

DNSSEC Workshop

Dan York, Internet Society | ICANN 56 | June 2016

Remote Participation

Slides and audio streams at:

- <https://meetings.icann.org/en/icann56-sched>

Program Committee

- Steve Crocker, Shinkuro, Inc.
- Mark Elkins, DNS/ZACR
- Cath Goulding, Nominet
- Jean Robert Hountomey, AfricaCERT
- Jacques Latour, CIRA
- Xiaodong Lee, CNNIC
- Luciano Minuchin, NIC.AR
- Russ Mundy, SPARTA, A Parsons Company
- Ondřej Surý, CZNIC
- Yoshiro Yoneya, JPRS
- Dan York, Internet Society
- Julie Hedlund and Kathy Schnitt, ICANN

DNSSEC Lunch and Implementer's Gathering Sponsors

- Afilias
- CIRA
- Dyn
- SIDN



The DNSSEC Workshop and associated activities at ICANN are an organized activity of the:

- **ICANN Security and Stability Advisory Committee (SSAC)**



with additional assistance from the:

- **Internet Society Deploy360 Programme**



Program

0915-0930 – Presentation: Dan York, Internet Society – *DNSSEC Workshop Introduction, Program, Deployment Around the World – Counts, Counts, Counts*

0930-1000 – Presentation: *Measurement Survey of Server-Side DNSSEC Adoption*

Dr. Matthäus Wander, University of Duisburg-Essen

1000-1015 – Presentation: *A Quick Review of DNSSEC Validation in Today's Internet*

Geoff Huston, APNIC

1015-1115 – Panel Discussion: *DNSSEC Deployment Challenges*

Moderator: Russ Mundy, Parsons

Panelists:

Dani Grant, CloudFlare – *Lying Makes Negative Answers Cheaper*

Ari-Matti Husa, FICORA – *DNSSEC Challenges*

Geoff Huston, APNIC – *DNSSEC Deployment Challenges*

Mauricio Oviedo, NIC.CR

Nick Shorey, Department for Culture, Media & Sport, UK Government

1115-1145 – Presentation: *Key Signing Key Rollover and ZSK Length Increase*

Matt Larson, ICANN and Duane Wessels, Verisign

1145-1200 – Discussion: *DNSSEC Encryption Algorithms*

Ondřej Surý, CZNIC and Dan York, Internet Society

1200-1215 – Presentation: *DNSSEC How Can I Help?*

Russ Mundy, Parsons and Dan York, Internet Society

1215-1230 – *The Great DNS/DNSSEC Quiz*

Roy Arends, ICANN

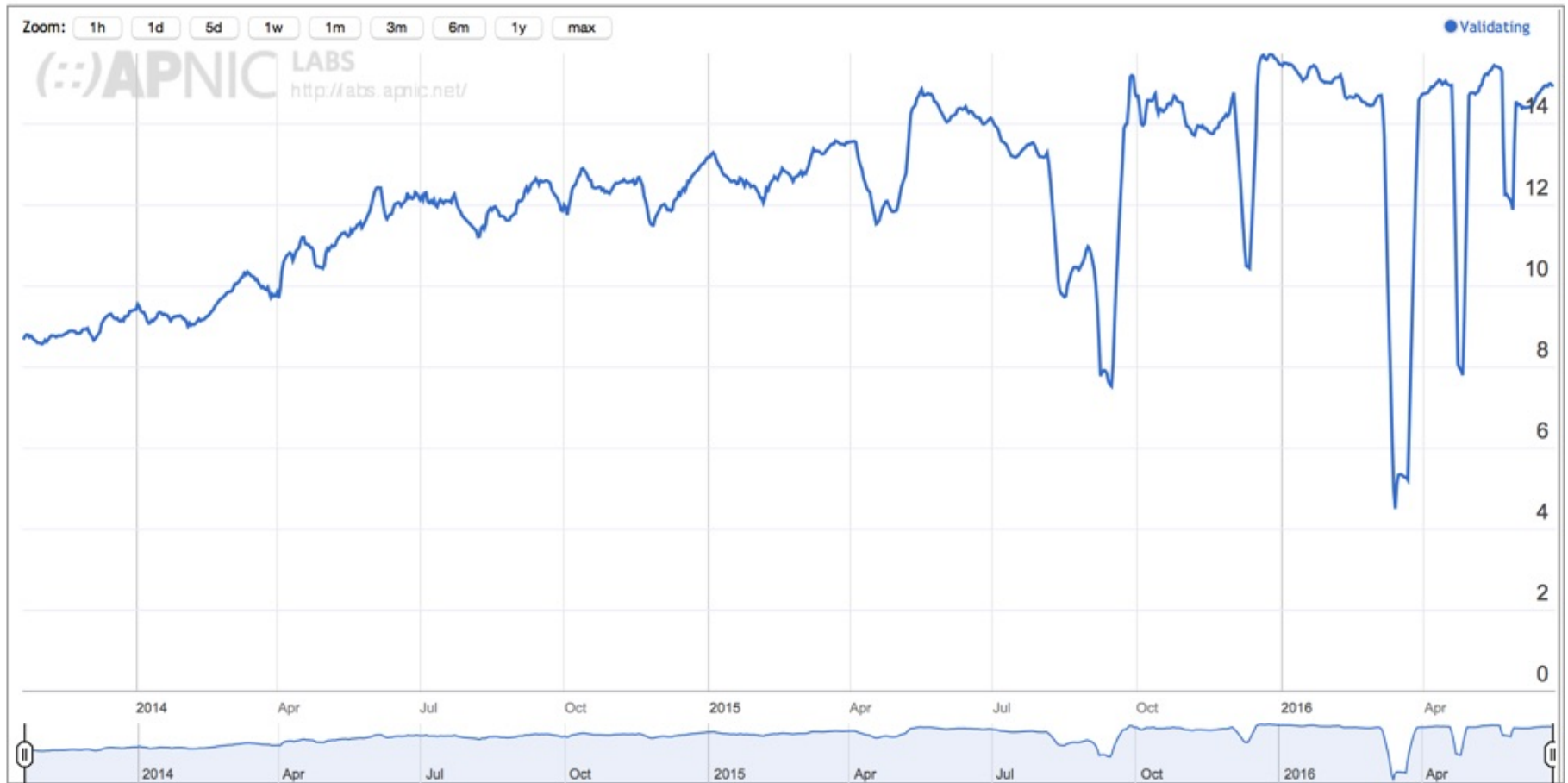
1230-1330 – *Sponsored Lunch*



DNSSEC Deployment Around the World: Counts, Counts, Counts

Dan York, Internet Society | ICANN 56 | June 2016

Use of DNSSEC Validation for World (XA)



