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MORITZ BODE / MDNOG 1

How a Forgotten Bill Interrupted Global Science

The 2015 DOI Outage

A ten-minute story about permanent links and ordinary dependencies.

The 48-hour invisibility cloak

20 JANUARY 2015

Up to 50%

of DOI resolution traffic
affected at times

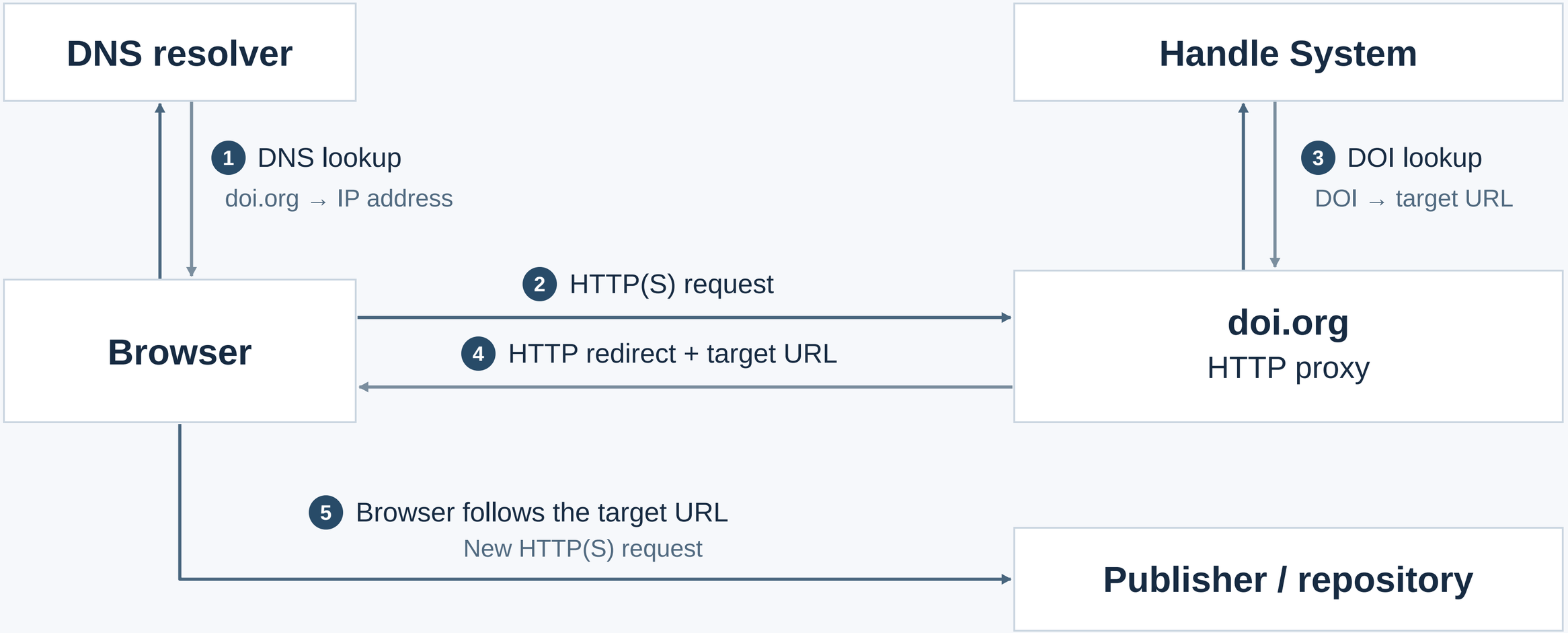


**The papers
were still there.**

[2] Crossref follow-up report. Partial, intermittent disruption. .

The machinery behind the link

DOI resolution in a web browser



Caching and DNS lookup for the target domain omitted.

DNS and DOI resolution

Lookup	Input	Result in this example
DNS	doi.org	Server address
DOI / Handle	10.5334/dsj-2017-009	Registered target URL

A permanent name still needs a working front door.

[3] DOI Foundation [4] RFC 1034 [5] Klump & Huber (2017)

Root cause: domain renewal

20 JANUARY 2015

Automatic renewal

OFF

Renewal reminder

MISSED



Renewed. Auto-renewal enabled.

[1, 2] Crossref reports, including the CNRI statement.

DNS remembers

~48 hours

until service returned to normal

“Works for me.”

A result from one resolver.

TTL and query timing shape recovery.
48 hours was specific to this incident.

