The Cyber Research Domain: From Threat, to Tool, to Training

University of Malta
MCAST

Introduction

Threats | Tools | Training

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Threats → Tools → Training

Ransomware attack vectors

Uptake in Phishing

- In recent years, especially post-Covid, we saw an uptake in phishing attempts.
- Locally several campaigns targeted clients of couriers, banks, telecom companies, airlines, etc. with some even making headline news.
- In June, a Malta Police press release stated that "Scammers conned €50,000 from 40 people in one day".

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INFO
Ikseb kitts ta 'trazzin b'xejn kontra l-epidemija COVID-19 mill-Ministeru tas-Sahha https://bit.ly/covid09-MT

RV-TEE - NATO Project

MobFor (i)

MobFor is a tool, developed by the University of Malta, to assist investigators in gathering evidence related to possible unlawful interception attacks via popular messaging apps e.g. Whatsapp, Telegram, Signal and PushBullet.

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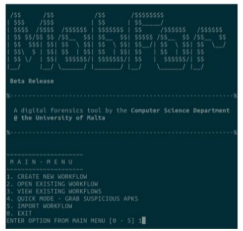

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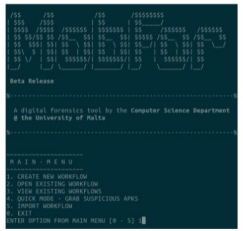

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Getting into Cybersecurity

MCAST HackSpace

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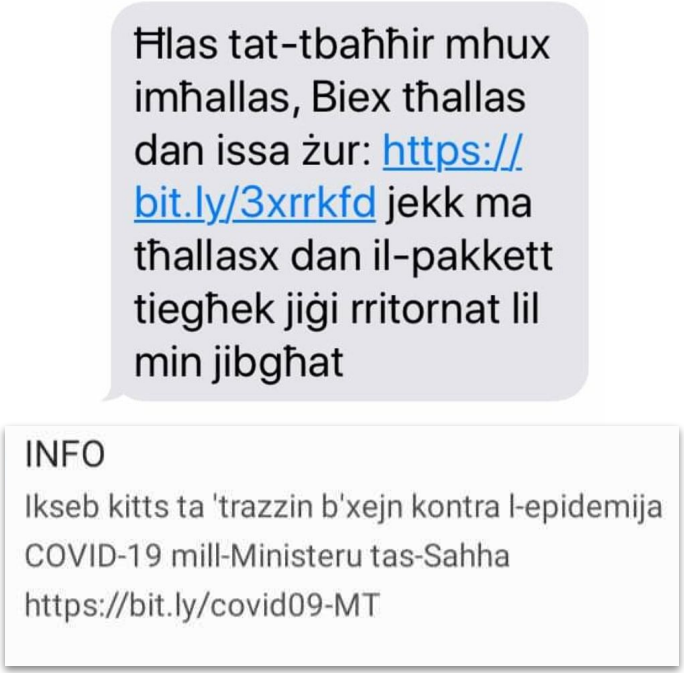


Phishing: Related projects

Ongoing research at MCAST IICT into the ability to recognise and deal with email phishing produced interesting results:

60%

Clicked links in phishing emails

< 40%

Use a password manager for most accounts

50%

Use 2FA when available

https://

Common misconceptions

Target: Automated system that runs phishing simulations, tracks user interaction and builds short training material **specifically for each user**.

