# Digital Forensics

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# Digital Forensics Course Concept

# Marian Svetlik

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- IDFA Management Board Member

# Course Content

- DF definition, relation to the cybersecurity and to the cybercrime
- Digital Traces & Digital Evidence, properties, documentation
- Sources, Handling, Gathering and Protection
- DF Examination Principles
- DF Lab creation and management, Assessment, Certification, Accreditation
- DF in Law, Electronic Evidence

# Recap

- Digital Trace
  - Immaterial
  - Latent
  - Coded
- Digital Trace
  - Seizable
  - Understandable
  - Relevant
- Locard's Principle in Digital World
- Digital Traces and their properties

# Today outline

- Typical sources of the digital traces
- Digital evidence gathering, handling and protection

# Typical Sources of the Digital Traces

# Starting with Theory:

- Digital information is the record of (immaterial) information in digital form **on a material medium that is capable of carrying or transmitting such kind of record**.

# Where they are?

- Integrated
  - Permanent (static)
  - Volatile (dynamic)
- External/Removable
- Remote
  - Local network storage (file server, NAS)
  - Cloud storage
- Data lines (dynamic)
  - Electric current/wires, light, el-mag filed, ….

# 1st Break

- Is there some difference between:
  - Local network storage
  - and Cloud?

# Integrated static

- HDD

# Integrated static

- SSD

# Integrated static

- SSD

# Integrated static

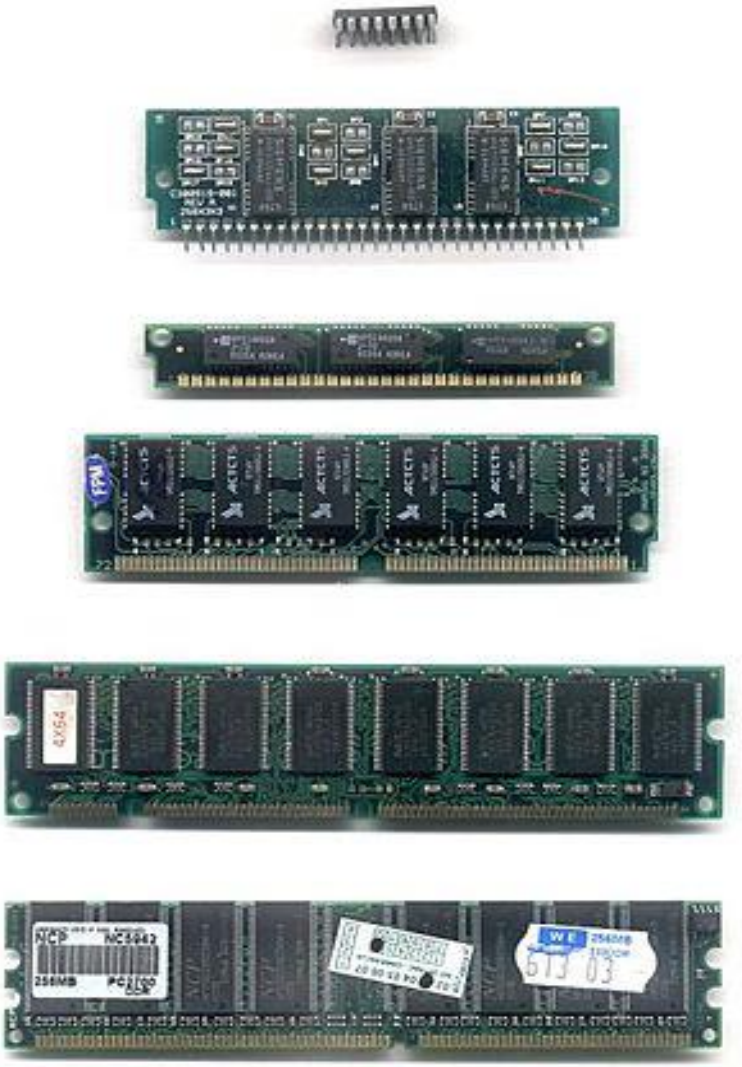
- SSD

# Integrated Volatile

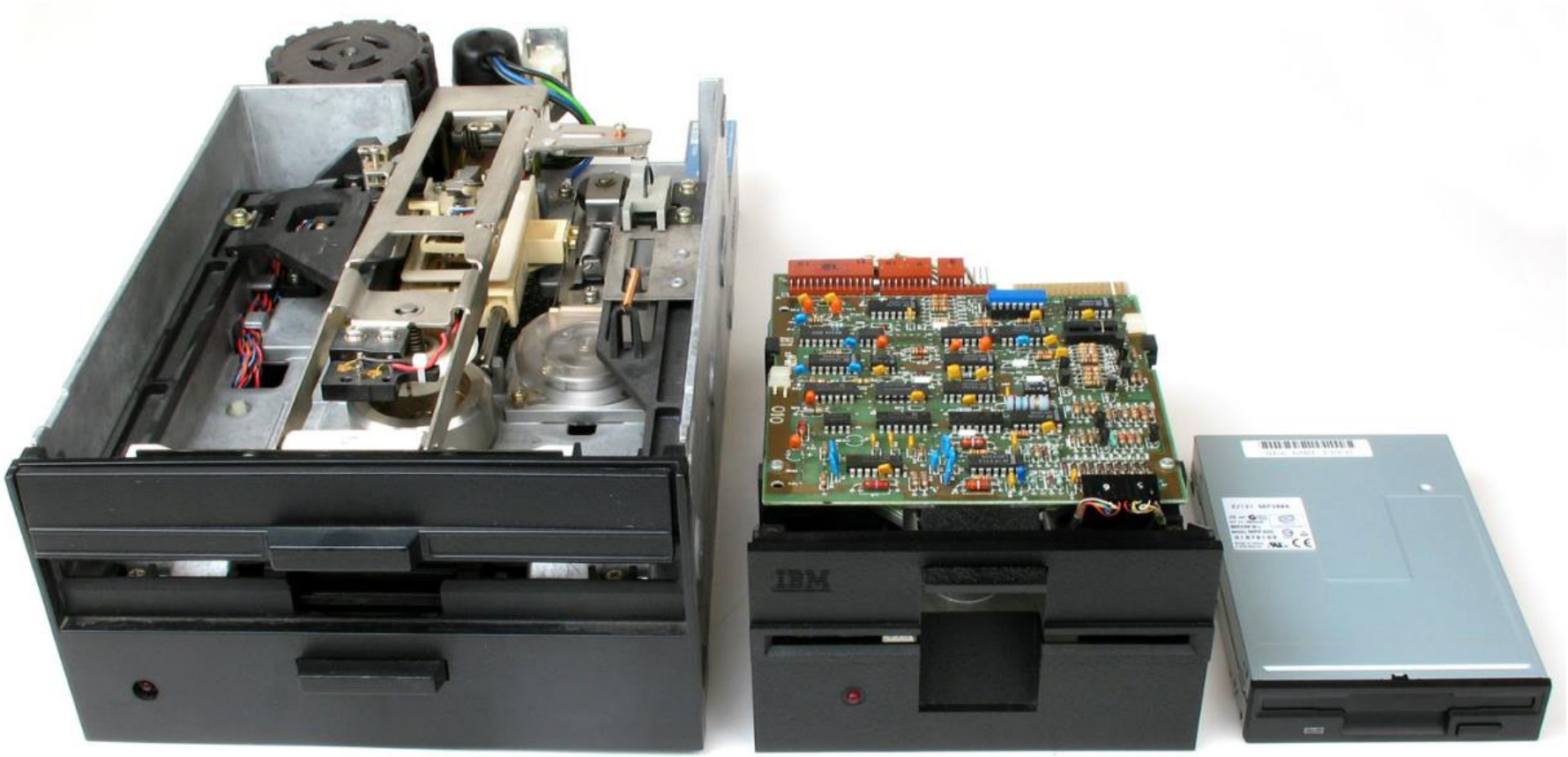
- RAM (Random Access Memory)
  - SRAM (static)
  - DRAM (dynamic)