<http://stats.labs.apnic.net/dnssec/XA?c=XA&x=1&g=0&r=0&w=7&r=1>

| Code | SubRegion | DNSSEC Validates | Uses Google PDNS |
|------|------------------------------------|------------------|------------------|
| XH | Eastern Africa, Africa | 37.15% | 28.38% |
| QQ | Melanesia, Oceania | 31.09% | 33.71% |
| XK | Southern Africa, Africa | 29.39% | 13.64% |
| QO | Western Europe, Europe | 23.08% | 10.32% |
| XQ | Northern America, Americas | 22.84% | 7.17% |
| QM | Northern Europe, Europe | 22.20% | 5.46% |
| QP | Australia and New Zealand, Oceania | 22.09% | 3.73% |
| XP | South America, Americas | 20.54% | 14.30% |
| XT | Southern Asia, Asia | 19.39% | 21.32% |
| XW | Eastern Europe, Europe | 18.19% | 12.27% |
| QR | Micronesia, Oceania | 12.14% | 26.28% |
| XV | Western Asia, Asia | 11.91% | 11.35% |
| XJ | Northern Africa, Africa | 11.73% | 14.30% |
| XI | Middle Africa, Africa | 11.69% | 28.11% |
| QN | Southern Europe, Europe | 11.59% | 9.67% |
| XU | South-Eastern Asia, Asia | 11.52% | 16.76% |
| XR | Central Asia, Asia | 9.10% | 11.72% |
| XN | Caribbean, Americas | 9.04% | 13.85% |
| XO | Central America, Americas | 6.86% | 14.98% |
| XL | Western Africa, Africa | 5.86% | 27.27% |
| XS | Eastern Asia, Asia | 2.93% | 4.92% |
| QS | Polynesia, Oceania | 2.46% | 8.63% |

<http://stats.labs.apnic.net/dnssec/XA?c=XA&x=1&g=1&r=0&w=7&r=1>

| CC | Country | DNSSEC Validates | Uses Google PDNS |
|----|--|------------------|------------------|
| FO | Faroe Islands, Northern Europe, Europe | 91.48% | 2.10% |
| AD | Andorra, Southern Europe, Europe | 90.38% | 11.58% |
| IS | Iceland, Northern Europe, Europe | 80.81% | 8.14% |
| SE | Sweden, Northern Europe, Europe | 76.99% | 6.77% |
| NO | Norway, Northern Europe, Europe | 62.31% | 6.69% |
| LI | Liechtenstein, Western Europe, Europe | 59.62% | 27.53% |
| EE | Estonia, Northern Europe, Europe | 57.81% | 4.56% |
| SI | Slovenia, Southern Europe, Europe | 57.35% | 10.59% |
| DK | Denmark, Northern Europe, Europe | 54.45% | 7.50% |
| EU | European Union, Western Europe, Europe | 52.71% | 17.70% |
| RO | Romania, Eastern Europe, Europe | 41.11% | 15.89% |
| LU | Luxembourg, Western Europe, Europe | 39.99% | 9.17% |
| BA | Bosnia and Herzegovina, Southern Europe, Europe | 35.66% | 10.47% |
| MK | The former Yugoslav Republic of Macedonia, Southern Europe, Europe | 34.78% | 17.00% |
| RS | Serbia, Southern Europe, Europe | 31.53% | 10.24% |
| CZ | Czech Republic, Eastern Europe, Europe | 30.72% | 18.05% |
| FR | France, Western Europe, Europe | 28.96% | 5.07% |
| DE | Germany, Western Europe, Europe | 27.53% | 16.48% |
| AX | Aland Islands, Northern Europe, Europe | 26.04% | 54.22% |
| BY | Belarus, Eastern Europe, Europe | 25.71% | 11.18% |
| FI | Finland, Northern Europe, Europe | 25.35% | 2.81% |
| IE | Ireland, Northern Europe, Europe | 24.14% | 4.61% |
| PL | Poland, Eastern Europe, Europe | 19.66% | 9.96% |
| UA | Ukraine, Eastern Europe, Europe | 19.45% | 20.10% |
| GR | Greece, Southern Europe, Europe | 18.97% | 10.51% |
| RU | Russian Federation, Eastern Europe, Europe | 14.76% | 10.52% |

Note: Minimal use of Google PDNS (this means DNSSEC support by local ISPs)

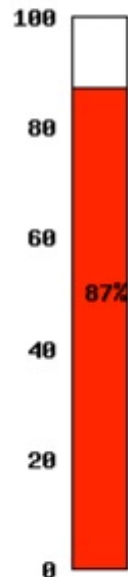
<http://stats.labs.apnic.net/dnssec/XA?c=XA&x=1&g=1&r=0&w=7&r=1>

DNSSEC Deployment Report

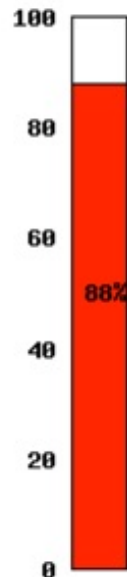
Thu Jun 23 22:55:25 UTC 2016

Total TLDs: 1363 / Signed TLDs in root: 1199 / Recently added: art. cookingchannel. foodnetwork. frontdoor. hgtv. nfl. politie. travelchannel. woodside. (06/23/2016)