Dataset: Malta phishing attempts

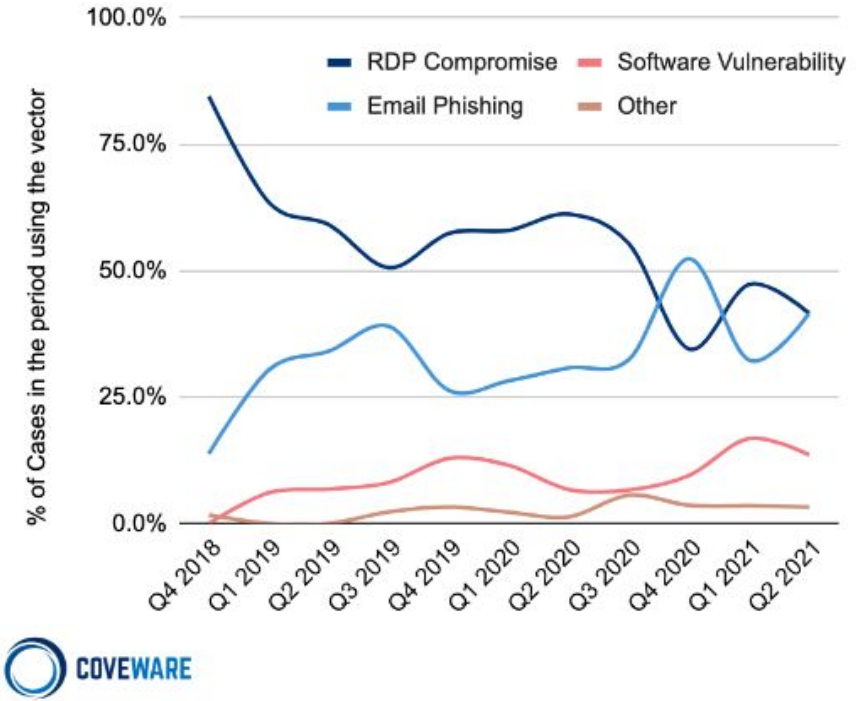
Public collection of samples targeting Malta from Q2 2021 onward. Data includes:

- type - msg | email | social
- source - Official | Media | MCAST | SocialMedia
- link - shortened | lookalike | other | unknown
- motivation - delivery | change | lockout | financial | 2facode | win | opportunity
- lang - en | mt
- personalised - yes | no
- entity - e.g. BOV or MaltaPost (or None)
- description - short description of phishing attempt
- many have transcript, screenshots and other information.

Ransomware attack vectors

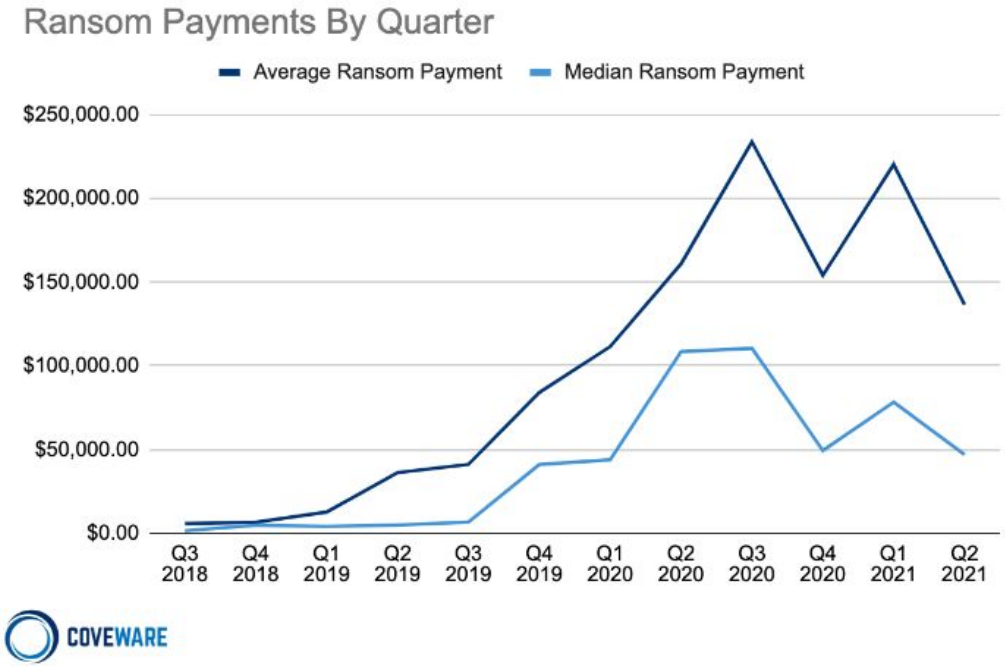
- Ransomware often in the news, especially after high-profile attacks in the USA (Colonial Pipeline, JBS, DC Police) and elsewhere (CD Projekt Red, Kia, Acer, Ireland's HSE, Kaseya, Accenture).

- Analysis show that **phishing** and **RDP attacks** are the most popular entry points for ransomware attacks … low-cost yet effective.



