DNSSEC Developments

Internetdagarna 2010, Stockholm

kirei

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IT Security Advisor

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Crypto Plumber

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IETF DNSSEC

Protocol Geek

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.SE DNSSEC Mascot

kirei

Unbound

kirei

OpenDNSSEC

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Root DNSSEC Design Team

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jakob@schlyter.se

kirei

Chocoholic

kirei

Lindy Hop Dancer

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Wife & two kids

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One car

kirei

No dog

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DNSSEC Yesterday

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1983

Paul Mockapetris invents the DNS and implements the first server – JEEVES

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1986

Formal IETF Internet Standard
RFC 1034 & 1035

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1990

Steve Bellovin describes cache poisoning –
report is held back until …

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1995

Steve Bellovin's article is published and
DNSSEC becomes a topic within the IETF

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1997

1st generation of DNSSEC – RFC 2065

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1997

Kashpureff of “AlterNIC” hijack the InterNIC website

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1997

BIND 8 released

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1999

First DNSSEC workshop in Sweden

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1999

2nd generation of DNSSEC – RFC 2535

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2000

BIND 9 released – with support for DNSSEC

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2001

RFC 2535 key management did not work

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2002 – 2004

"DNSSEC will be ready in 6 months"

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2005

3rd generation of DNSSEC – RFC 4033/4034/4035

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2005

.SE deploys DNSSEC

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2006 – 2007

Others are thinking about deploying DNSSEC

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2008

RFC 5155 brings us NSEC3

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2008

The Kaminsky Bug

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2009

Others are deploying DNSSEC

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2010

The root zone is signed

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Signing the Root

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Root DNSSEC Design Team

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Requirements

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Transparency

Processes and procedures should
be as open as possible for the Internet
community to trust the signed root

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Audited

Processes and procedures should
be audited against industry standards,
e.g. ISO/IEC 27002:2005

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High Security

Root system should meet all NIST
SP 800-53 technical security controls required
by a HIGH IMPACT system

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2048-bit RSA

SHA-256

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Split KSK/ZSK management

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ICANN manage the Key Signing Key

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VeriSign manage the Key Signing Key

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Incremental deployment

Deliberately Unvalidatable Root Zone (DURZ)

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Trusted Community Representatives

