholders. As a collaborative research laboratory, Frostbyte focuses on advancing knowledge in cybersecurity and developing innovative solutions to address emerging threats. The name “Frostbyte” was chosen by student and faculty researchers, and it has its own web page at: https://www.frostbyte.is

According to the grant agreement, “NCC-IS will create a cybersecurity laboratory, directly connected to the internet including funding for student positions to operate and monitor it. The goal is to provide direct experience of cybersecurity monitoring and incident handling, as well as a test bed for developing next generation cyber defences. The Laboratory will be made available to all interested parties in Iceland (universities, SMEs, government, etc.)” and “The Joint Master Program between UoI and RU aims to benefit 20 students in the first year after being launched. A laboratory will be created with new equipment and it will be made available to all students (physical event in Icelandic). In addition to the obvious educational purposes (including public awareness), it will also serve as a test bed for projects that can increase the resiliency of critical infrastructure.”

The first stage of the Frostbyte laboratory became operational in summer 2024, i.e. before its formal opening at three events (for three different target groups) in 2025. Since then, it has been used for education, research, dissemination, and outreach. The laboratory currently consists of server hardware, located at both universities, that allows the creation of virtual environments. In addition, other hardware is becoming available, such as small home/small office routers donated by Icelandic Internet Service Providers for security analysis. On the software side, the laboratory has a policy of using open-source software wherever possible, in order to educate students in accessible, non-commercial alternatives.

The details of the Frostbyte cybersecurity laboratory have already been described in Deliverable D6.1 “Cyber Defence Laboratory”. This document provides evidence that Milestone 9 “Opening of the Cybersecurity Laboratory” has been achieved.

2. Opening of the Cybersecurity Laboratory

While the Frostbyte cybersecurity laboratory has been in use since summer 2024, the official opening was organized as separate events for the different audiences[1]: students, experts from SMEs, and the general public. These events are described in the following.

2.1. Opening to experts from SMEs

The IT fair "UT messan"[2] is the largest IT fair in Iceland: 1500 IT professionals, mainly from SMEs, but more broadly from the private and public sector, attended the conference day that took place in Reykjavik on Friday, 7 Feb 2025. One track of the conference was on security and Eyvör NCC-IS member Jacky Mallett (Assistant Professor from Reykjavík University) gave a presentation on the impacts of ransomware attacks. That opportunity was also used to announce the opening of the Frostbyte cybersecurity laboratory to IT professionals (see Figure 1) and to offer it for cybersecurity activities that fit into the Eyvör NCC-IS context.

Figure 1 - From the opening of the Frostbyte lab to professionals at UTmessan 2025

[1] While the grant agreement mentioned "The Laboratory will be made available to all interested parties in Iceland (universities, SMEs, government, etc.)", no specific opening event for the government was held: the government is the coordinator of Eyvör NCC-IS, and consequently gets information about the lab directly from monthly consortium meetings and other project-internal communication. As the grant agreement also includes public awareness ("In addition to the obvious educational purposes (including public awareness)"), the Frostbyte cybersecurity laboratory was advertised to the general public in Iceland.

[2] https://utmessan.is/

2.2. Opening to the general public

The IT fair “UT messan” also hosted a public visitor day on Saturday 8 Feb 2025 that had 10 400 visitors[3] (2.6% of the population in Iceland). Both universities, Reykjavik University and University of Iceland had booths where the Frostbyte cybersecurity laboratory was advertised to the interested general public (see Figure 2).

Figure 2 - From the opening of the Frostbyte lab to the interested public at UTmessan 2025

As the grant agreement refers in the context of the laboratory to “In addition to the obvious educational purposes (including public awareness)”, a cyber physical twin of critical infrastructure in Iceland was shown at UT messan by Evör NCC-IS (see Figure 3). This was used to raise awareness of cyberattacks: attacks to a honeypot that runs on the Frostbyte cybersecurity laboratory servers were visualised by that cyber physical twin. This turned out to be a successful conversation starter for a wide variety of cybersecurity topics with a broad spectrum of the public.[4]

[3] https://utmessan.is/english/statistics
[4] See also the video snippet at 0:20 of https://vimeo.com/1055264592. In addition, the UTmessan 2025 booth of the Computer Science department of Reykjavik University can be seen at 0:25.