Ransomware payments

- Suspected ransomware payments in H1 2021 reached $600 million. (US Dept. of Treasury)
- That is more than the 2020 total.
- Payment values are also rising.



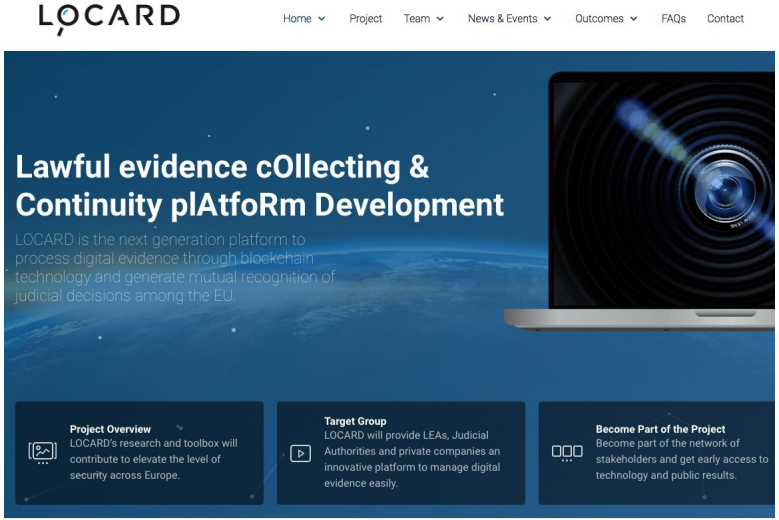
Ransomware awareness

There is no 100% protection, but it's possible to ward off opportunistic attackers.

With our students we make sure to cover the basics:

- Always change change default passwords
- Never reuse passwords, use password managers
- Enable 2FA whenever possible
- Keep software updated
- Design solid backup strategies, and test them.

LOCARD Project



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MobFor (ii)

Forensic readiness

1. Asset management

Targeted
> Apps
> Devices
> Users

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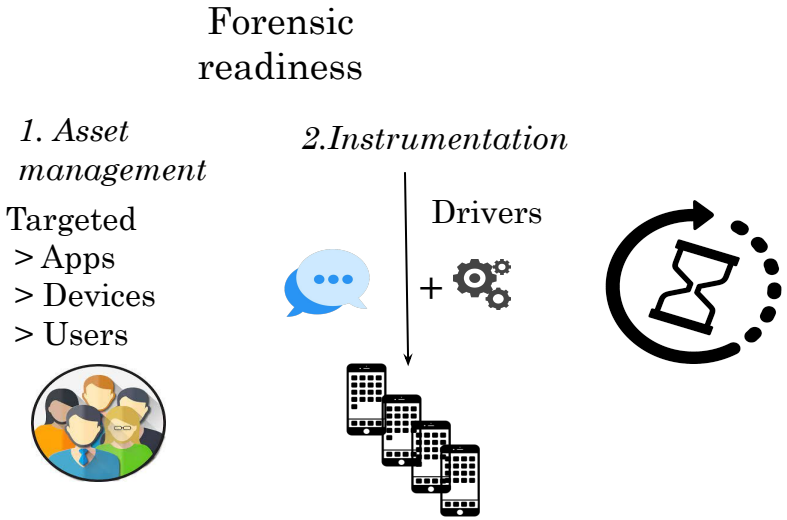

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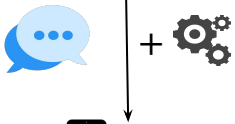
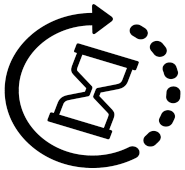
2.Instrumentation

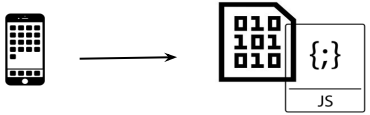
Drivers





Forensic acquisition

3.Event-triggered memory dumps



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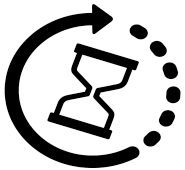

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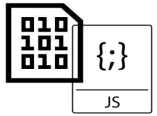

