Automating DNSSEC with CDS for .ch

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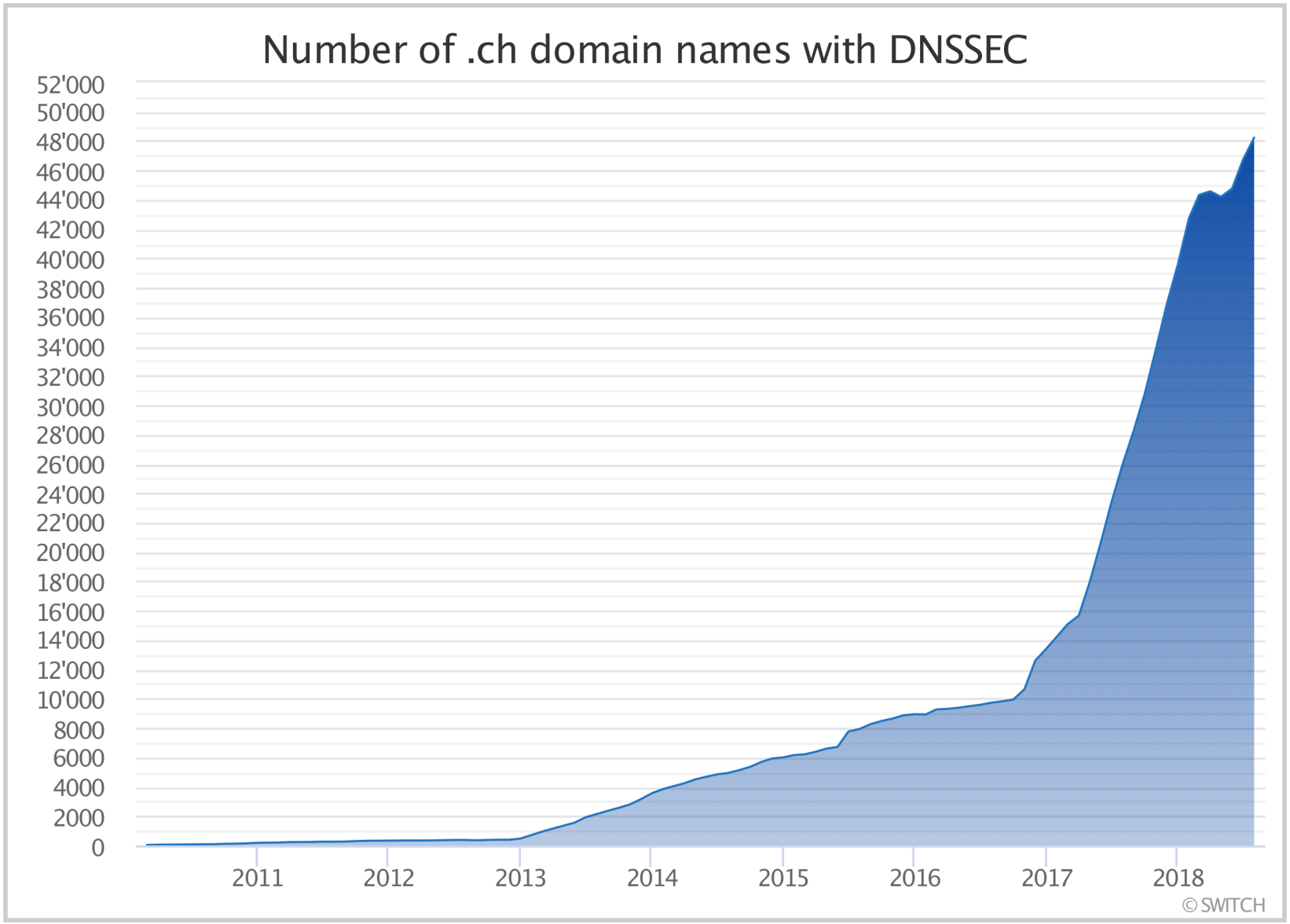
ICANN63