# Integrated Volatile

- RAM



# External/Removable



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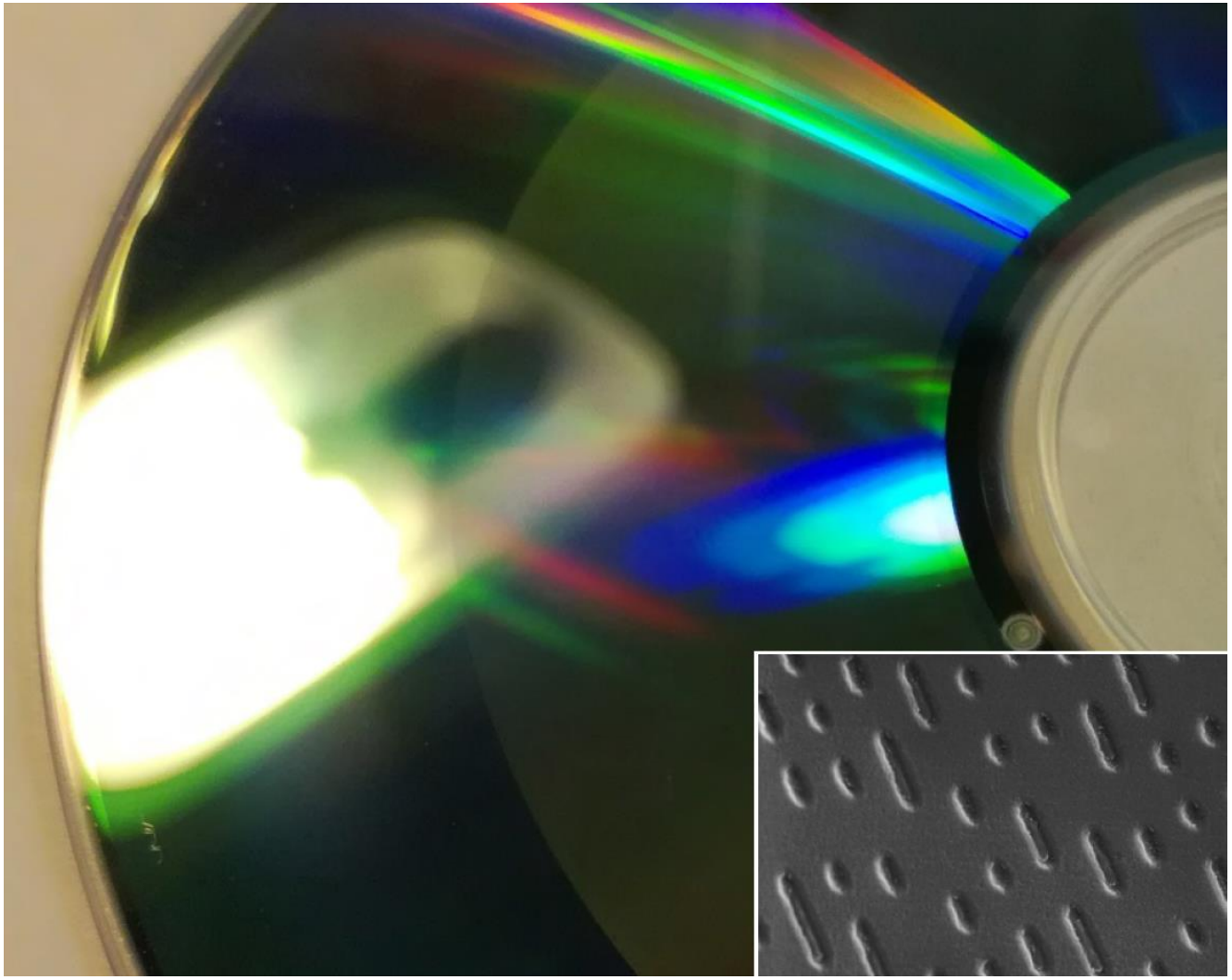