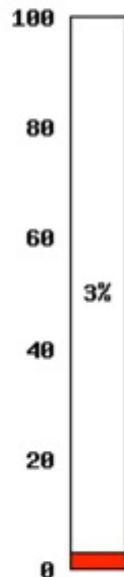
% of TLDs signed in root



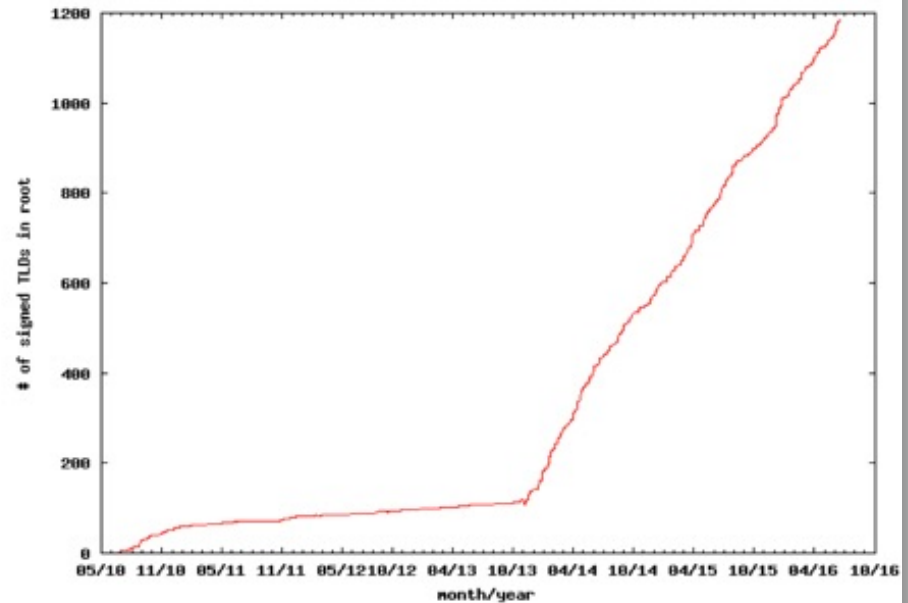
% of TLDs signed










Approx % of 2LDs signed



Trend



<https://rick.eng.br/dnssecstat/>

| TLD | | Description | DS Date | % Signed | Signed/Total |
|-----------------------|---|---|-------------|----------|------------------|
| nl. |  | SIDN (Stichting Internet Domeinregistratie Nederland) | 11-NOV-2010 | 44.52 | 2500091/5616108 |
| br. |  | Comite Gestor da Internet no Brasil | 23-JUN-2010 | 23.76 | 918637/3865794 |
| com. | | VeriSign Global Registry Services | 31-MAR-2011 | 0.46 | 585325/126417660 |
| cz. |  | CZ.NIC, z.s.p.o | 24-JUN-2010 | 63.40 | 489405/771939 |
| net. | | VeriSign Global Registry Services | 9-DEC-2010 | 0.65 | 101976/15593047 |
| nu. |  | The IUSN Foundation | 25-SEP-2010 | 23.73 | 68613/289120 |
| org. |  | Public Interest Registry (PIR) | 22-JUL-2010 | 0.56 | 60285/10861915 |
| ovh. | | OVH SAS | 19-JUN-2014 | 43.67 | 21373/48946 |
| info. |  | Afilias Limited | 4-SEP-2010 | 0.38 | 21144/5502315 |
| biz. |  | Neustar, Inc. | 7-AUG-2010 | 0.80 | 18177/2262138 |
| xyz. | | XYZ.COM LLC | 19-FEB-2014 | 0.15 | 9008/6078552 |

Note: Only includes the TLDs for which Rick Lamb can get statistics. (Example, .GOV is not listed.)

<https://rick.eng.br/dnssecstat/>

| new gTLD | Domains | % Share |
|---------------|---------|---------|
| 1. .ovh | 22,027 | 21.03% |
| 2. .webcam | 9,056 | 8.64% |
| 3. .xyz | 8,846 | 8.44% |
| 4. .amsterdam | 6,203 | 5.92% |
| 5. .top | 3,856 | 3.68% |
| 6. .fri | 3,672 | 3.51% |
| 7. .paris | 3,411 | 3.26% |
| 8. .bank | 3,214 | 3.07% |
| 9. .online | 1,196 | 1.14% |
| 10. .win | 1,176 | 1.12% |
| 11. .immo | 1,103 | 1.05% |
| 12. .bzh | 983 | 0.94% |
| 13. .website | 845 | 0.81% |
| 14. .party | 829 | 0.79% |
| 15. .club | 821 | 0.78% |

Note that .BANK has 100% signed, as does .INSURANCE.