DNSSEC in .ch


Number of .ch domain names with DNSSEC
52'000
50'000
48'000
46'000
44'000
42'000
40'000
38'000
36'000
34'000
32'000
30'000
28'000
26'000
24'000
22'000
20'000
18'000
16'000
14'000
12'000
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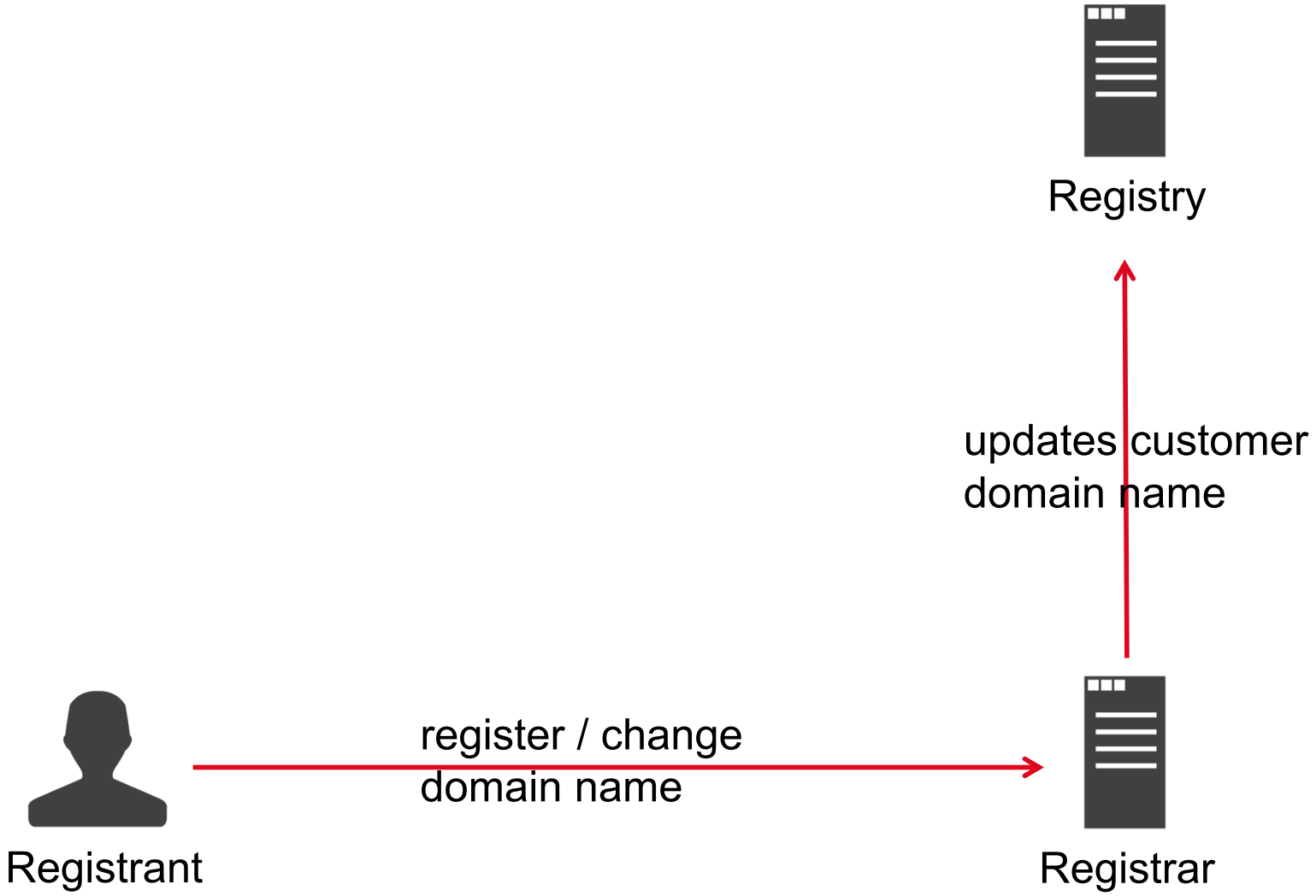
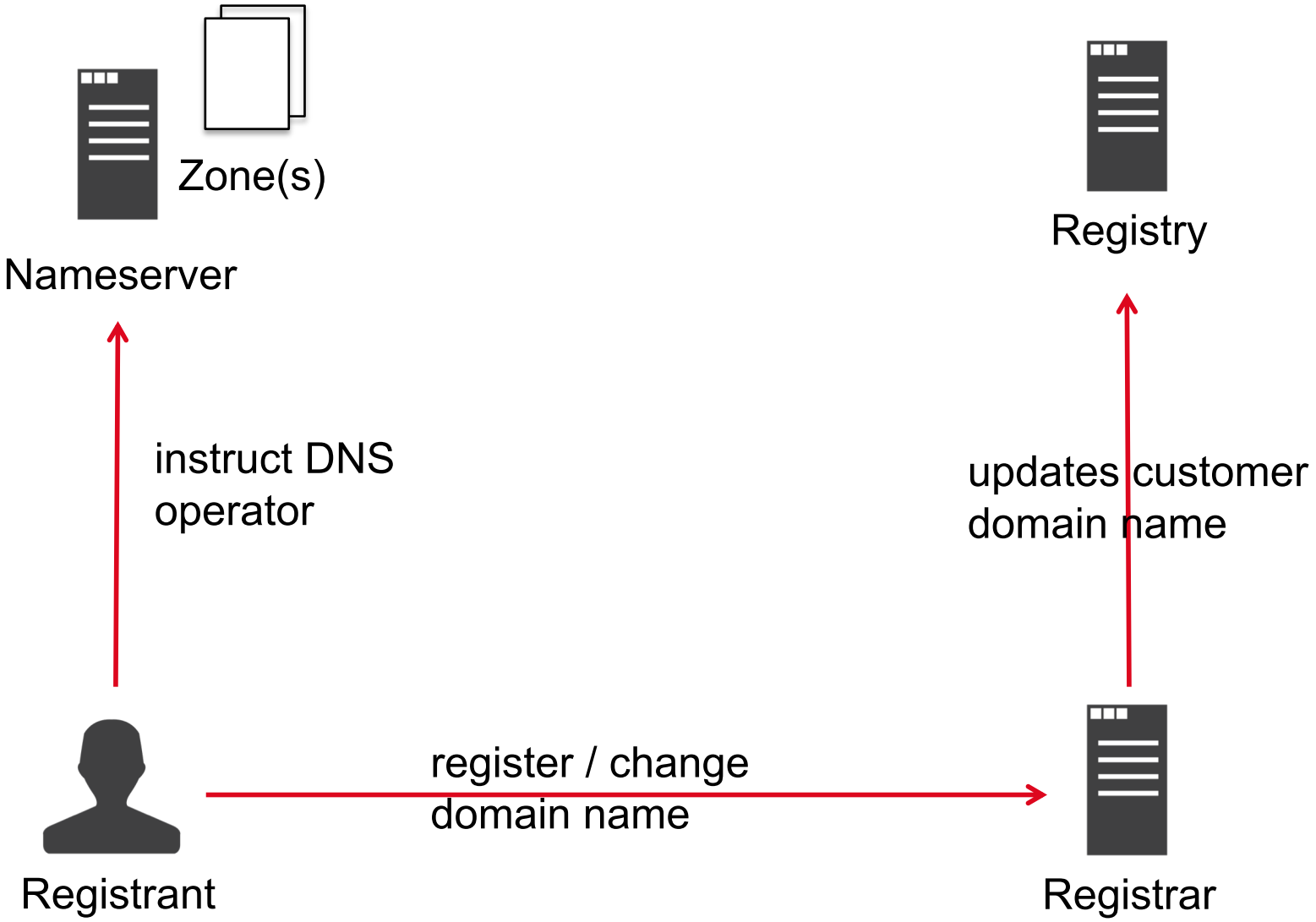
8000
6000
4000
2000
0
2011
2012
2013
2014
2015
2016
2017
2018
© SWITCH