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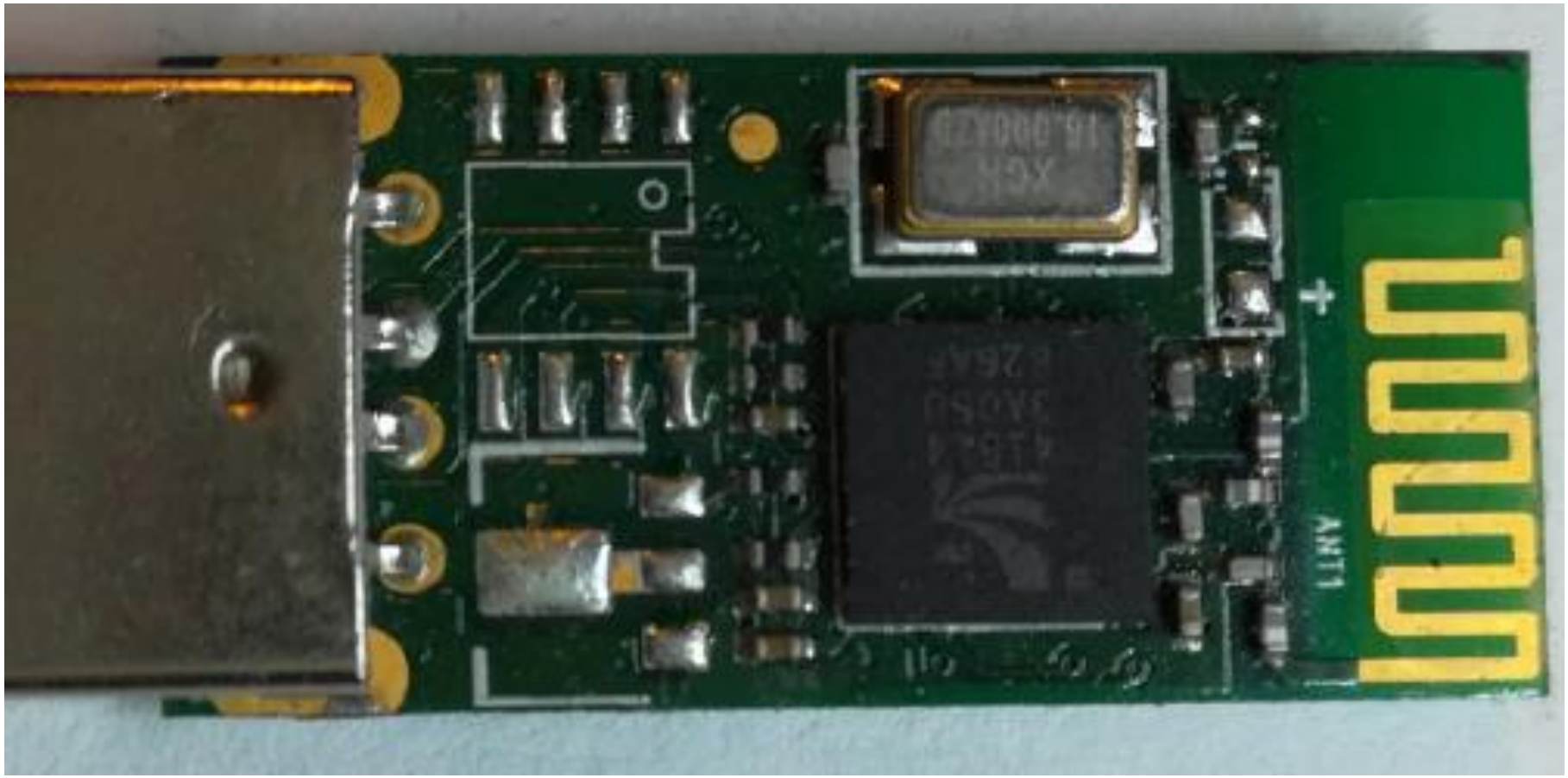