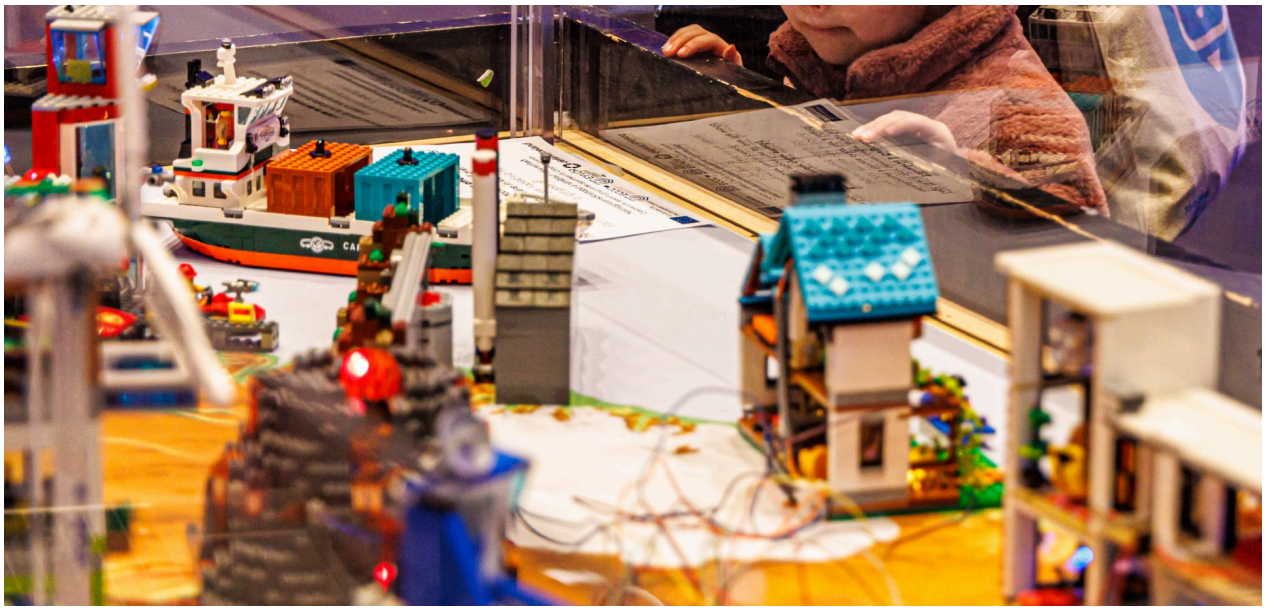

Figure 3 - Cyber physical twin of critical infrastructure to visualise attacks on a honeypot running on a server of the Frostbyte cybersecurity laboratory. Shown at UTmessan 2025. (Source: https://utmessan.is/images/stories/2025_UTmessan/myndir_laugardagur/B93A5606.jpg)

Furthermore, Frostbyte presented several interactive showcases on various cybersecurity-related topics—such as malware detection and classification, honeypots, and password phishing risks in public wireless access points—to raise awareness and spark interest in the laboratory's work. These exhibits encouraged hands-on engagement and facilitated discussions with attendees about current cybersecurity challenges and practices (see Figure 4).

Figure 4. Interactive cybersecurity exhibits presented by the Frostbyte laboratory at UTmessan.

2.3. Opening to students

While the Frostbyte cybersecurity laboratory has been available to students since summer 2024, an official opening event for students was held on Friday 23 May 2025 as part of the Frostbyte Cybersecurity Workshop. At this workshop, students presented results of their cybersecurity projects that they had worked on during their studies. After these presentations, the Frostbyte cybersecurity laboratory was formally opened (see agenda in Figure 5), with 25 participants attending that event.