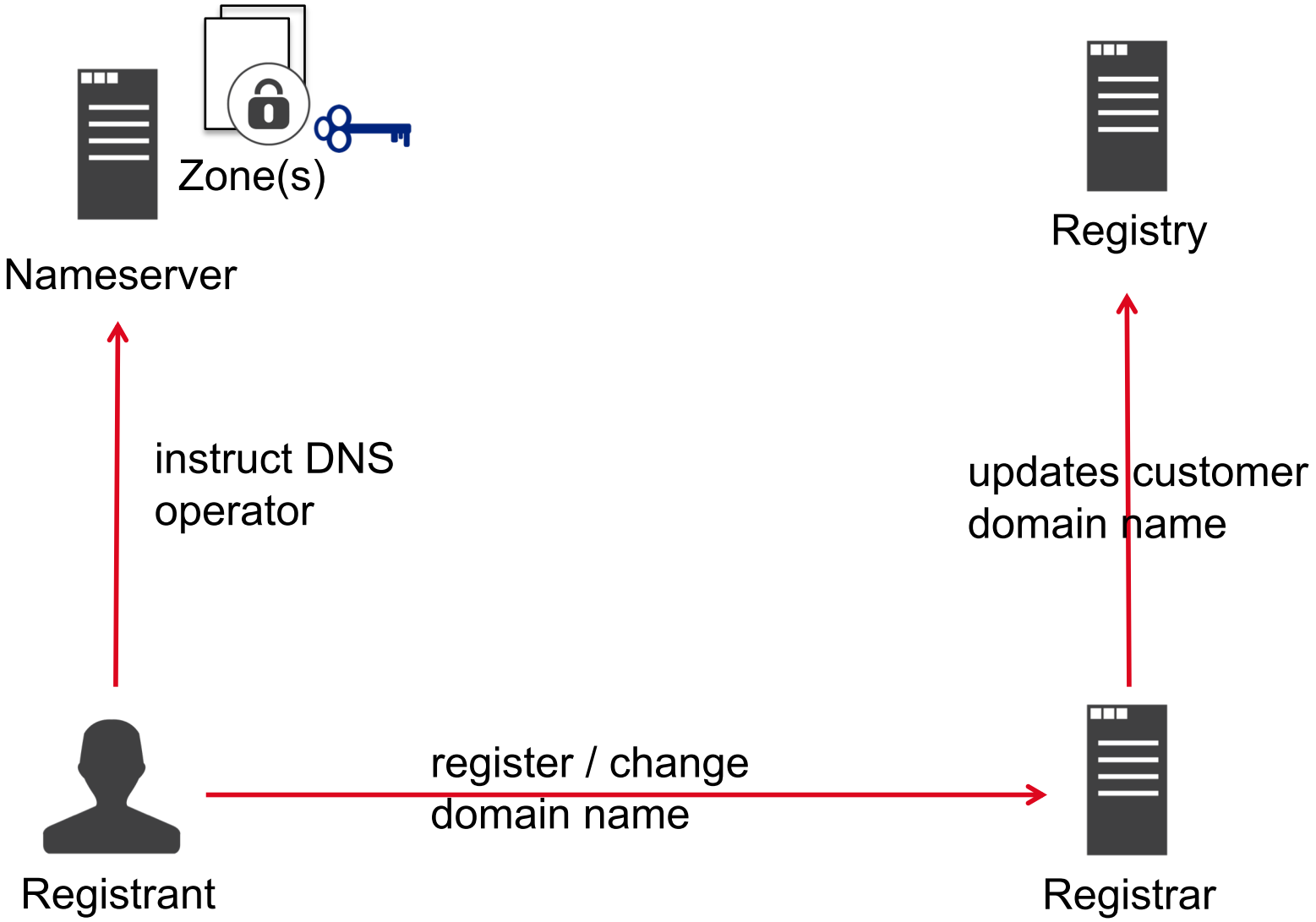
Domain Registration Process



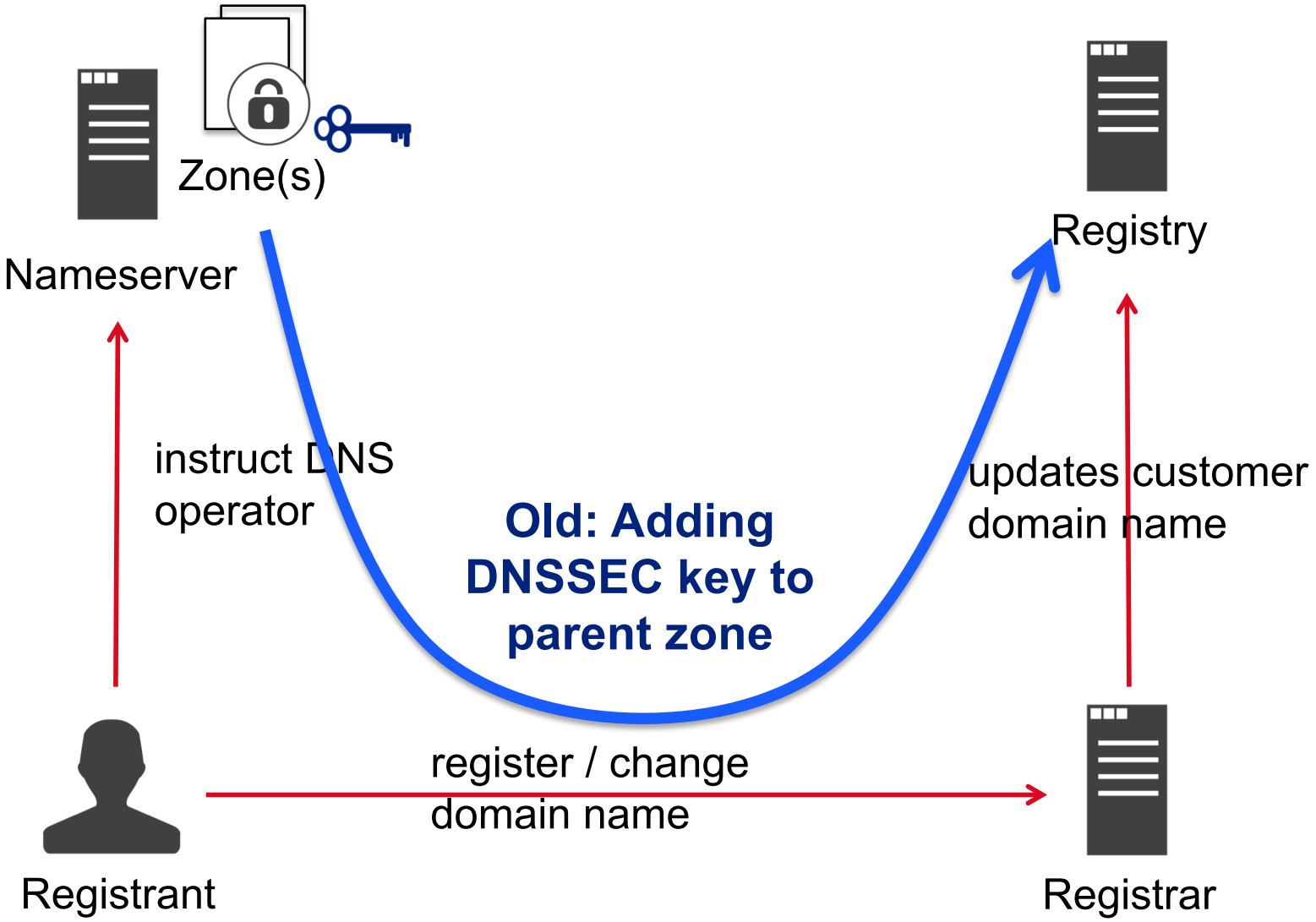
Domain Registration Process



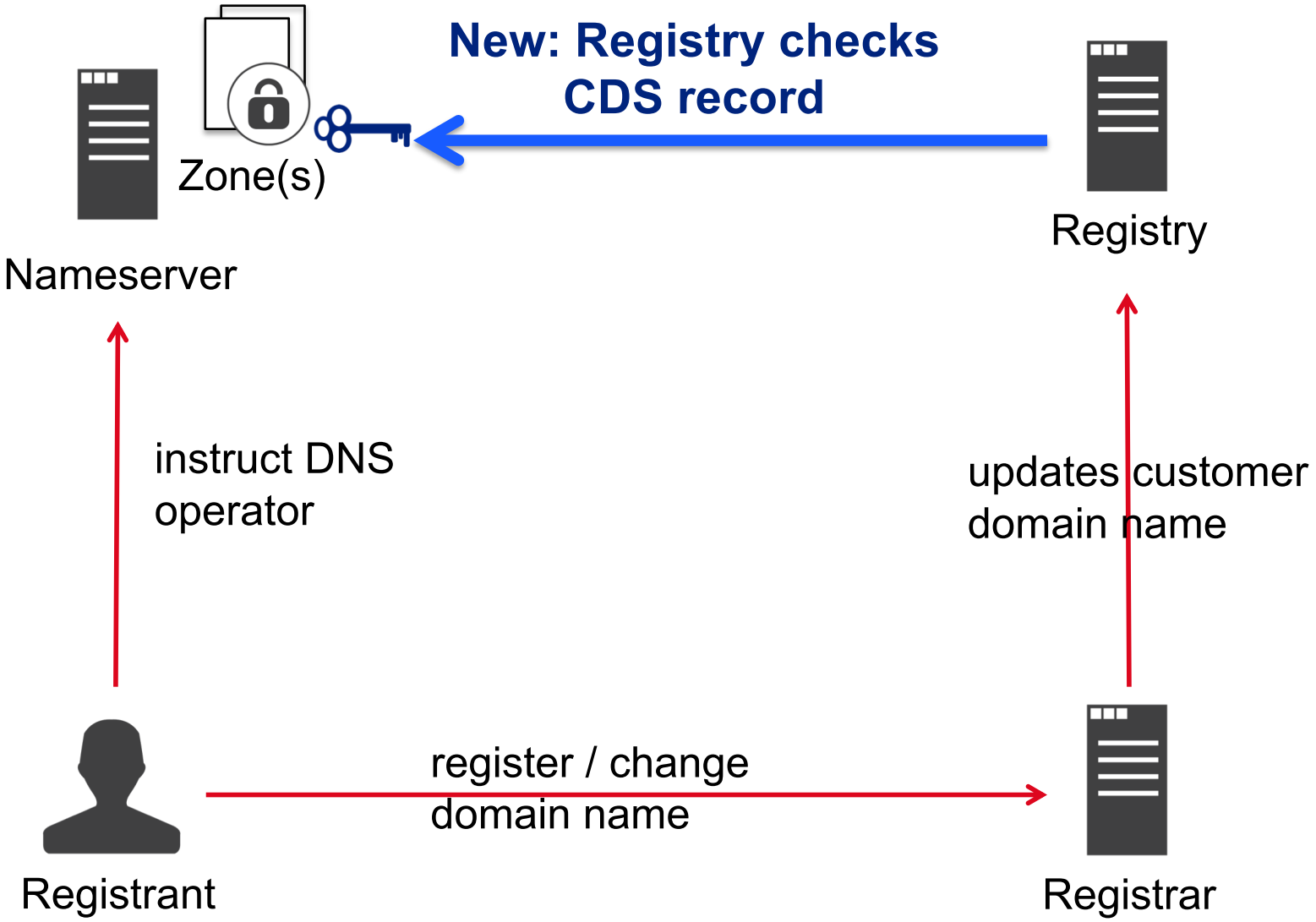
Domain Registration Process



Domain Registration Process



Domain Registration Process



Motivation

- Allow domain operators to automate DNSSEC
- Provide simple method to enable DNSSEC
- Prevent manual key rollover errors by automation
- Show that DNSSEC is easy to use

Note: Automated DNSSEC provisioning is not intended to enable DNSSEC in case your registrar does not support it. For emergency you want an interface from your registrar to edit DNSSEC information instantly.

How to sign a zone?

Example configuration for knot [1] name server software :

```
...

template:
  - id: default
    storage: /var/lib/knot


zone:
  - domain: example.ch
```

[1] https://www.knot-dns.cz/

How to sign a zone?