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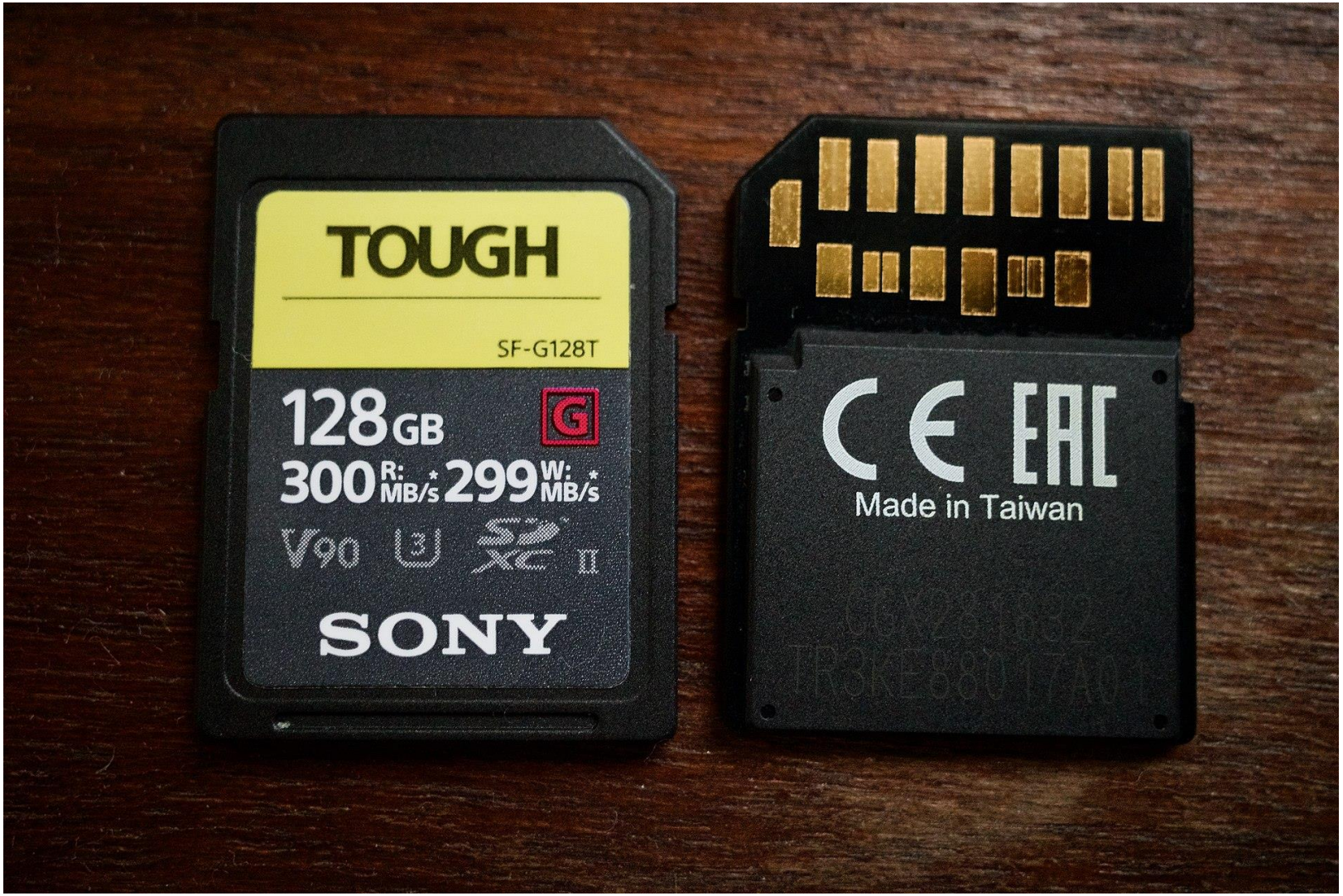


