.org advance your mission

DNSSEC
DNS Security Extension Deployment in .ORG

Monday 23 June 2008
ICANN Paris

Agenda

- PIR Implementation Approach
- RSTEP Report Outcome
- Risk Analysis
- What We Are Evaluating
- Milestones

Our Approach

» Motivation - Do the right thing not just for .ORG but for the Internet at large:

- A secure DNS is a fundamental layer for future development
- To do this, a gTLD has to come forward
  - implementation of DNSSEC at gTLD level will enable awareness, education and adoption, →
  - So…the next generation Internet features a secure DNS

»Approach – Collaborate, Learn, Share

- Learn: ccTLDs
- Collaborate: RIPE, Afilias, Nominet
- Share: DNSSEC Adoption Survey

RSTEP Report Outcome

- Overall
  - RSTEP review team gave thumbs up to our proposal
  - Finite but manageable adverse risk to security and stability of the .ORG zone
- Key Observations
  - Many issues solved with a signed root
  - Registrar adoption allows for better user choice
  - Suggests possible use of multiple KSKs
    - PIR is evaluating the risk vs. benefit of multiple keys
  - Concerned about “stopping DNSSEC” if needed
    - Proposes implementing RFC 5011
    - In our opinion – this does not solve the problem, since a complete key set compromise would still need a “full stop”

Risk Analysis

» Four categories of risks:

- ***Not*** inherent or specific to DNSSEC
- Are specific to DNSSEC but whose ***probability is so low***, it does not materially impact our plans
- Are specific to DNSSEC, but until we implement we will not know
- Are specific to DNSSEC and we plan to adjust our plan accordingly

Risk Analysis

#1 **Not specific to DNSSEC** ***(no action needed)***	**#2** **Yes...probability = lightning striking me as I speak** ***(not a real risk)***	**# 3** **(Will not know full measure until we implement)** ***(normal pre-op testing)***	**#4** **(Valid – we will evaluate our plan)** ***(useful work to be done)***
3.4.1: Transmission of DS records is exactly the same as transmission of other registrant data	3.5.6: PIR will be using HSM. This is a mature technology and does not fail in a way that exposes private keys.	3.2: Proper operation of the .ORG domain should be presumed. Configuration errors in browsers will need to be ironed out for everyone	3.4.5: At least two registrars enabled before there is formal operation
3.4.2: PIR will not require key change when registrar changes		3.4.6: Unlikely and easily detectable. Registrars will be required to be responsive	3.5.5: Registrants may need to improve their own operation or obtain assistance. Education will help
3.5.4: Signing interval of DS consistent with TTL		3.5.3: Unlikely and easily detectable. Issues will be taken care of during normal shakedown	3.6.2: Report suggests a testing site for people to try out whether their configuration properly interacts.

Risk Analysis (cont.)

#1 **Not specific to DNSSEC** ***(no action needed)***	**#2** **Yes...probability = lightning striking me as I speak** ***(not a real risk)***	**# 3** **Will not know full measure until we implement** ***(normal pre-op testing)***	**#4** **Valid – we will evaluate our plan** ***(useful work to be done)***
3.5.7: Zone signing has already been tested	3.6.5: DOS potential is not a threat as the signed answers are still much shorter than 4096 byte TXT record.	3.6.1: Most, if not all of this should be dealt with during shakedown period	3.6.7: PIR will work with trust anchor repository (TAR) operators to help the community build a robust scheme.
3.4.3: Fast publication when the key changes is already part of PIR's operation.	3.6.6: It's not clear that redundant info In the WHOIS record regarding algorithms used would help. It might create additional complexity and potential inconsistency.	3.6.4: Additional load is limited and manageable	
3.6.3: Multiple NS operators serve the zone			

What We're Evaluating

- **Key Management**
  - RSTEP suggests using multiple KSKs to mitigate bogus zone problem
- **Key Rollover Policies**
  - We believe our policies lead to good security
    - ZSKs will be updated at least monthly
    - KSKs will be updated at least yearly
  - The frequent updates cause some stability concerns
    - We intend to address by a limited scope launch, user and registrar education
    - We need feedback from network operators, registrars, and others on the expected impact of our rollover policies
- **Use of Trust Anchor Repositories (TAR)**
  - We will place the keys for .ORG in the IANA DS registry
  - We do not currently plan to use DLV
- **Registrar/Registrant adoption**
  - We are signing up registrars now to ensure sufficient adoption exists
  - Testing site may help