Resolver A

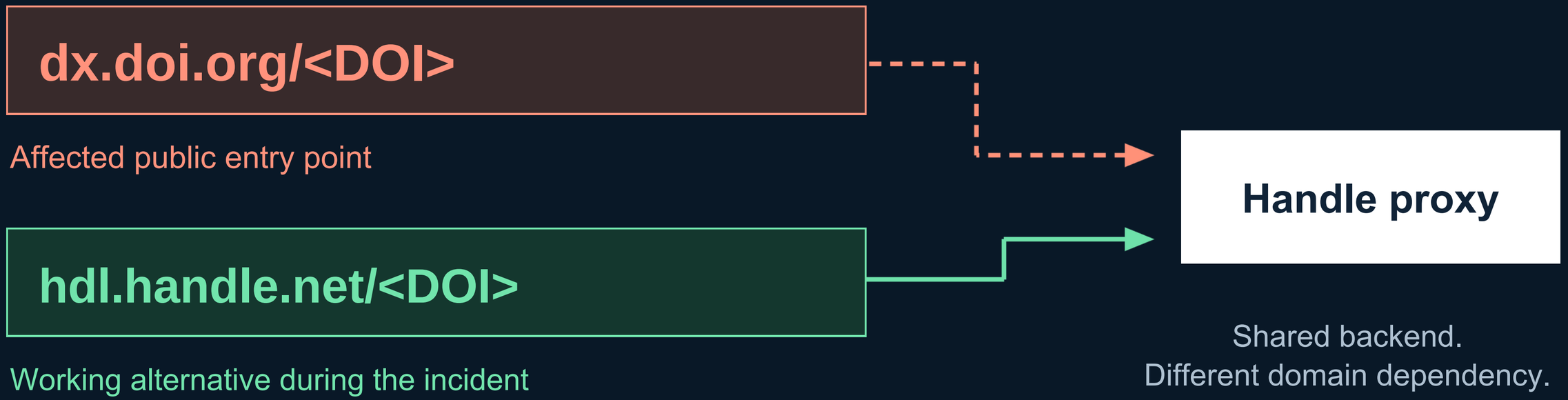
Working cached answer → **Access succeeds**

Resolver B

Problematic cached answer → **Access still fails**

[2] Crossref [4] RFC 1034. Cache states are schematic, not measured resolver data.

Same Handle. Different door.



Internal services kept working.
Twitter raised the alarm.

[1, 2] Crossref reports. Historical workaround, using the same registered DOI.

What the NOC should watch

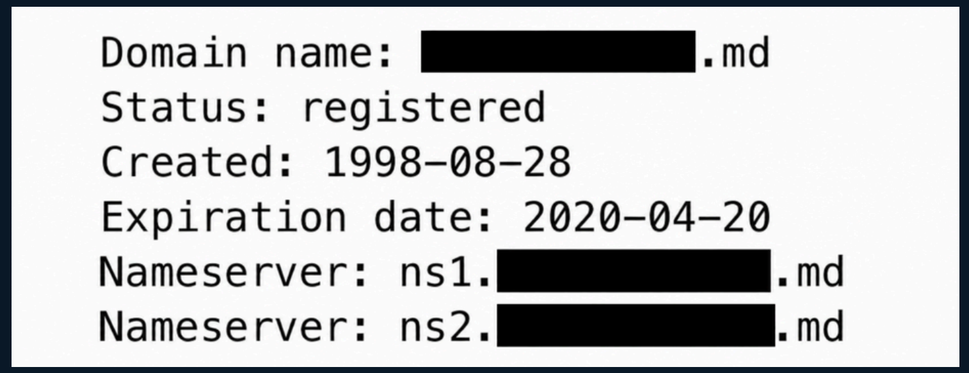
01	**Domain renewal**	Owner, backup owner, expiry alerts and confirmed renewal
02	**Public user path**	Known DOI, redirect chain and expected destination
03	**Independent probes**	Separate networks, documented fallback and an independent status page

A mailbox is not an on-call rotation.

Presenter-derived recommendations based on [1, 2, 6, 7].

2020 incident in Moldova

Anyone remembers?



Enjoy your lunch break.

References

Incident and technical sources

[1] Bilder (2015a)

Problems with dx.doi.org on January 20th 2015

Crossref incident report

[2] Bilder (2015b)

January 2015 DOI Outage: Followup Report

Crossref follow-up report

[3] DOI Foundation

DOI Resolution Documentation

[4] Mockapetris (1987)

RFC 1034 · Domain Names

Research literature

[5] Klump & Huber (2017)

20 Years of Persistent Identifiers: Which Systems are Here to Stay?

10.5334/dsj-2017-009

[6] Klein & Balakireva (2020)

On the Persistence of Persistent Identifiers of the Scholarly Web

10.1007/978-3-030-54956-5_8

[7] McMurry et al. (2017)

Identifiers for the 21st century

10.1371/journal.pbio.2001414