# External/Removable

… and others

# Remote

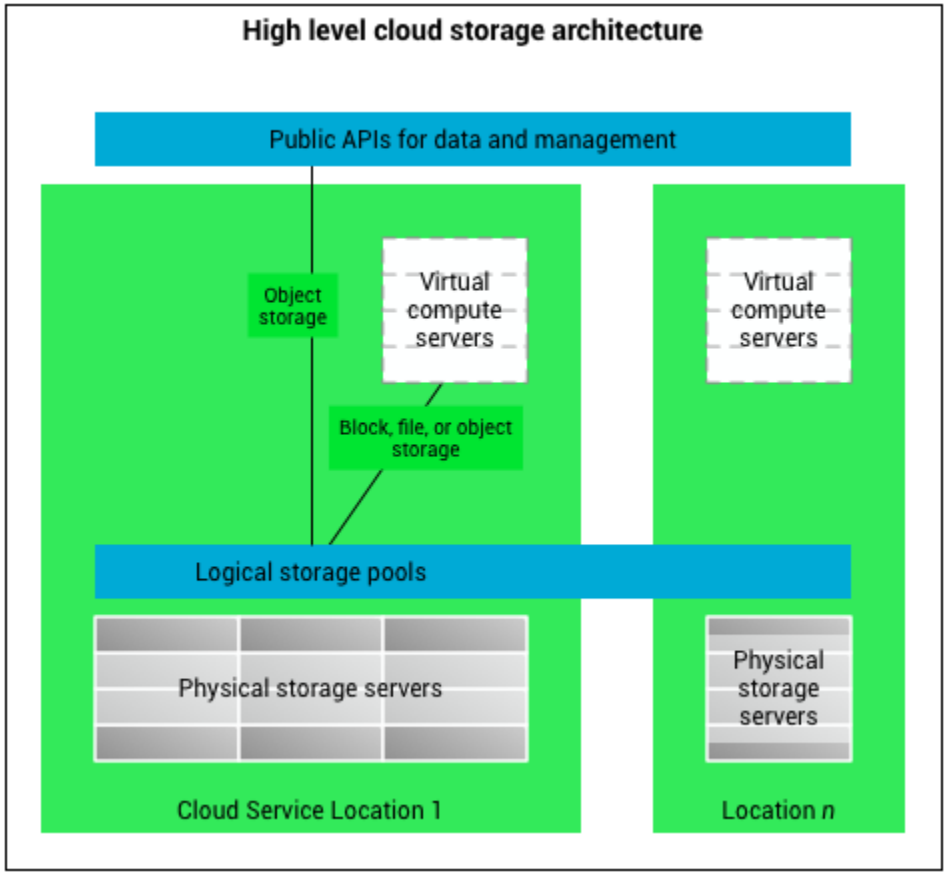
- Fila Srver

# Remote

- NAS (Network Attached Storage)

# Remote

- Cloud



# Network Lines

# How to deal with digital evidence

- Gathering/Seizing
- Manipulate
- Protection

# Gathering/Seizing Digital Evidence

The goal is to seize as much as possible of all accessable digital data.

Why?

# Where they are? (recap)

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# Seizing order

1. Network flow
2. Volatile memory
3. Cloud storage
4. NAS
5. Integrated permanent
6. Removable

Why such order?

# The degree of control over the data

- Network flow – just at the moment of flow
- Volatile memory (RAM) – up till power is on
- Cloud storage – risk of the remote tampering
- NAS – similar as cloud
- Internal disks – quite often at crime place
- Removable media – could be seized as media and gather a data later

# Bit copy vs. Logical copy

- Bit copy (forensic image)
- Logical copy (forensic file copy)

What are Cons and Pros of both versions?

# Limits

- Legal limits (vary based on jurisdiction)
- Size of the data
- Technical limits
- Time limits

# Integrity

- Once you have a control over the seized data, integrity is one of the core conditions to take a care

- Checksums
  - MD5 (!)
  - SHA1 (!)
  - SHA256

# Spec forensic SW

- Imaging SW
  - Reliability (crash could lead to error in data)
  - Error handling (what in case of reading error?)
  - Hashing (reliable integrity)
  - Maximum compatibility (various sources & formats)
  - Speed (multithread processes)

# Handling & Securing

- 2 copies as minimum on different HW
  - 1st copy compressed & archived
  - 2nd copy as working
- Read-only access (?)
- Encryption(?)
- Blockchain(?)

# Practice

- How to protect electronic attachement to the forensic report?