

DNSSEC for the Root Zone

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**This design is the result of a cooperation
between ICANN & VeriSign with
support from the U.S. DoC NTIA**

Roles and Responsibilities

ICANN

IANA Functions Operator

- Manages the Key Signing Key (KSK)
- Accepts DS records from TLD operators
- Verifies and processes request
- Sends update requests to DoC for authorization and to VeriSign for implementation

DoC NTIA

U.S. Department of Commerce
National Telecommunications and Information Administration

- Authorizes changes to the root zone
 - ▶ DS records
 - ▶ Key Signing Keys
 - ▶ DNSSEC update requests follow the same process as other changes
- Checks that ICANN has followed their agreed upon verification/processing policies and procedures

VeriSign

Root Zone Maintainer

- Manages the Zone Signing Key (ZSK)
- Incorporates NTIA-authorized changes
- Signs the root zone with the ZSK
- Distributes the signed zone to the root server operators

Deployment

Goals

- Deploy a signed root zone
 - ▶ Transparent processes
 - ▶ Audited procedures
 - ▶ DNSSEC deployment
 - validators, registries, registrars, name server operators
- Communicate early and often!

Anticipated Issues

DO=1

- A significant proportion of DNS clients send queries with EDNS0 and DO=1
- Some (largely unquantified, but potentially significant) population of such clients are unable to receive large responses
- Serving signed responses might break those clients

Rollback

- If we sign the root, there will be some early validator deployment
- There is the potential for some clients to break, perhaps badly enough that we need to un-sign the root (e.g., see previous slide)
- Un-signing the root will break the DNS for validators

Staged Deployment

Deploy Incrementally

- The goal is to leave the client population with some root servers not offering large responses until the impact of those large responses is better understood
- Relies upon resolvers not always choosing a single server

DURZ

- Deploy conservatively
 - ▶ It is the root zone, after all
- Prevent a community of validators from forming
 - ▶ This allows us to unsign the root zone during the deployment phase (if we have) to without collateral damage

DURZ

- “Deliberately Unvalidatable Root Zone”
- Sign RRSets with keys that are not published in the zone (but with matching keytag...)
- Publish keys in the zone which are not used, and which additionally contain advice for operators (see next slide)
- Swap in actual signing keys (which enables validation) at the end of the deployment process

Measurement

- For those root servers that are instrumented, full packet captures and subsequent analysis around signing events
- Ongoing dialogue with operator communities to assess real-world impact of changes

Interaction with TLD Managers

DS Change Requests

- Approach likely to be based on existing methods for TLD managers to request changes in root zone
- Anticipate being able to accept DS requests 1-2 months before the validatable signed root zone is in production

Communication

Project Web Page

- <http://www.root-dnssec.org/>
 - ▶ Status updates
 - ▶ Documents
 - ▶ Presentation Archive
 - ▶ Small collection of links to relevant tools
 - ▶ Contact information
 - ▶ RSS

Draft Timeline

- December 1, 2009
 - ▶ **Root zone signed**
 - Initially signed zone stays internal to ICANN and VeriSign
 - ▶ ICANN and VeriSign begin KSR processing
 - ZSK and KSK rolls
- January - July 2010
 - ▶ Incremental roll out of DURZ
- July 1, 2010
 - ▶ KSK rolled and trust anchor published
 - ▶ **Signed root fully deployed**

Deployment Status

20 April 2010

Documentation

- NTIA Requirements document posted
- Many documents describing aspects of design and operations for DNSSEC in the root zone posted in draft form
- Project documentation continues to be updated and new documents posted

<http://www.root-dnssec.org/>

Testing

- Data collection testing by Root Server Operators complete - have now done this for real
- Several KSR/SKR exchanges complete
- DURZ vs. Resolver testing complete

DURZ Roll-Out

L	Completed on 27 January
A	Completed on 10 February
M, I	Completed on March 3rd
D, K, E	Completed on March 22nd
B, H, C, G, F	Completed on April 12th
J	May 5th

Trusted Community Representatives

- ICANN is soliciting volunteers from the technical community to participate in cryptographic key ceremonies
- For more details and to submit an expression of interest, see

<http://www.root-dnssec.org/tcr/>

Thoughts?

- Feedback is extremely welcome
 - ▶ Email to rootsign@icann.org

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