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Crypto Officers

7 people for each facility, controlling
access to the Cryptographic Modules

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3 of 7 required

for access

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Recovery Key Shareholders

7 people keeping the recovery key safe

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5 of 7 required

to recover

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Key Management Facilities

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US East & West Coast

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Multi-Tiered Security

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m-of-n

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SysTrust audit

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Key Ceremonies

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KSK Generation

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ZSK Signing

4 times a year

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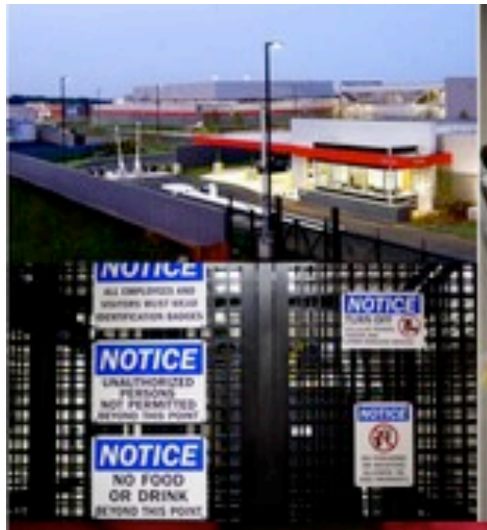
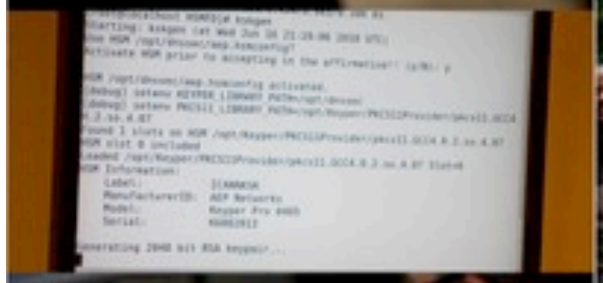
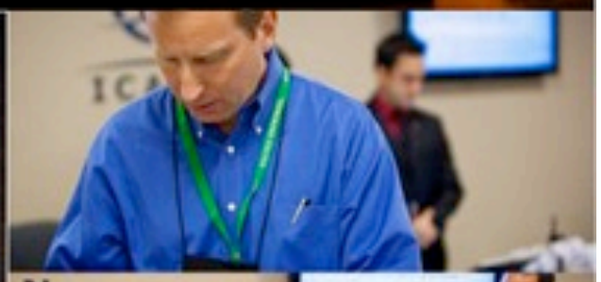
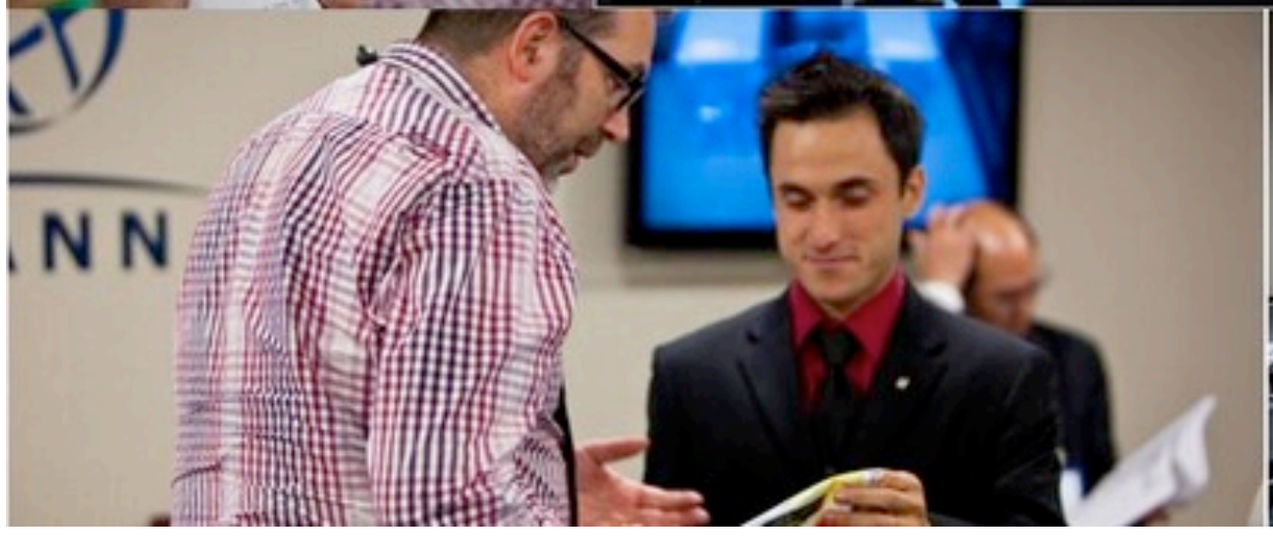

NOTICE
NOTICE
NOTICE
NO FOOD
OR DRINK
BEYOND THIS POINT


ICANN






N


NN


One World. One Internet. Everyone Connected.
19036

The Internet Corporation for Assigned Names and Numbers

```
Starting: kskgen (at Wed Jun 16 21:19:06 2010 UTC)
Use HSM /opt/dnssec/aep.hsmconfig?
HSM /opt/dnssec/aep.hsmconfig activated.
setenv KEYPER_LIBRARY_PATH=/opt/dnssec
setenv PKCS11_LIBRARY_PATH=/opt/Keyper/PKCS11Provider/pkcs11.GCC4.0.2.so.4.07
Found 1 slots on HSM /opt/Keyper/PKCS11Provider/pkcs11.GCC4.0.2.so.4.07
HSM slot 0 included
Loaded /opt/Keyper/PKCS11Provider/pkcs11.GCC4.0.2.so.4.07 Slot=0
HSM Information:
    Label:            ICANNKSK
    ManufacturerID:   AEP Networks
    Model:            Keyper Pro 0405
    Serial:           K6002013

Generating 2048 bit RSA keypair...
Created keypair labeled "Kjqmt7v"

SHA256 DS resource record and hash:
. IN DS 19036 8 2 49AAC11D7B6F6446702E54A1607371607A1A41855200FD2CE1CDDE32F24E8FB5
>> deckhand pedigree snapline breakaway kickoff hemisphere flytrap detergent guidance c
oherence eating outfielder facial hurricane hamlet fortitude keyboard Bradbury cranky l
eprosy Dupont adroitness willow Chicago tempest sandalwood tactics component uproot dis
tortion payday positive <<

Created CSR file "Kjqmt7v.csr":
O: ICANN
OU: IANA
CN: Root Zone KSK 2010-06-16T21:19:24+00:00
1.3.6.1.4.1.1000.53: . IN DS 19036 8 2 49AAC11D7B6F6446702E54A1607371607A1A41855200FD2C
E1CDDE32F24E8FB5

Kjqmt7v.csr SHA256 thumbprint and hash:
401120C1721BA100B2D9ABF2D01332399535BA0F9C71DB[illegible]97232C5EBD608D2
>> crackdown Babylon bison recover highchair bravado ratchet adroitness sawdust support
ive rhythm vagabond stagnate barbecue checkup corporate preclude conformist shadow atmo
sphere python hideaway suspense supportive waffle holiness checkup resistor trouble spe
culate aimless sensation <<

Unloaded /opt/Keyper/PKCS11Provider/pkcs11.GCC4.0.2.so.4.07 Slot=0
```