A Controlled Launch

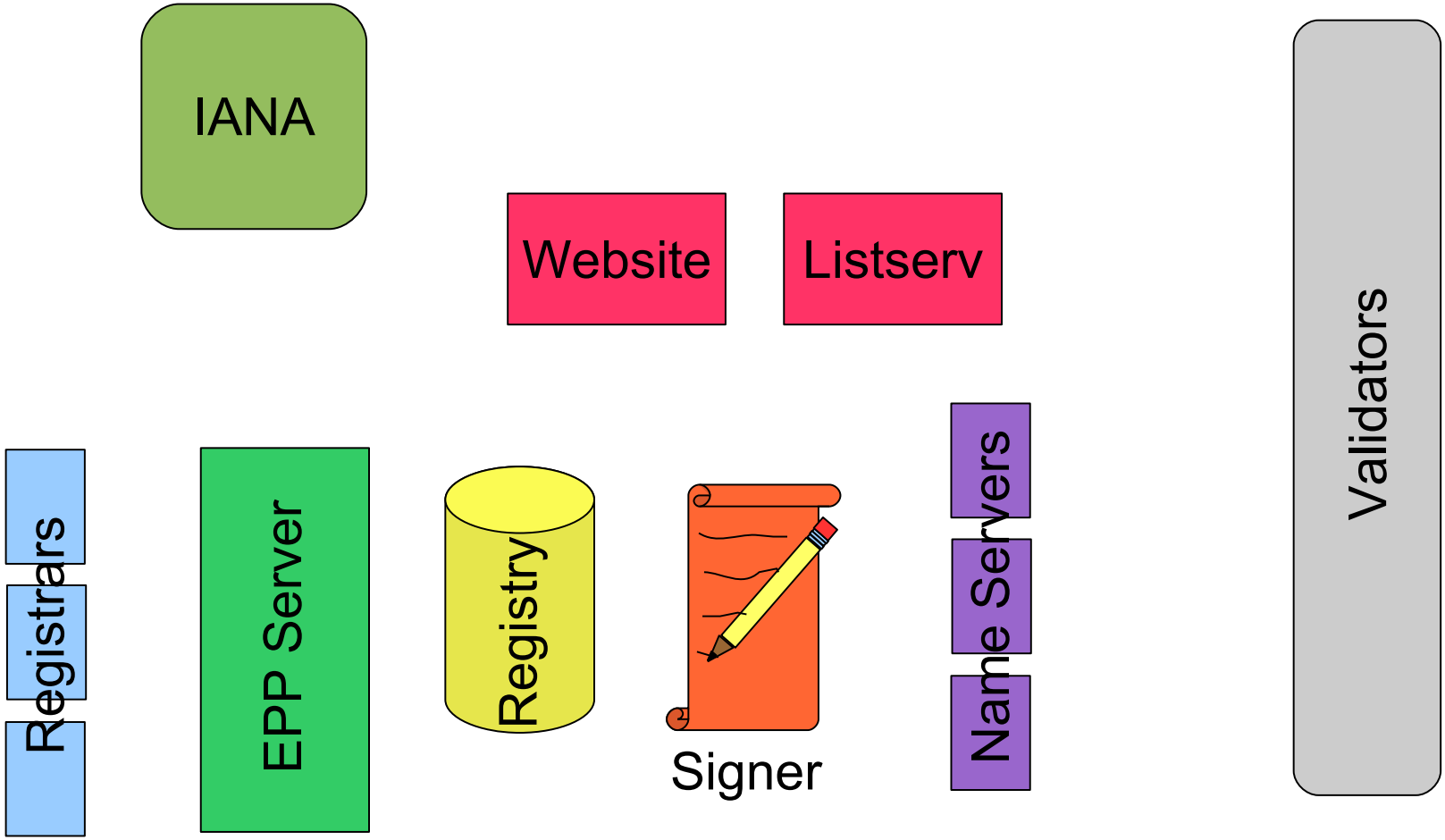
- June 2008
  - RSTEP Response
- Q4 2008 (estimated)
  - BIND NSEC3 compatibility release
  - HSM Integration
- Q1 2009 (estimated)
  - Friends & Family signed zones (pir.org, isoc.org, afilias.org, etc)
- Q3 2009 (estimated)
  - Expanded Friends & Family (based on results of F&F)
- 2010 (estimated)
  - Mainstream availability - Monitor, evaluate, then when advisable release to whole zone

Questions?