HÁSKÓLINN Í REYKJAVÍK
REYKJAVIK UNIVERSITY

UNIVERSITY OF ICELAND

Frostbyte Cybersecurity Workshop

Presentation of student projects and Frostbyte cybersecurity laboratory opening

Organised by the cybersecurity collaboration of University of Iceland and Reykjavik University
https://www.frostbyte.is/

Friday, 23 May 2025, 9:00-13:45
Reykjavik University – Lecture room Mars M122

9:00-9:10	Opening, Introduction of participants
9:10-9:20	Keynote: Towards a better understanding of evolving cyber security threats (Hans P. Reiser)
9:20-9:40	How safe is home? – Investigating router configurations and cybersecurity readiness in Iceland (Valgarð Guðni Oddsson)
9:40-10:00	Vulnerabilities and exploitation of RFID identification cards (Sigurður Marteinn Lyngberg Sigurðsson)
10:00-10:20	Future of bootkits and defences against them (Milan Petrusic)
10:20-10:30	Coffee break
10:30-10:50	Accidental pentest – why not to code with AI (Birgir Sigurðsson)
10:50-11:10	Towards real-time malware classification through honeypot analysis (Miguel Faísco)
11:10-11:30	HoneywareX: LLM-based Linux Shell Honeypot (Adetayo Adebimpe)
11:30-12:00	Lunch break
12:00-12:20	Scan Iceland: Vǫlva - Architecture and Implementation of a Continuous National Network Scanner (Marteinn Lundi Kjartansson & Emilía Maidland)
12:20-12:40	Gagnabær: An interactive visualization of real-world cyberattacks (Brynjólfur Stefánsson)
12:40-13:00	Flexible introspection solutions & VMI vs eBPF (Niku Waltteri S. Nuutinen)
13:00-13:30	Round table discussions *Identify problems & topics, needed skills & resources for teaching and research*
13:30-13:35	Closing & Announcement of best student presentation
13:35-13:45	Frostbyte cybersecurity laboratory opening and lab tour

Coffee and small bites available from 9:00.

The Ministry of Culture, Innovation and Higher Education is funding the cybersecurity collaboration of University of Iceland and Reykjavik University. The European Union and the European Cybersecurity Competence Centre (ECCC) are co-funding the Frostbyte cybersecurity laboratory via the Digital Europe Programme projects *Iceland Cybersecurity Coordination Centre (NCC-IS)* and *Defend Iceland.*

Government of Iceland Ministry of Culture, Innovation and Higher Education
Co-funded by the European Union
ECCC
EYVÖR
defend Iceland

Figure 5 - Agenda of the Frostbyte Cybersecurity Workshop and official Frostbyte cybersecurity laboratory opening to students.
(Source: https://www.frostbyte.is/news/2025-05-23-Programme.pdf)

The Frostbyte Cybersecurity Workshop and Frostbyte Cybersecurity laboratory opening ceremony has been advertised by both universities to their students and the general public by contacting cybersecurity students, but also by general announcements on the universities' web pages (see Figure 6).