<https://ntldstats.com/dnssec>

TLD DNSSEC Implementation Status

Experimental – internal experiments

Announced – Public commitment to deploy

Partial – Zone is signed but not in operation

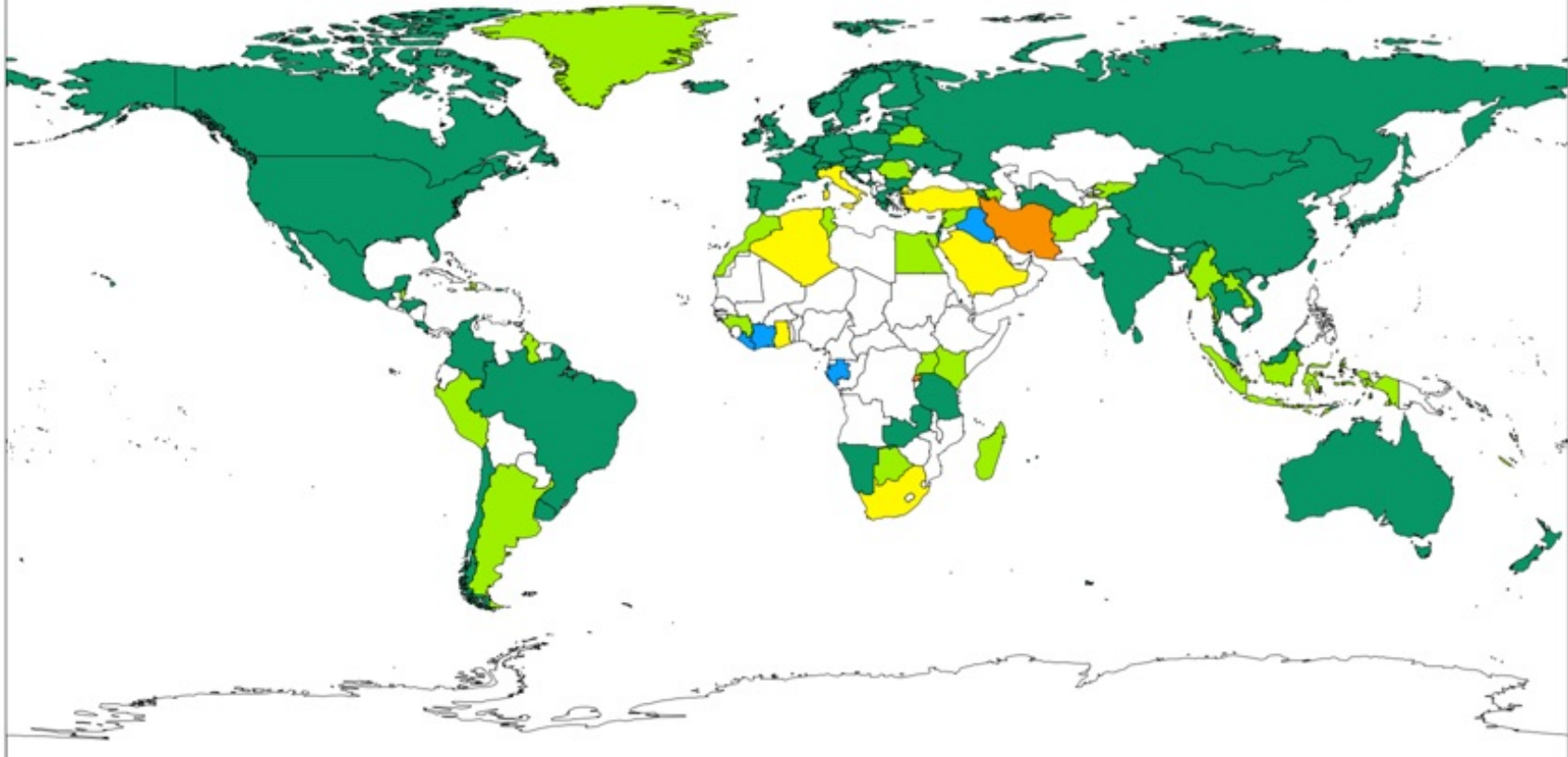
DS in Root

Operational – Accepting signed delegations



ccTLD DNSSEC Adoption as of 2016-06-24

Experimental ● Announced ● Partial ● DS in Root ● Operational ●



Experimental -- Internal experimentation announced or observed (4):

Announced -- Public commitment to deploy (7):

Partial -- Zone is signed but not in operation (no DS in root) (6):

DS in Root -- Zone is signed and its DS has been published (40):

Operational -- Accepting signed delegations and DS in root (76):