4.Non-volatile memory

Device logs,
Backup, Cloud,
External sources

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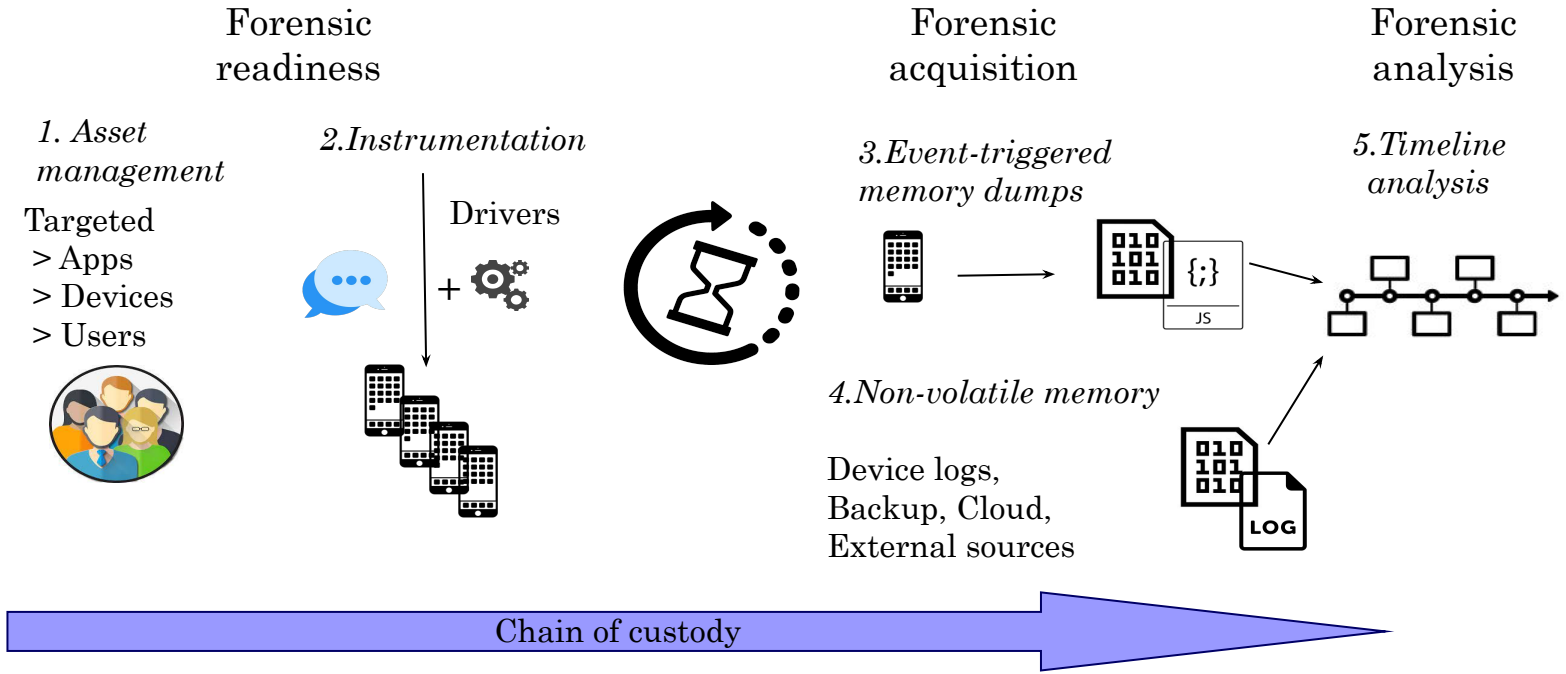

