

TLD DNSSEC Timeline

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Lightning Talk

ICANN 87 – SSAC – Bali – October 17, 2026

How did this start?

CircleID • 13 Oct 2026

Common Beliefs About DNSSEC Put to the Test

Barbara Jantzen (deSEC)

Part 2 of a 4-part series

Facts endorsed by 60+ people from
the industry

Takes the claims of “**Against DNSSEC**” (2015) one by one and checks them against today’s data

YES AND NO

“DNSSEC is a government-controlled PKI”

A registry can be subject to its government, but jurisdiction affects every PKI, including the CAs behind TLS

NO

“DNSSEC is cryptographically weak”

ECDSA is widely used, including in the Web PKI (leading among HTTPS server keys)

Check current data, not decade-old narratives.

What does other work cover?



INCIDENTS

IANIX outage list

Sparse since 2020, curation method unclear

Fewer incidents, or less upkeep?



AVAILABILITY

John Kristoff, PLNOG

>99.99% in 15 of 16 years, weighted

Yesterday; slides not yet online

<https://plnog.pl/#agenda>



SECOND-LEVEL

DNSSEC & DANE stats

Wes Hardaker and Viktor Dukhovni, focused on SLD data

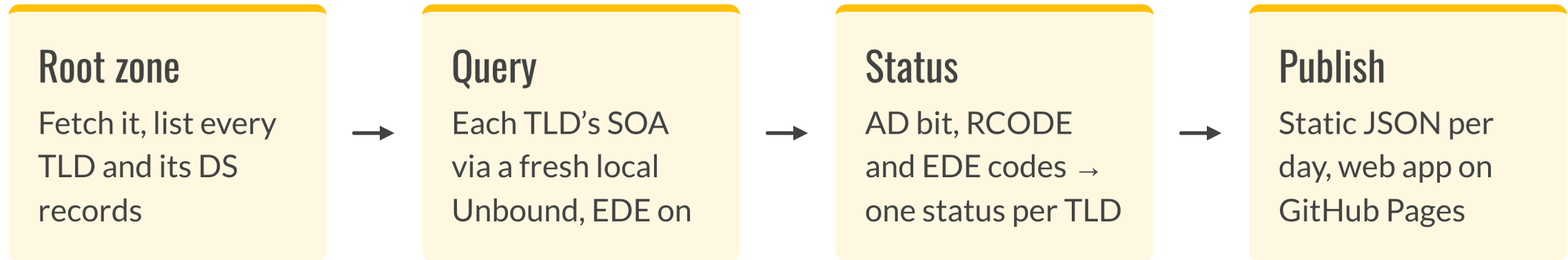
<https://stats.dnssec-tools.org/>

So we built a daily, open record of validation status for every TLD

Today: **1,351** of **1,437** TLDs validate

What do we measure?

Once a day • GitHub Actions

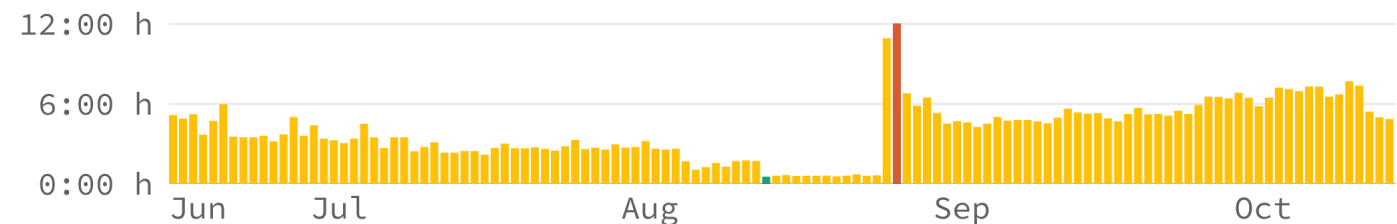


Each TLD is tagged gTLD/ccTLD × ASCII/IDN: IDN ccTLDs come from IANA's Root Zone Database

<https://data.iana.org/TLD/v1/tlds.json> (JSON file format since yesterday)

Raw AD, RCODE and EDE data are kept, so any classification bugs can be fixed later.