IR RW TO UM

DZ GH IT SA SG TR ZA

CI GA IQ LR MS VC

AD AF AG AR AW AZ BW BY BZ CC EG FO GD GI GL GN GY HT ID KE KG KI KY LA LB

LC MA MG MM NC NU PE PW RO SJ SY TN TV UG VU

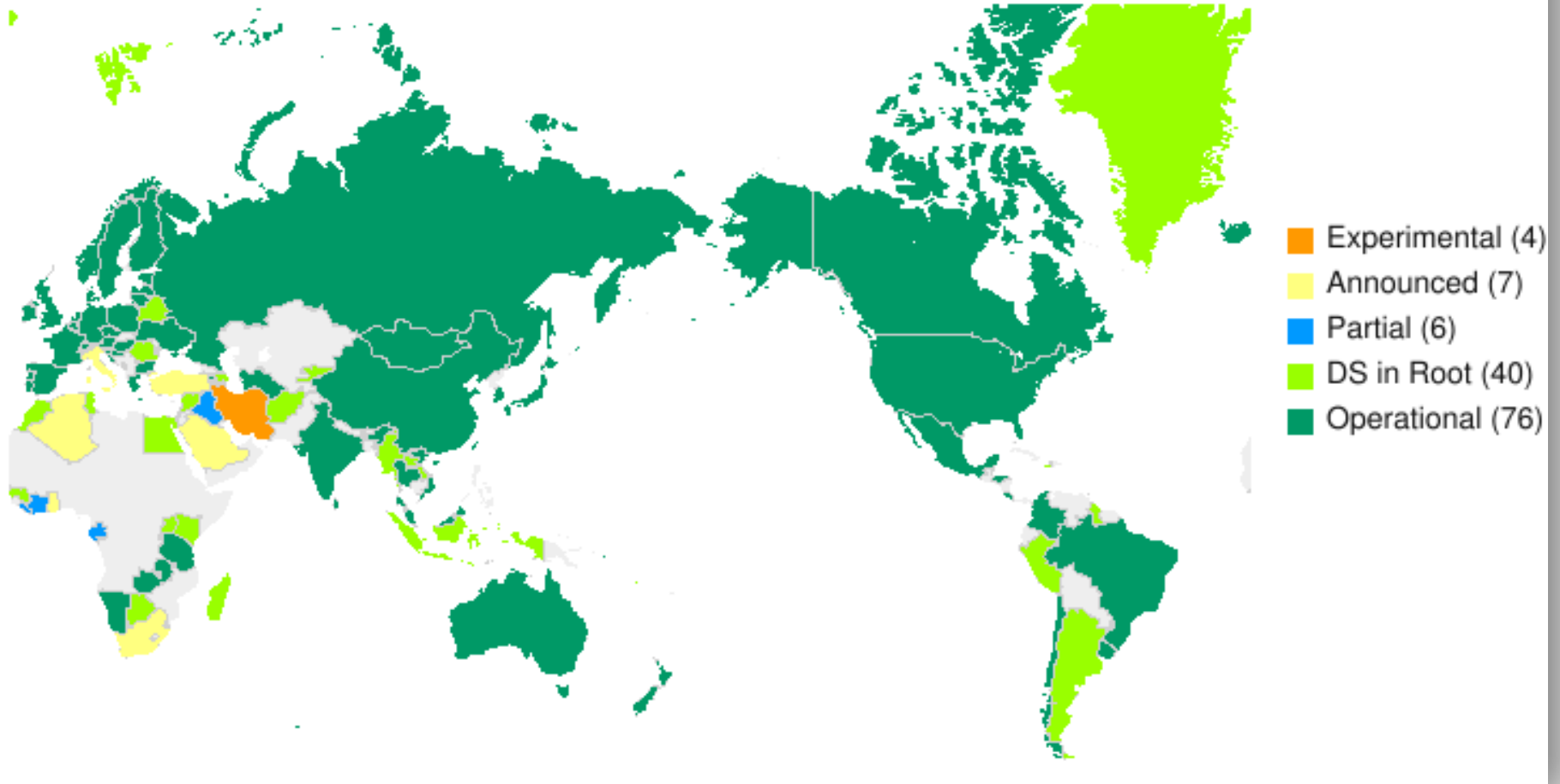
AC AM AT AU BE BG BR CA CH CL CN CO CR CX CZ DE DK EE ES FI FR GR GS HK HN

HR HU IE IL IN IO IS JP KR LI LK LT LU LV ME MN MU MX MY NA NF NL NO NZ PL