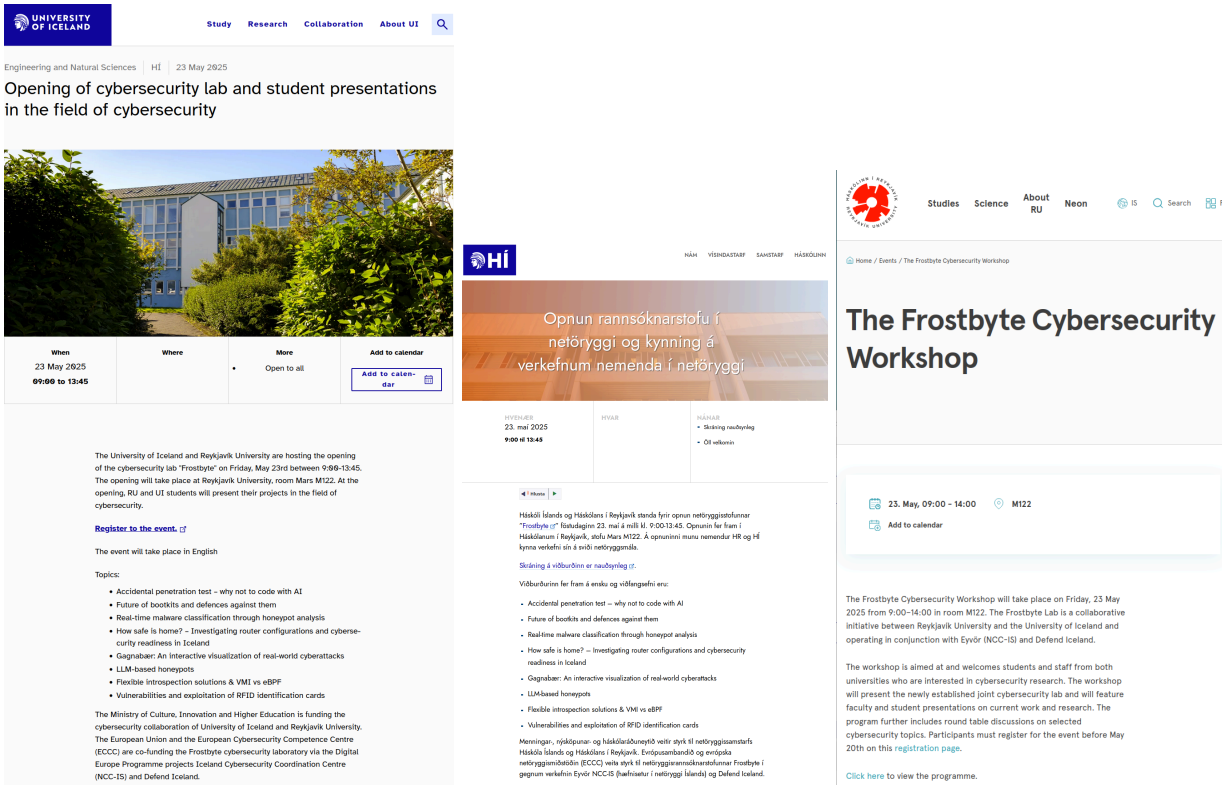

Figure 6 - Announcements of Frostbyte cybersecurity laboratory opening to students (Sources: https://english.hi.is/opening-cybersecurity-lab-and-student-presentations-field-cybersecurity https://hi.is/vidburdir/opnun_rannsoknarstofu_i_netoryggi_og_kynning_a_verkefnum_nemenda_i_netoryggi https://www.ru.is/en/events/the-frostbyte-cybersecurity-workshop)

The Frostbyte Cybersecurity Workshop and Frostbyte Cybersecurity laboratory opening has also been covered by a public news piece in Icelandic (see Figure 7) and in English (see Figure 8).

30. maí 2025

Rannsóknir og menntun á sviði netöryggis innan Frostbyte rannsóknastofunnar

Svokölluð Frostbyte vinnustofa var haldin þann 23. maí síðastliðinn og markaði formlega opnun Frostbyte rannsóknastofunnar fyrir nemendur. Um er að ræða sameiginlegt framtak Háskólans í Reykjavík og Háskóla Íslands, með það að markmiði að efla rannsóknir og menntun á sviði netöryggis. Á viðburðinum komu saman nemendur og starfsfólk frá báðum háskólunum til að taka þátt í fróðlegum erindum, líflegum umræðum og tengslamyndun, þar sem netöryggi var í brennidepli.

Á viðburðinum fluttu nemendur erindi sem veittu innsýn í núverandi verkefni og viðfangsefni. Tvö erindi voru verðlaunuð sérstaklega, frá HR Scan Iceland: *Völva – Architecture and Implementation of a Continuous National Network Scanner* eftir Martein Lunda Kjartansson og Emilíu Maidland og frá HÍ *Accidental pentest – why not to cod*, í flutningi Birgis Sigurðssonar.