 **Fun fact:** due at 03:30 UTC, the run has never started on time: **0:33** to **12:03** hours late



What do the statuses mean?

	secure	Validated: AD bit set
	insecure	Unsigned TLD: answer without AD, as expected
	bogus	Validation failed: a DNSSEC EDE code (1, 2, 5–12)
	unreachable	No answer: a connectivity EDE code (22, 23), or a silence that passes three checks (next slide)
	error	Anything else, e.g. SERVFAIL without EDE

In the chart, insecure and error start hidden: one is about adoption, the other mostly about the measurement itself.

What if a TLD doesn't answer?

A timeout alone is not a verdict. A TLD is only *unreachable* if all three hold:

1 · Retry

A second pass 2 minutes later is also silent

2 · We can see

The root servers do answer us

3 · They are silent

The TLD's own nameservers don't answer a direct query

All three → unreachable

Otherwise → unmeasured, shown as a gap

Before adding the retry, the GitHub runner flagged an alphabetical stretch of 1–3 healthy TLDs as down every single day.

Where does the history come from?

2012

17 Jun 2026 → today

2012-01-01 → 2026-06-16

Historic: Jaap Akkerhuis

His earlier monitoring ([presented at ICANN 55](#)),
used with his permission

Converted into the same format

Signed TLDs only

2026-06-17 → today

Live: our daily runs

The measurement from the previous slides

Unsigned TLDs (insecure) included since
18 Aug 2026

May backfill insecure for the historic period later, so the graph doesn't jump.

<https://desec-io.github.io/tld-dnssec-timeline/>

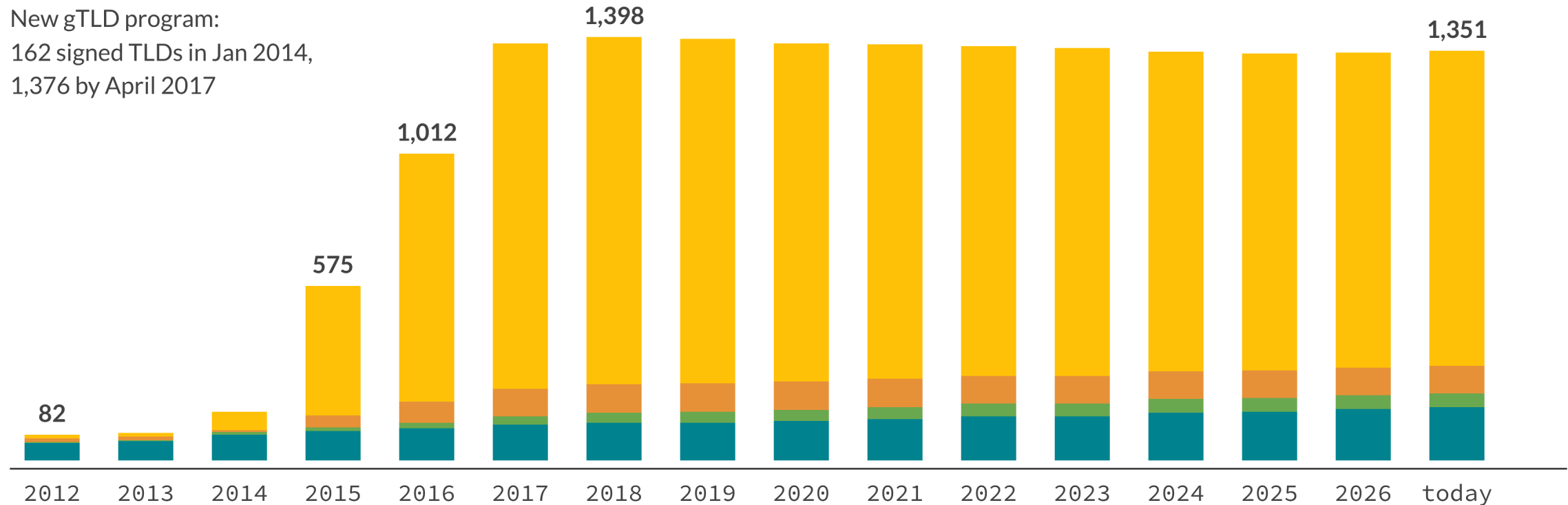
Demo

1 How signing grew • 2 How rare failures are • 3 One bad day
4 One TLD's story • 5 Who is still unsigned

Demo 1 - How did signing grow?