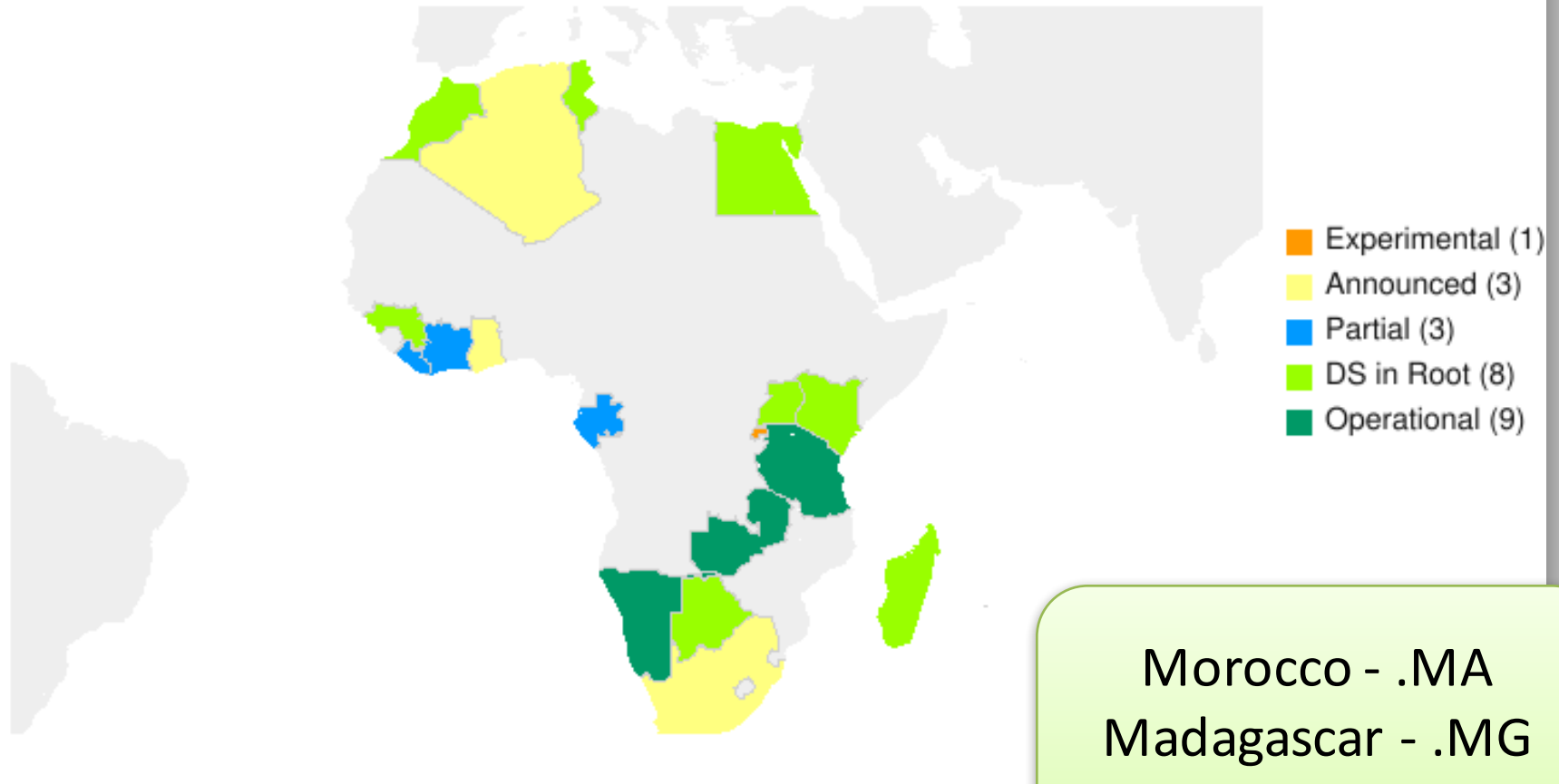
PM PR PT RE RU SB SC SE SH SI SX TF TH TL TM TT TW TZ UA UK US UY VN WF YT

ZM

ccTLD DNSSEC Status on 2016-06-20

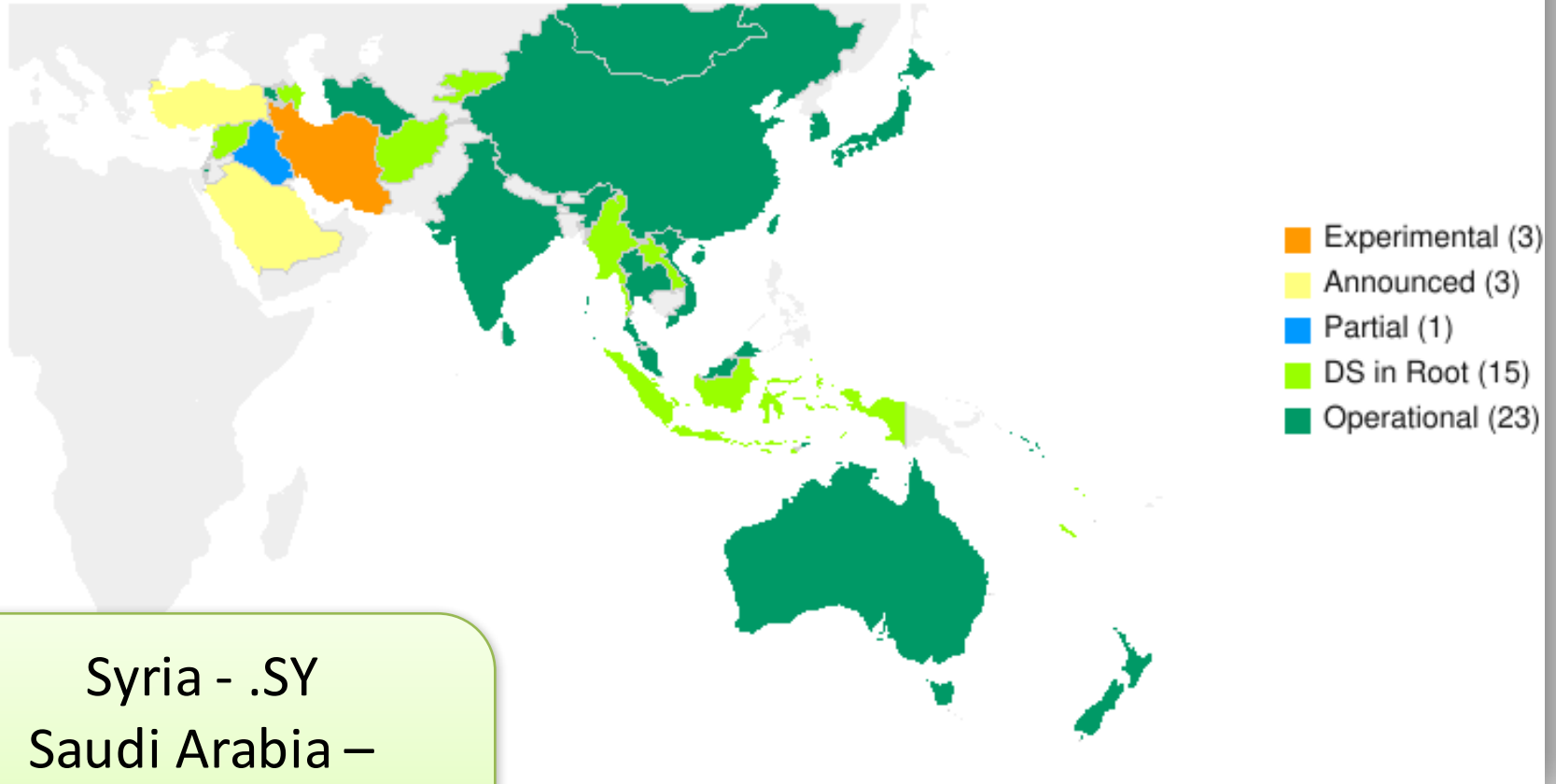


AF ccTLD DNSSEC Status on 2016-06-20



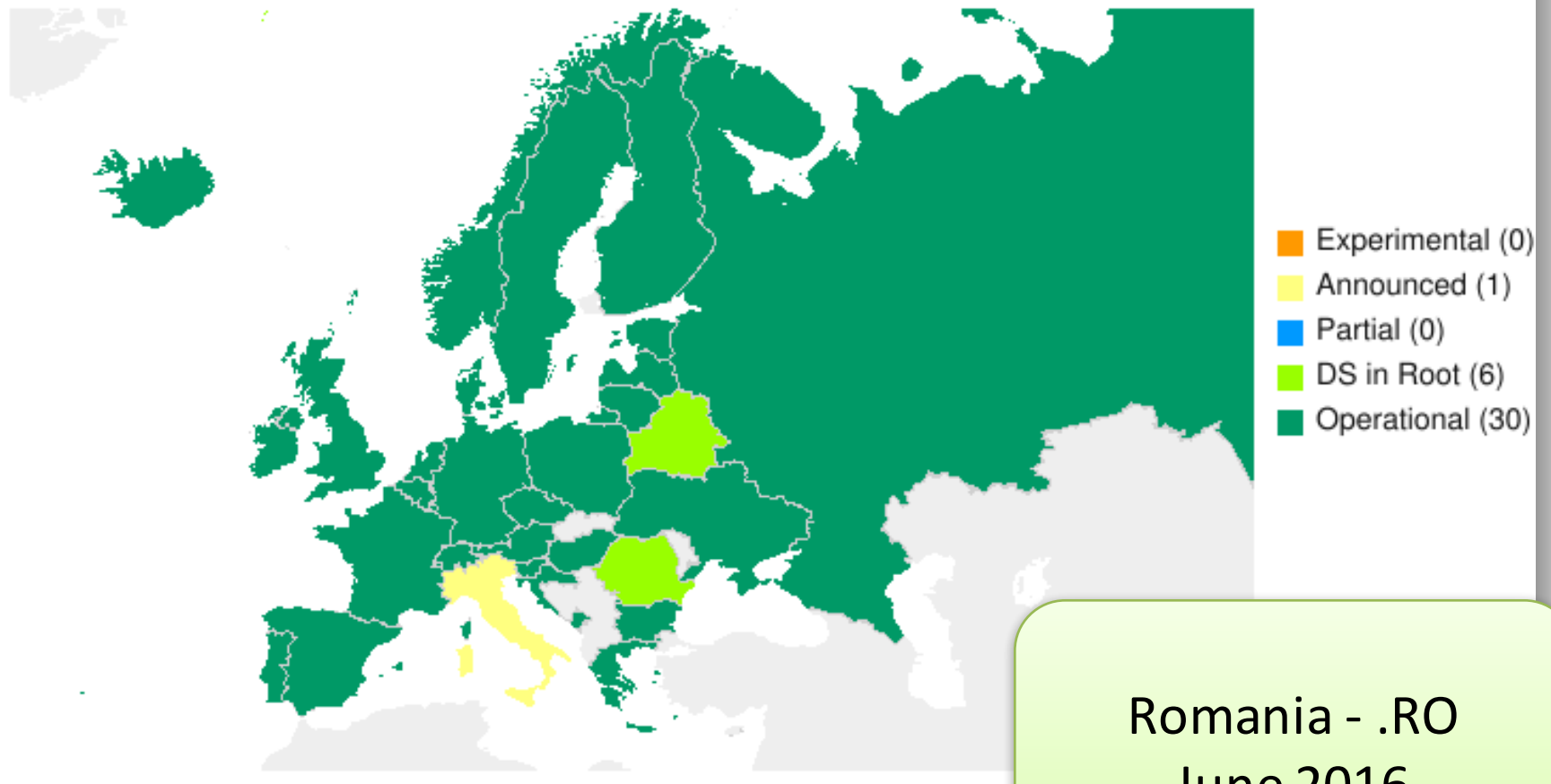
Morocco - .MA
Madagascar - .MG
March 2016