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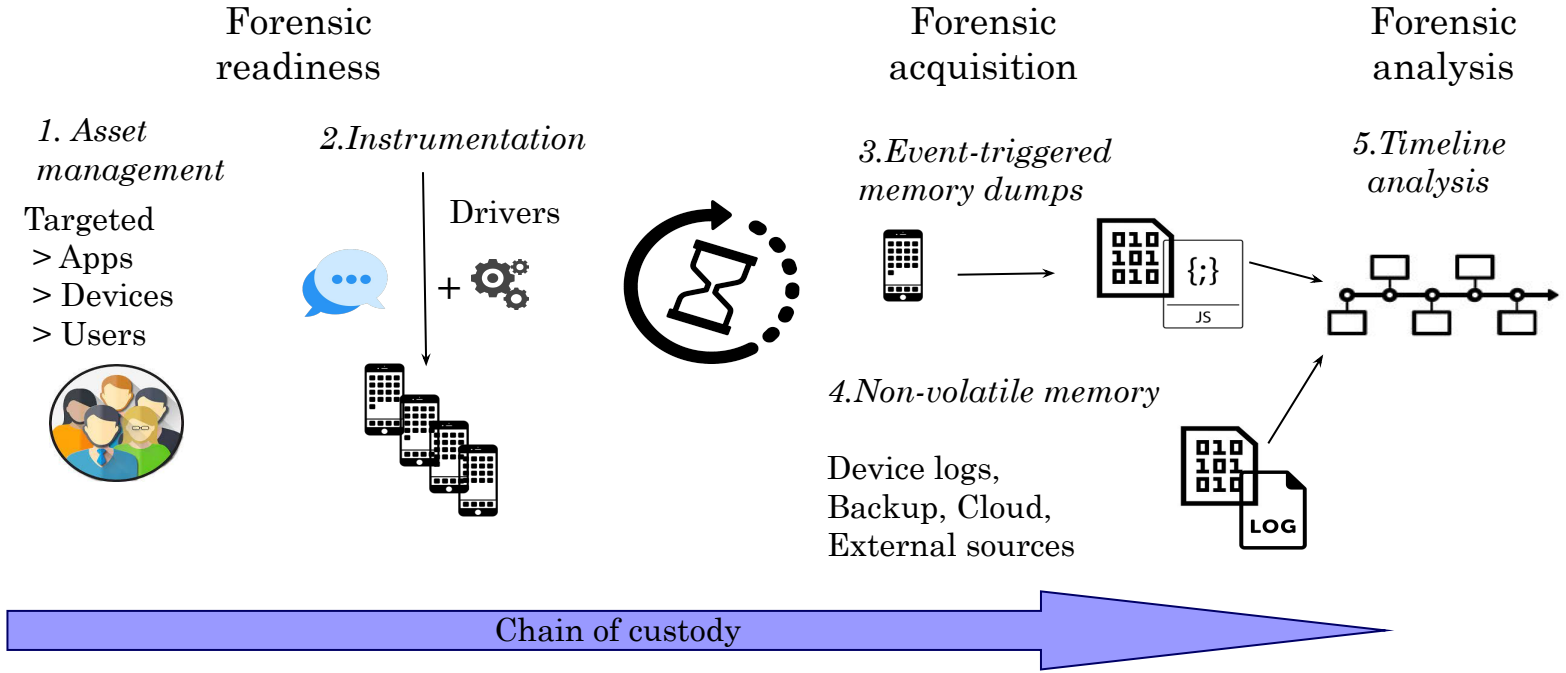
Technologies



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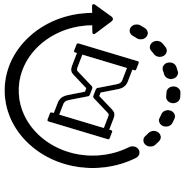

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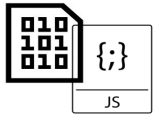

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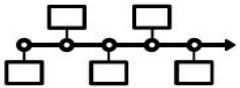
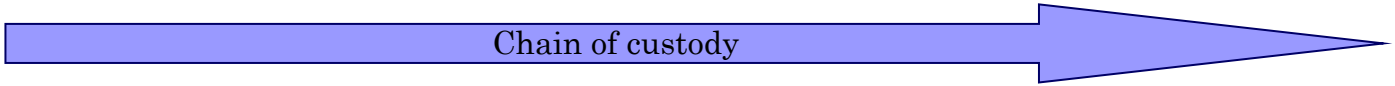
Forensic analysis

5.Timeline analysis





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Quantum-Safe Communication Protocol

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How do we ensure security from bugs, attacks, vulnerabilities?