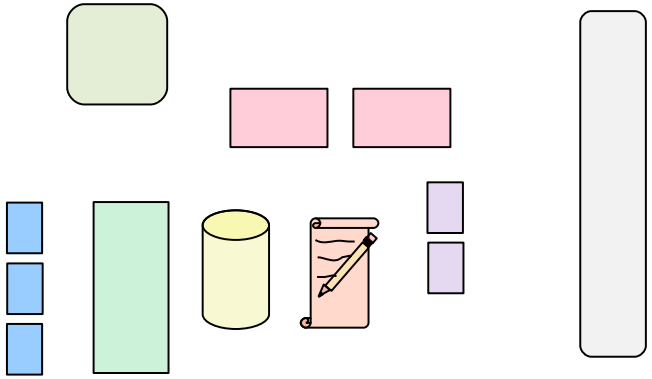
araad@pir.org

Appendix

DNSSEC “Moving Parts”

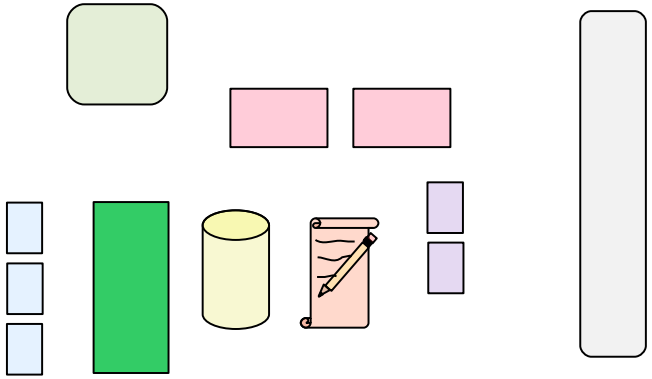


Registrars



- New Registrar Tool Kit for DNSSEC
  - Adds DNSSEC EPP transactions (RFC 4310)
- Registrars Do Not Have to use
  - But MUST pass OT&E if they do
- Registry assumes all data is correct and valid
  - Similar to other WHOIS and DNS data
- To transfer, gaining registrar must be DNSSEC-ready
  - or registrant can wipe DNSSEC info

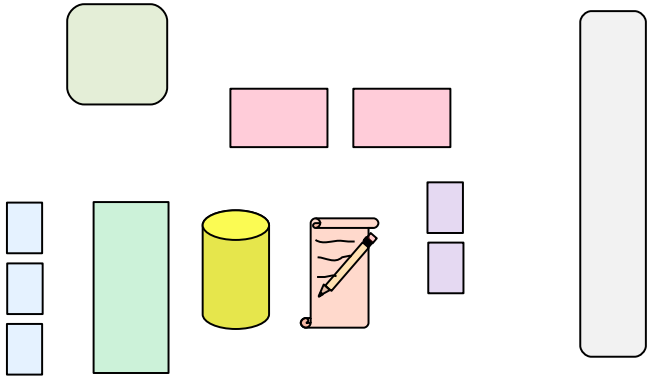
EPP Server



» Modified for DNSSEC

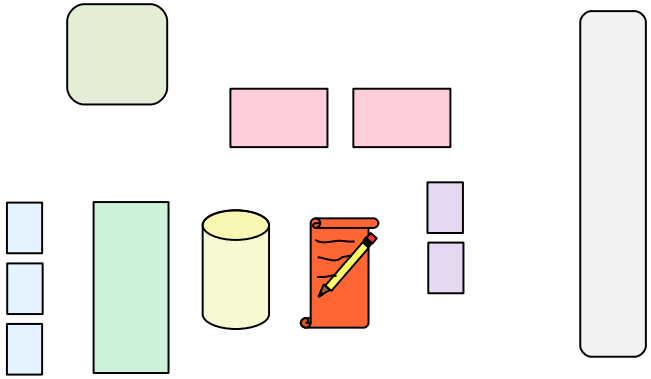
– Adds DNSSEC EPP transactions (RFC 4310)