AP ccTLD DNSSEC Status on 2016-06-20

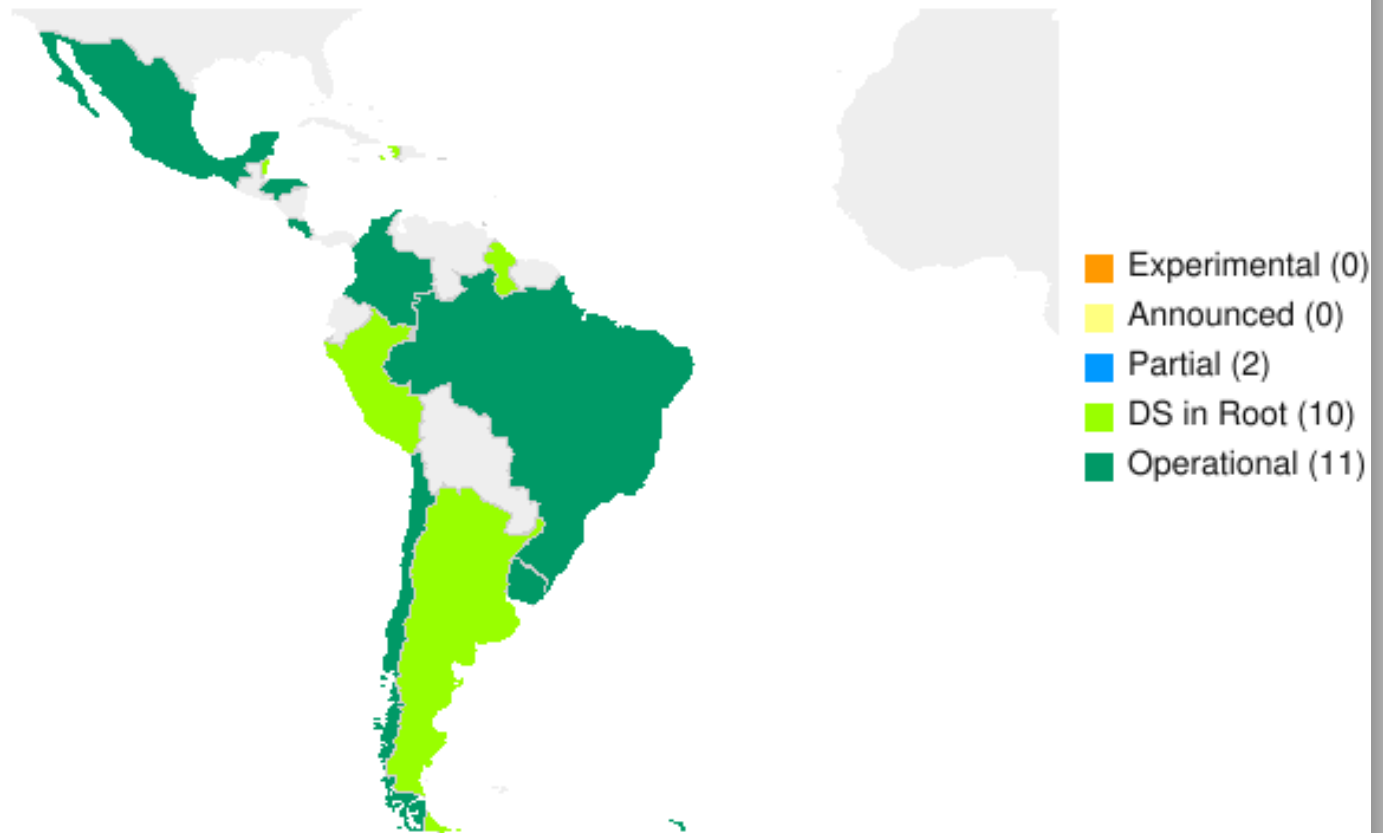


Syria - .SY
Saudi Arabia –
السعودية .
June 2016

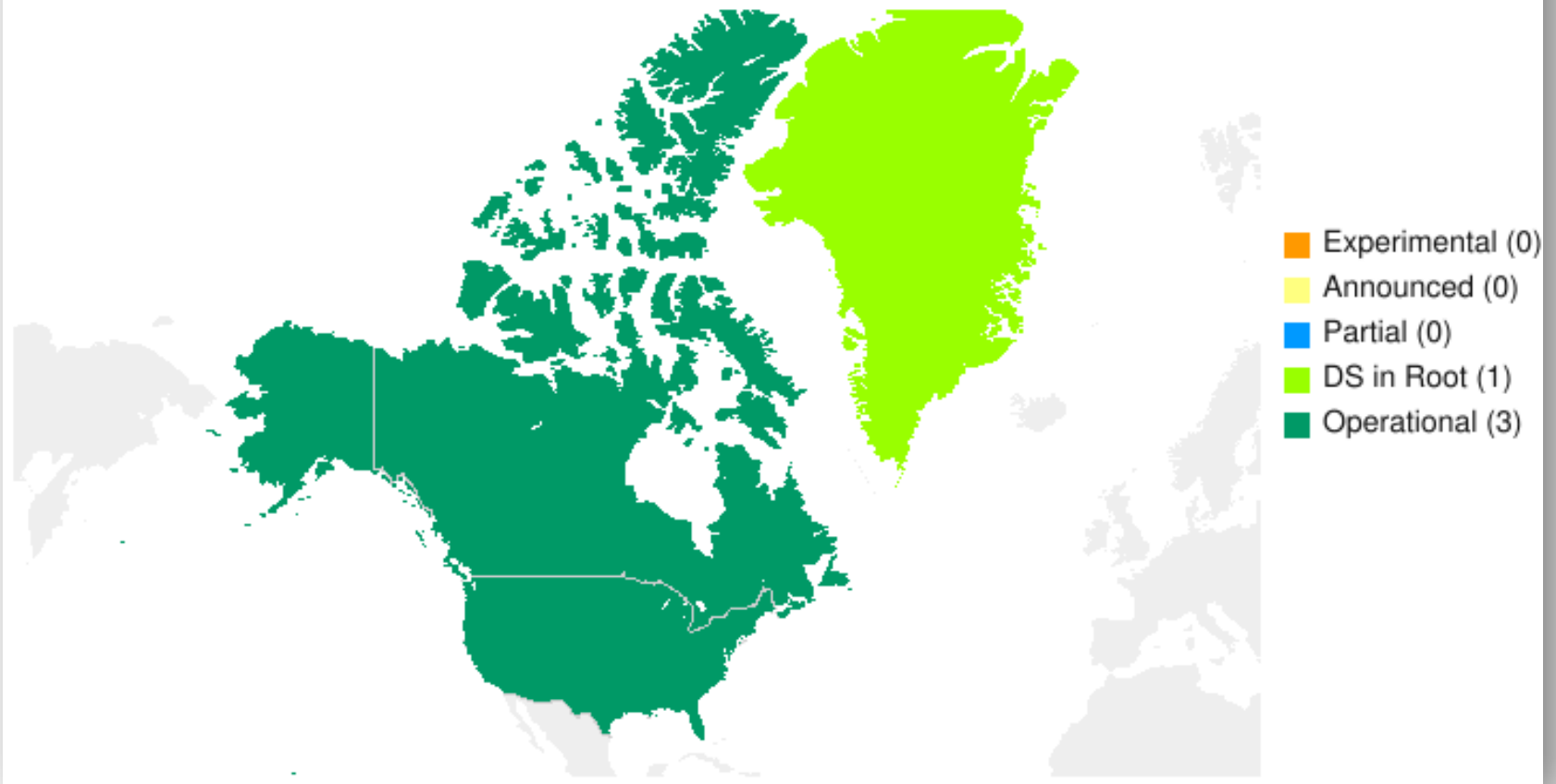
EUR ccTLD DNSSEC Status on 2016-06-20



LAC ccTLD DNSSEC Status on 2016-06-20



NA ccTLD DNSSEC Status on 2016-06-20



Receiving the DNSSEC Deployment Maps

The DNSSEC Deployment Maps are published via email every Monday morning through the Internet Society Deploy360 Programme.

To subscribe, visit:

www.internetsociety.org/deploy360/dnssec/maps/

DNSSEC Event Calendar

New calendar to track DNSSEC/DANE-related events.
Two views – event listing:

<https://www.dnssec-deployment.org/events/>

Calendar view:

<http://www.dnssec-deployment.org/calendar/>

Send event submissions to york@isoc.org

IETF 96 Hackathon

Sat/Sun, July 16/17– Berlin

- <https://www.ietf.org/hackathon/96-hackathon.html>
- Opportunity to work on new tools or services for DNSSEC / DANE / DNS Privacy
- Join us!

DNSSEC History Project