Example configuration for knot name server software :

```
...

template:
  - id: default
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    dnssec-signing: on

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zone:
  - domain: example.ch
```

Default DNSSEC Policy

```
algorithm: ecdsap256sha256
single-type-signing: off
ksk-lifetime: 0
zsk-lifetime: 30
cds-cdnskey-publish: always
```

Automatic DNSSEC via CDS processing

What we implemented

- **RFC 7344** - Automating DNSSEC Delegation Trust Maintenance, September 2014
- **RFC 8078** - Managing DS Records from the Parent via CDS/CDNSKEY, March 2017

How we implemented it
Step 1: Getting the CDS data

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Zone is already secure:

1. CDS checked via validating resolver
2. CDS must not change for 3 days

Zone is not secure (no DS in parent):

1. Auth. servers as provided in registry are checked on all their IP addresses
2. These name server must respond with a consistent result
3. DNS query sent over TCP only
4. Name server checked from multiple vantage points
5. CDS must not change for 3 days

How we implemented it
Step 2: Verifying the CDS data

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1. CDS only accepted if it does not break trust chain
2. DNSSEC algorithm supported: 5, 7, 8, 10, 13, 14, 15, 16 and 0 for deletion
   - https://www.iana.org/assignments/dns-sec-alg-numbers/dns-sec-alg-numbers.xhtml
3. Digest Type supported: 1, 2, 4 or 0 for deletion
   - https://www.iana.org/assignments/ds-rr-types/ds-rr-types.xhtml

How we implemented it
Additional information

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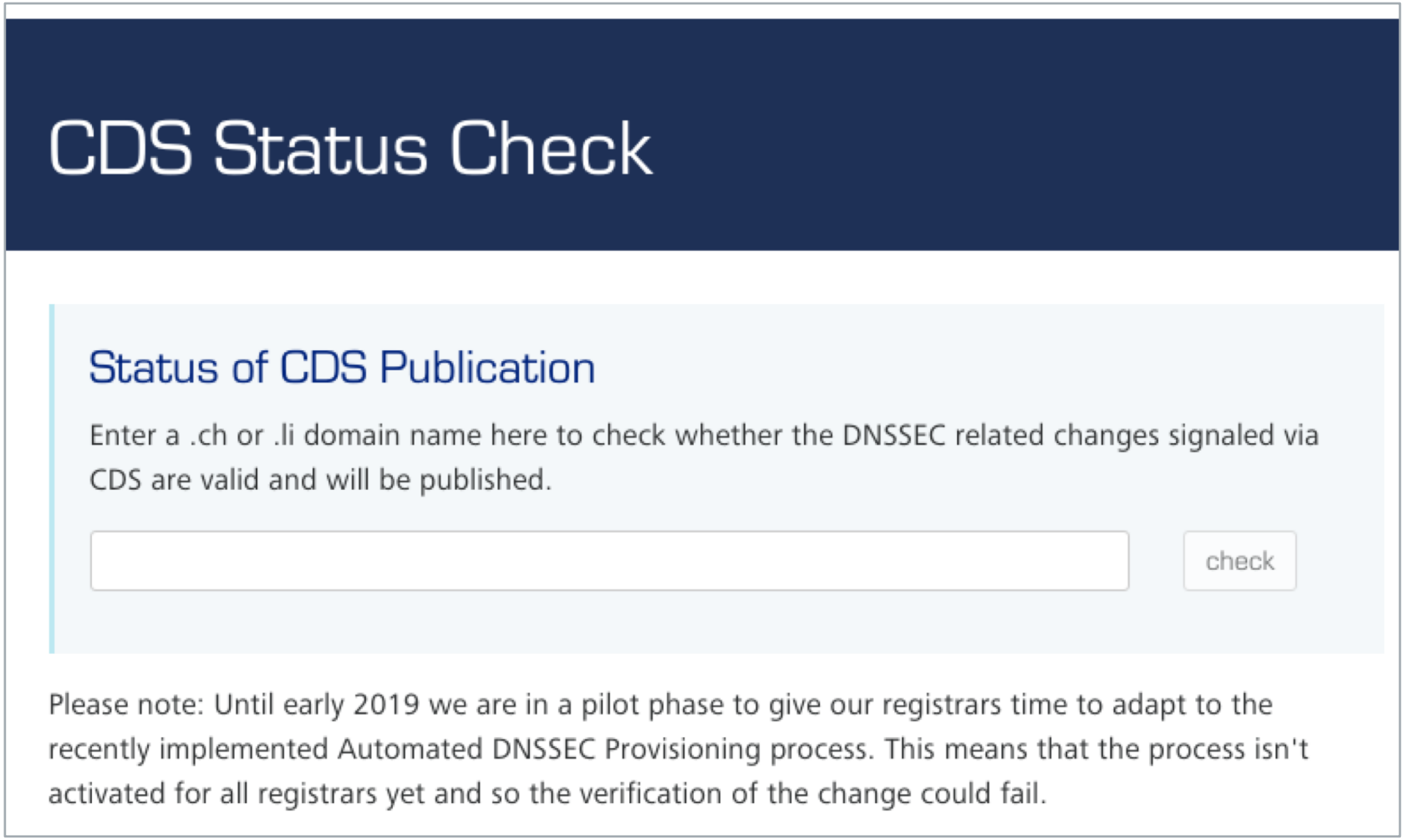
- DS record via EPP from registrar overwrites registry data, CDS record re-evaluated if newer than last EPP update
- Accepted CDS signaling changes are also sent to your registrar using EPP poll messages
- No communication by email to registrant or technical contact. However, we provide a status portal for curious users. Status portal: https://www.nic.ch/de/faqs/dnssec/cds/