■ gTLD (ASCII)
 ■ gTLD (IDN)
 ■ ccTLD (IDN)
 ■ ccTLD (ASCII)

New gTLD program:
 162 signed TLDs in Jan 2014,
 1,376 by April 2017



Signed TLDs at the first measurement of each year in the timeline, plus 16 Oct 2026

Demo 2 · How rare are failures?

0–3

bogus TLDs on a typical day

Log scale keeps them visible next to 1,300+ secure TLDs

~790

error results on 2021-08-20 (790) and 2022-02-10 (769)

Legacy measurement artifacts, which is why error is hidden by default

Live: <https://desec-io.github.io/tld-dnssec-timeline/?scale=log>, then switch error on in the legend

Demo 3 - What happened on 3 Jan 2020?

Eight of India's IDN ccTLDs went **bogus at once**, all with expired signatures (EDE 7), for five straight days.

ಕರ್ನಾಟಕ Kannada xn--2scrj9c	ଓଡ଼ିଆ Odia xn--3hcrj9c	ভাৰত Assamese xn--45br5cyl	भारतम् Sanskrit xn--h2breg3eve
भारोत Santali xn--h2brj9c8c	بارت Kashmiri xn--mgbbh1a	ڀارت Sindhi xn--mgbgu82a	മലയാളം Malayalam xn--mrv1e0am3e

Apparently testing: all eight are from the 2017 batch, not yet open for registration; India's older IDN ccTLDs and .in stayed secure.

Live: <https://desec-io.github.io/tld-dnssec-timeline/#2020-01-03> shows the status grid and table.

Demo 4 · One TLD's story: الاردن

xn--mgbayh7gpa · Jordan's IDN ccTLD · 7 May → 16 Oct 2026



Meanwhile, ASCII .jo isn't signed at all.

Supports the view that some IDN TLDs are used for testing only.

Demo 4 · Are IDN ccTLDs different?

3%

of signed TLDs are
IDN ccTLDs

80%

of all bogus results in the
timeline, 2012 to today

100%

of bogus results since our own
runs began on 17 Jun 2026

Counted per TLD per day: 788 of 987 bogus results were IDN ccTLDs; since 17 June, 39 of 39.

Demo 5 · Who is still unsigned?

86 unsigned TLDs today, all of them ccTLDs

71 ASCII ccTLDs

15 IDN

72% of ccTLDs are now signed (223 of 309)

0 unsigned gTLDs

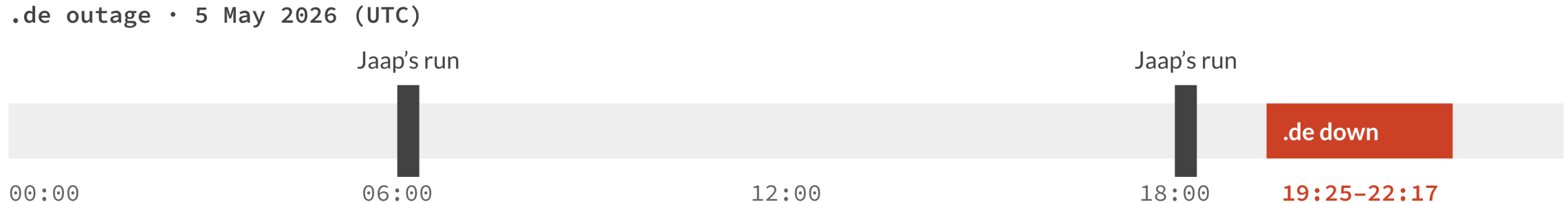
Recently signed

.dj secure since 11 Sep 2026

.pk secure since 10 Oct 2026

What can't the timeline show?

Snapshots, not continuous monitoring: failures between two runs don't show up.



- About three hours of disruption (DENIC), between two of Jaap's runs: not shown in timeline
- Only about a third of .de's signatures validated, so even a probe inside the window might have come back secure
- Also: One vantage point, one resolver implementation

Use it for trends and persistent breakage, not as an outage detector.

Conclusion

- Open code, open data: look up your TLD's history
 - ↳ Every view has its own URL: [#2020-01-03, ?scale=log](#)
- Ideas and contributions welcome
- Thanks to Jaap Akkerhuis for the historic data

<https://desec-io.github.io/tld-dnssec-timeline/>

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Questions?