Washington, DC	**1101 New York Avenue NW, Suite 930**	**Washington, DC 20005**	**USA**	**T +1 202 570 7240**	**F +1 202 789 0104**
Brussels	6 Rond Point Schuman, Bt. 5	B-1040 Brussels	BELGIUM	T +32 2 234 7870	F +32 2 234 7848
Marina del Rey	4676 Admiralty Way, Suite 330	Marina del Rey, CA 90292	USA	T +1 310 823 9358	F +1 310 823 8649
Sydney	Level 2, 48 Hunter Street	Sydney NSW 2000	AUSTRALIA	T +61 2 8236 7900	F +61 2 8236 7913

http://icann.org

```
. IN DS 19036 8 2 49AAC11D7B6F6446702E54A1607371607A1A41855200FD2CE1CDDE32F24E8FB5
```

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DNSSEC Today

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Top Level Domains

are deploying

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60 of 294

TLDs are now signed

http://stats.research.icann.org/dns/tld_report/

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41 of them has published DS in the root zone

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.arpa .asia .be .bg .biz .br

.bz .cat .ch .cl .cz .dk

.edu .eu .fi .fr .gi .gov .hn

.info .jp .kg .lc .li .lk .me

.mn .museum .my .na .nl

.nu .org .pm .pr .pt .re

.sc .se .tf .th .tm .uk .us

.vc .yt .இலங்கை

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ISPs are validating

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Swedish ISPs deployed early

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Comcast recently started its rollout

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Secure by default

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Key Management

You are doing it wrong

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OKRS

Obsessive Key Rollover Syndrome

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Yes, it is partly my fault

We didn't know better back in 2005

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We know better now

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Best Current Practice

is ≠ best nor current

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Say hi to risk management

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Calm down

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Roll keys when needed

– not ‘cause you can

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Rolling a key is associated with a risk

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Still need to practice

… although not in the production environment

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DNSSEC Tomorrow

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Are we ready to rumble?

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We still have needs

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Tools are getting better

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Appliances are finally getting up to speed

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Open Source Software getting better

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ISC BIND

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OpenDNSSEC

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… and others

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DNSSEC for the masses

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How do you sign 100’000 zones?

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How do you sign dynamic zones?

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Secure Key Management

which doesn't cost you a fortune

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Sane Key Management

Obsessive Key Rollover Syndrome
should not be the default

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DNSSEC-aware Applications

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I proposed this

back in 2002

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… and was told this

was NOT a good idea

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8 years later, it's apparently kosher

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KIDNS BOF

Cryptographically secured communication
by using information in DNS

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SSH – Secure Shell

kirei

PKI

kirei

Domain Validation

vs

Extended Validation

kirei

If you control the DNS…

kirei

…you control the PKI

kirei

Can DNSSEC take care of domain validation?

kirei

Speed. I am Speed.

kirei

No more waiting for revocation verification

kirei

IPsec

kirei

DKIM

kirei

The future is bright

kirei

Don’t forget GIGO

kirei

Garbage in – Garbage out

kirei

The End

kirei