Quantum-Safe Communication Protocol

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Isolation

Sensitive operations and data (keys) kept separate on a USB Token

Quantum-Safe Communication Protocol

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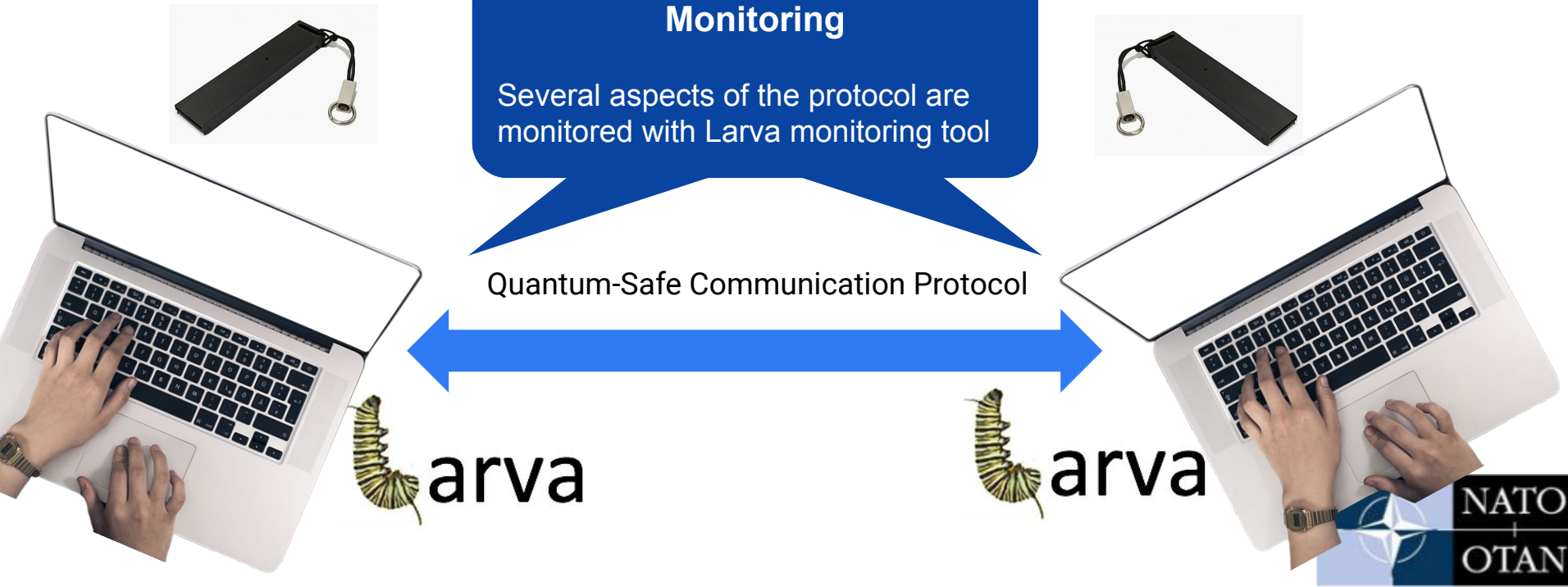