Registry Database



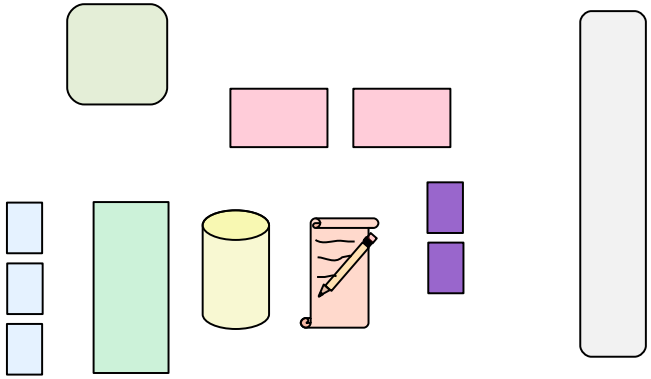
- Stores DS information
- Holds MaxSigLife
  - Currently set to default of 10 days

Zone Signing



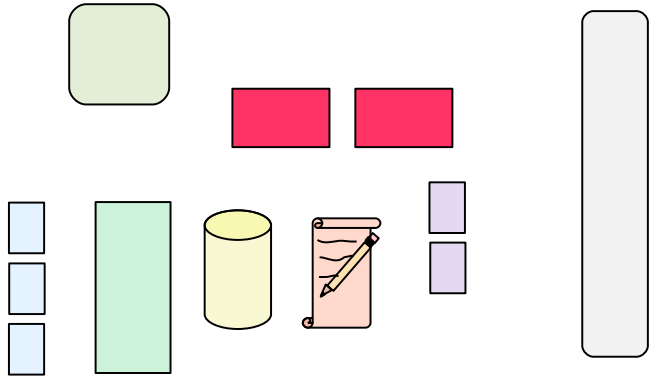
» Using HSM for key generation and zone signing
  – FIPS 141-2 compliant
» Will sign domain names as they come through
  – Full zone re-sign will be fed through as quickly as possible

Name Servers



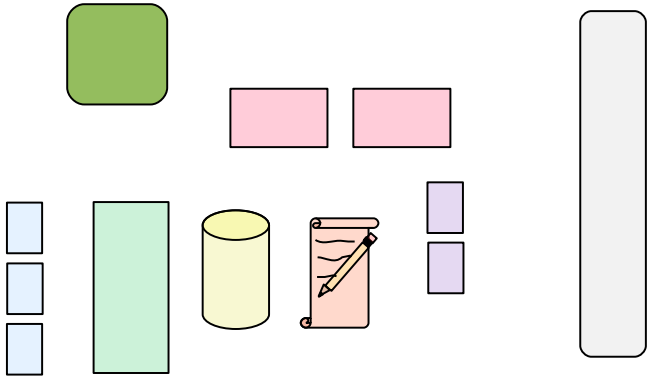
- Will Support NSEC3
  - Currently Using NSD and BIND
- Servers already have enough capacity
  - Hooray for opt-out!

Ancillary Functions



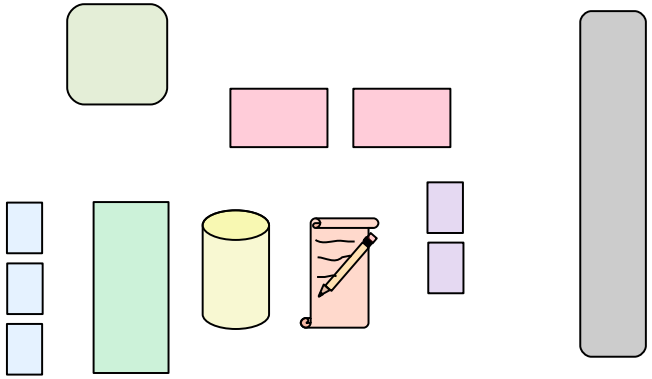
- PIR Website
  - Will have public information for validators
- Email list (read-only)
  - Notifies everyone when TA must be updated

IANA



» Will Update DS on each change
  – Using new IANA DS Registry
    • (Once it's up and running)
  – Also once the root is signed

Validators



» Admins should sign up for email list
  – Once it's ready
» PIR preparing help docs for admins to configure TA info
» Will need to update at least once / year