Þátttakendur tóku þátt í umræðu í hópum þar sem ýmsar hugmyndir um framtíðarannsóknir og verkefni voru rædd. Má þar nefna rannsóknir á öryggi flugumferðarstjórnunar, dróna og möguleika á misnotkun þeirra, auk tölvuöryggis í skólum, kennslu og vitundarvakningu um netöryggi í skólum og skammtatölvukóðun í heilbrigðisgeiranum.

Frostbyte rannsóknarstofan var stofnuð með stuðningi úr Evrópusambandinu í gegnum NCC-IS (Eyvör) og Defend Iceland styrkina. Hún var formlega kynnt á viðburðinum og gestir fengu að sjá aðstöðu rannsóknarstofunnar.

Dagsetning

30. maí 2025

Deila

Figure 7 - News (in Icelandic) on the Frostbyte cybersecurity laboratory opening to students (Source: https://www.ru.is/frettir/rannsoknir-og-menntun-a-svidi-netoryggis-innan-frostbyte-rannsoknastofunnan)

News and events

30. May 2025: Official opening of the Frostbyte Lab to students and best student presentation awards at the Frostbyte workshop

The Frostbyte Cybersecurity Workshop, held on May 23rd, 2025, marked the official opening of the Frostbyte Lab to students. The Frostbyte Lab is a joint initiative between Reykjavík University and the University of Iceland.

The event brought together students and faculty from both institutions for a day of engaging talks, discussions, and networking centered on cybersecurity research.

The workshop highlights included several outstanding student presentations which provided impressive insights into current projects and topics. Two student presentations, with Birgir Sigurðsson from the University of Iceland presenting "Accidental pentest – why not to code with AI", and Marteinn Lundi Kjartansson together with Emilía Maidland from Reykjavík University presenting "Scan Iceland: Völva - Architecture and Implementation of a Continuous National Network Scanner", received the Best Student Presentation award with a book prize. Round table discussions with mixed groups raised various future research and project ideas, ranging from, e.g., research into security of air traffic control, drones and potential for malicious use to IT security of schools, research on cybersecurity teaching and awareness in schools and quantum encryption in healthcare.

The Frostbyte Lab, established with support through EU funding via the NCC-IS (Eyvör) and Defend Iceland grants, was formally introduced during the course of the workshop which finished with a tour of the Frostbyte Lab facilities at Reykjavík University.

Figure 8 - News (in English) on the Frostbyte cybersecurity laboratory opening to students (Source: https://www.frostbyte.is/news/frostbyte-opening.html)

3. Summary

To support the goals of Eyvör NCC-IS, the University of Iceland and Reykjavík University have collaboratively developed a cybersecurity defense laboratory: Frostbyte[5]. The aim of this laboratory is to provide resources for cybersecurity defense education and research projects for academia, the public sector and SMEs in Iceland.
The hardware and software configuration of the Frostbyte Cybersecurity laboratory have already been described in Deliverable D6.1 “Cyber Defence Laboratory” and were therefore not covered again in this document. That deliverable also describes the usage of the Frostbyte cybersecurity laboratory for research and education as well as its usage for extracurricular projects (e.g. by the cybersecurity student club), dissemination and outreach.
While the Frostbyte cybersecurity laboratory has been in use since summer 2024, the official opening events were all in 2025: the opening to experts from SMEs (at the IT fair “UT messan 2025” conference day on Friday, 7 Feb 2025), to the general public (at the IT fair “UT messan 2025” public visitor day on Saturday, 8 Feb 2025), and to students (at the Frostbyte Cybersecurity Workshop and Frostbyte cybersecurity laboratory opening ceremony on Friday, 23 May 2025). The acceptance of the Frostbyte cybersecurity laboratory by students and the public is good and the opening events raised interest among the different target groups.

[5] https://www.frostbyte.is