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Isolation

Sensitive operations and data (keys) are kept separate

Monitoring

Several aspects of the protocol are monitored with Larva monitoring tool

Secure Communication

- From bugs
- From attackers
- From vulnerabilities

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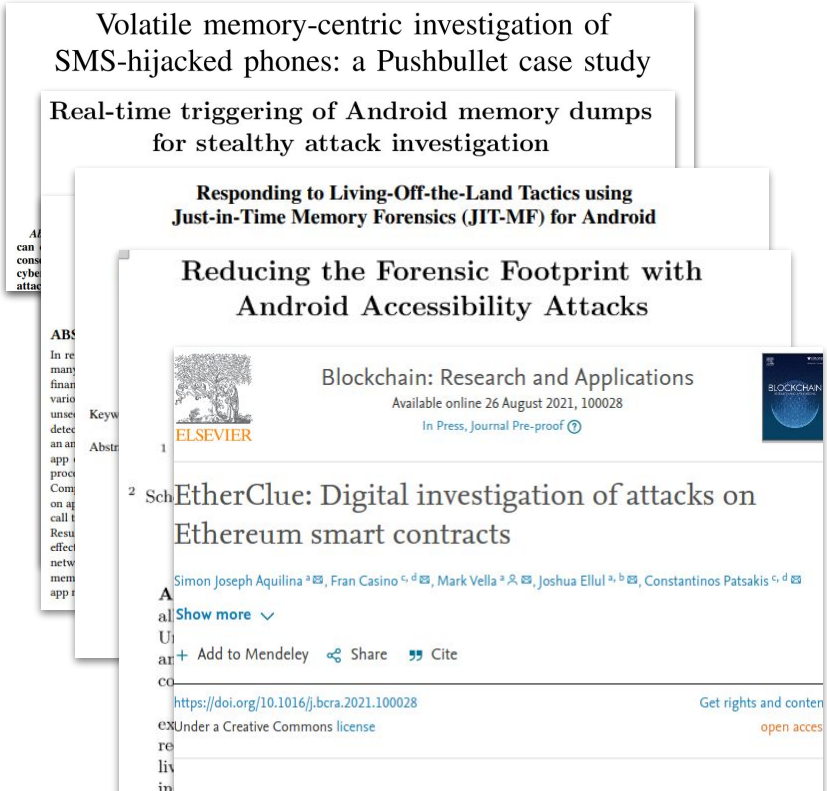
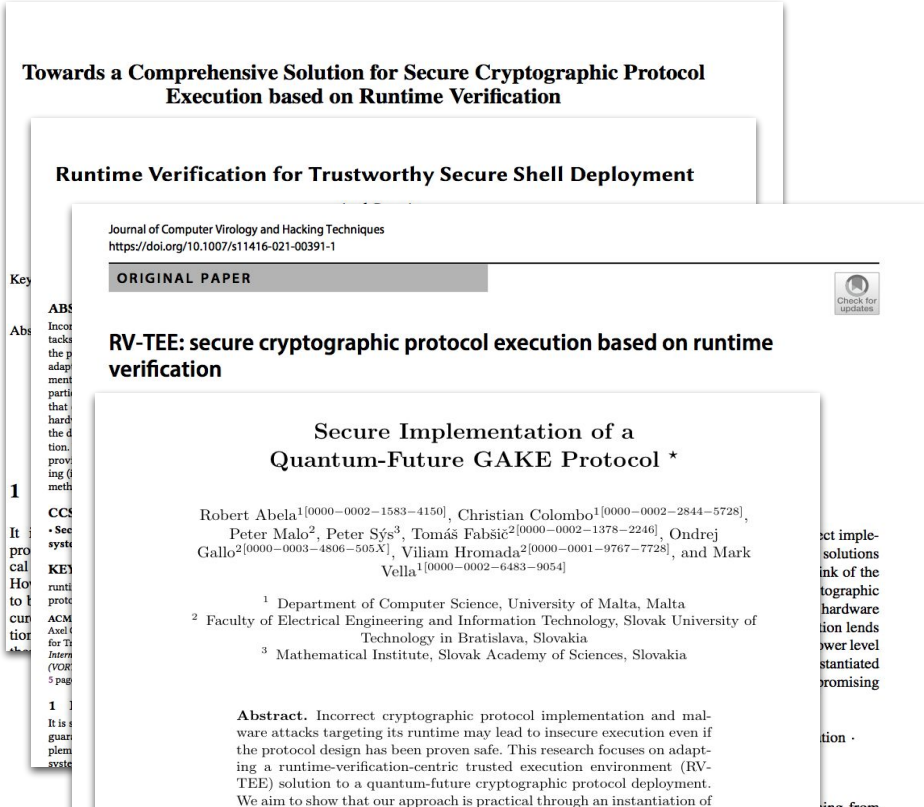
Our Contributions





Getting into Cybersecurity

- You cannot learn to protect your infrastructure just by reading guidelines and standards.
- We try to instill the culture of Security by Design.
- We want our students to convince their future employers that information security is vital and does not come for free.

Our Approach

- Understand the underlying technical principles.
- Know what an offender might be up to...otherwise you cannot protect yourself.
- Implement protection measures.
- Know how to respond to incidents.

Cyber Research - What does it take?

- Solid programming skills.
- Understanding of the inner-workings of hardware and operating systems.
- Understanding of computer networks and the various protocols that enable communication between machines.
- Perseverance.

University of Malta and MCAST offer full-time and part-time courses that will help you start the journey!

MCAST HackSpace

https://hackspace.mcast.edu.mt

MCAST **Hack**Space

- A new initiative we are starting this year at MCAST's Institute of Information and Communication Technology.
- An informal space where students, academics and industry partners can discuss emerging information security related topics.
- Some of the planned sessions:
  - Hands-on Security Fundamentals with Real-Life Challenges
  - Hardware Hacking
  - Cyber Attack Simulation
  - Dark Web & Tor
  - Digital Forensics: Challenges and Opportunities.

Thank you

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