The DNSSEC History Project is an ongoing project to collect and record the history of the work that went into bringing about the deployment of DNSSEC. To view – or to contribute – please see:

https://wiki.tools.isoc.org/DNSSEC_History_Project

GCIIG “One Internet” Report



Global Commission on Internet Governance

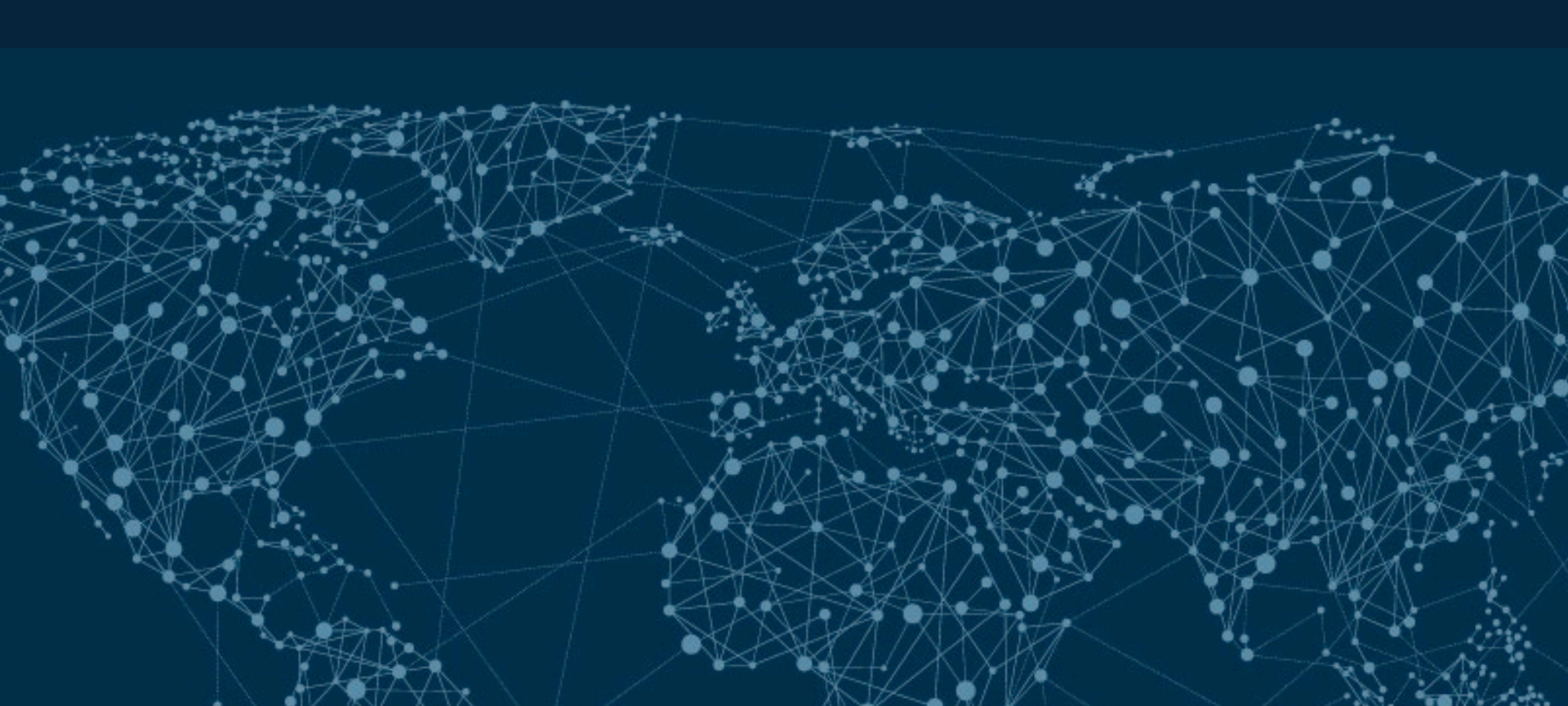
One Internet

<http://ourinternet.org/>
June 21, 2016



Recommendation

DNSSEC offers significant improvements to the current security of the DNS. Even though DNSSEC is currently being deployed, it is not happening quickly enough. Accelerating its adoption should be considered a high priority by DNS and network operators. It is essential that the Internet technical community's ongoing promotion efforts continue to support operators with the deployment of DNSSEC through the promotion of capacity-building programs, best practices and guidelines.



Thank you and Questions

Dan York, Internet Society | ICANN 56 | June 2016