An overview of signing and DNSSEC deployment

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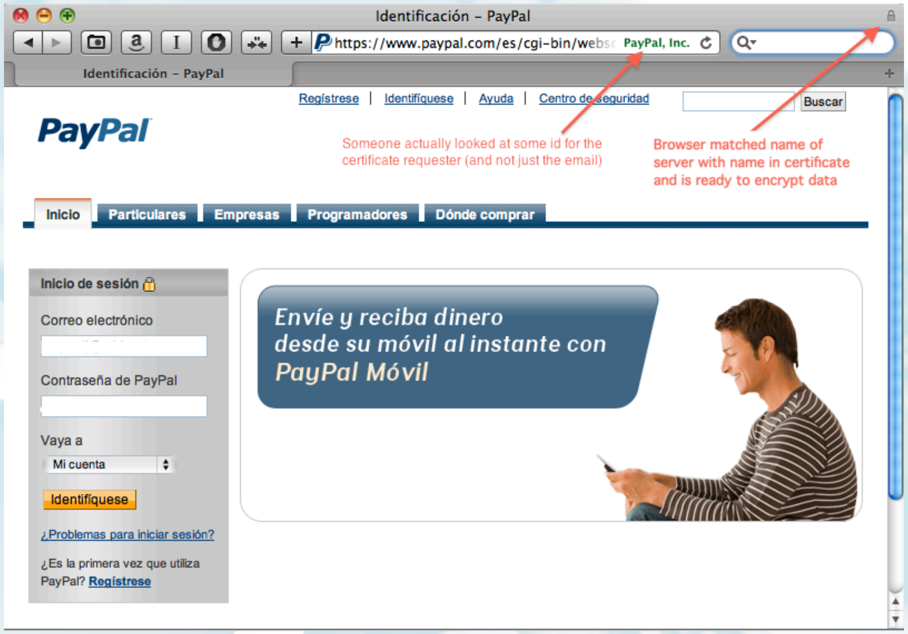
Overview

- Yes, let’s do it
- ...but, what does it mean to sign a zone?
- Administrative aspects of signing
- Operational aspects of signing

What does DNSSEC signing give you?


Identificación – PayPal
https://www.paypal.com/es/cgi-bin/websc
PayPal, Inc.
Identificación – PayPal
Regístrese | Identifíquese | Ayuda | Centro de seguridad
Buscar
PayPal
Inicio
Particulares
Empresas
Programadores
Dónde comprar
Inicio de sesión
Correo electrónico
Contraseña de PayPal
Vaya a
Mi cuenta
Identifíquese
¿Problemas para iniciar sesión?
¿Es la primera vez que utiliza PayPal? Regístrese
Envíe y reciba dinero desde su móvil al instante con PayPal Móvil

Someone actually looked at some id for the certificate requester (and not just the email)

Browser matched name of server with name in certificate and is ready to encrypt data

DNSSEC

- does not encrypt data
- does not identify the servers

- protects data against tampering while travelling the net

The equivalent of the green label is provided by the registrar checking the customer

Administrative aspects of signing

- Cost (making it smaller)
  - how big is the zone?
  - expected initial uptake?
  - where to keep the keys?

- From the above follow some operational consequences

Operational aspects

- Choosing keys
  - just follow widespread advice. Don’t be creative where you don’t need to be.
- Where to store the keys
  - HSMs
  - Offline machines
  - USB keys
- Document and publish your approach
  - there are models out there to be used [1]

Signing

One thing affects most operational considerations with DNSSEC

How big?

Signatures are BIG

```
www.isc.org.  600  IN  A  149.20.64.42
www.isc.org.  581  IN  RRSIG  A 5 3 600 20101227233208 20101127233208
14457 isc.org. pBzL/
uIDgwebXk46zGuFOzc49wPefgH8MfaCsMoyS3IGibJwv7V1/Egu
qENHUz7Q8a0plRhHPVh0+9bnDhPE0qvTBcHQUifVqPrj6umAfqdyht1/
vRqLYGvXcosPLcEHw84RJHFFIFTGw7C1IOhg9PI9UDNwvkMI1ChPuE5P
mAs=
```

Signing

- a small detail
  - –Delegations and glue do NOT get SIGNED
  - –wonderful for a TLD

Signing - proof of ∄

- Proof of non-existence
  - A nameserver’s ability to tell you that there is no data for the question being asked and to prove it by signing the no-data answer
    - Need to pre-compute
    - NSEC (next secure)

```
dig mail2.isc.org +dnssec ↴
mail.isc.org. 3600 IN NSEC manx.isc.org. A AAAA RRSIG NSEC
```

Signing - proof of ∄

- Duplicates the size of the zone (and then you add the size of the signatures)
  - zones become 4-7 times bigger
- to the rescue...

Signing - proof of ∄

- NSEC3
  - really stands for “you loose some, you gain some”
  - Official ~~excuse~~ reason: privacy
  - Real benefit: opt-out
    - allows a zone administrator to designate intervals in the zone for which no NSEC3 are generated
    - In a delegation heavy zone (e.g. a TLD), reduces the increase in size dramatically

Signing - proof of ∄

- Example

.org has ≅5000 NSEC3 records

  - mostly from A records that are not glue
  - Only these (and the .org records themselves) get signed
  - increment in size is minimal

Signing - proof of ∄

- What do you loose?
  - the proof of ∄ in the gaps

Operational impact

- Need to be careful with those keys
- Don’t let signatures expire (!)
- Estimate signing time - do it offline
- Check your available bandwidth
- Check the RAM (and disk) in your servers
- Publish your policy
- DO NOT FORGET THE REGISTRY

Conclusion

- It is doable
- There are various automation tools
- Understand what is being done
  - –even if you outsource
- Go through the checklist
- Ask for assistance. We have all made mistakes

Questions?

Just ask now (DNSSEC is much more of a beast than we are)

Grab me (or us)

Send email ☞ joao@isc.org

References

- [1] draft-ietf-dnsop-dnssec-dps-framework-03.txt or succesors
- http://www.dnssec.net/
- DNSSEC in 6 minutes
  - http://www.isc.org/files/DNSSEC_in_6_minutes.pdf