Status Portal



https://www.nic.ch/de/faqs/dnssec/cds/

Status Portal

Success! A CDS record for the domain name dnssectests.ch has been found.

Domain name	dnssectests.ch
State	PENDING
Expected processing	12 October 2018
Type of change	BOOTSTRAP
Last scan run	09 October 2018 10:30
Unchanged since	09 October 2018
Scan runs	1 (at least 3 scan runs and 3 days since first "Unchanged since" date are required for the change to be activated)
Checked name servers	cds-auth-test.servername.ch / 2001:620:5ca1:1f0:f816:3eff:fed6:b706 cds-auth-test.servername.ch / 86.119.39.55

Valid Record Set

```
CDS 9508 13 2 70CB27735E6B115920C43AE3E9F3217C5E210A6260C7606498FA290315BA16C7
```

Status of CDS Publication

Enter a .ch or .li domain name here to check whether the DNSSEC related changes signaled via CDS are valid and will be published.

loiseaubleu.ch

check

Success! A CDS record for the domain name loiseaubleu.ch has been found.

Domain name	loiseaubleu.ch
State	PENDING
Expected processing	25 October 2018
Type of change	BOOTSTRAP
Last scan run	22 October 2018 08:00
Unchanged since	22 October 2018
Scan runs	1 (at least 3 scan runs and 3 days since first "Unchanged since" date are required for the change to be activated)
Checked name servers	cruz.ns.cloudflare.com / 2400:cb00:2049:1::adf5:3a58 ned.ns.cloudflare.com / 173.245.59.210 cruz.ns.cloudflare.com / 173.245.58.88 ned.ns.cloudflare.com / 2400:cb00:2049:1::adf5:3bd2

Valid Record Set

```
CDS 2371 13 2 19ABD2BD7D87BCD231F1D5DA9D70FD30EAC056646CD879C73CC4F5AF54AC0857
```

Who is using it already?

- Over 900 .ch domain names publish a CDS record set as of end of Sept 2018
- Top 10 by registrars

Registrar	#
Gandi SAS	219
Infomaniak Network SA	113
switchplus AG	96
Hostpoint AG	63
1API GmbH	52
OVH	48
METANET AG	41
cyon GmbH	28
NetZone AG	25
united-domains AG	23

Top 3 by DNS operator

Registrar	#
cloudflare.com	574
googledomains.com	113
internezzohosting.ch	24

DNSSEC sign your zone

- DNSSEC sign your zones
- Turn on DNSSEC validation on your resolver
- Don’t be on Team Telnet

Team Telnet

noun

1. a member of a computer user community which continues to use insecure communication protocols

Questions

More information about
Automated DNSSEC provisioning at
https://www.nic.ch/faqs/dnssec/cds/

Appendix

How to sign a zone?

Example configuration for knot name server software :

```
remote:
  - id: google
    address: [ "8.8.8.8" ]

submission:
  - id: validating-resolver
    parent: google

policy:
  - id: default
    ksk-submission: validating-resolver
    # ksk-lifetime: 365d

template:
  - id: default
    storage: /var/lib/knot
    dnssec-signing: on
```

Needed for KSK key rollover

Allows name server to detect whether parent is ready