# IANA Update for CCTLD Registries

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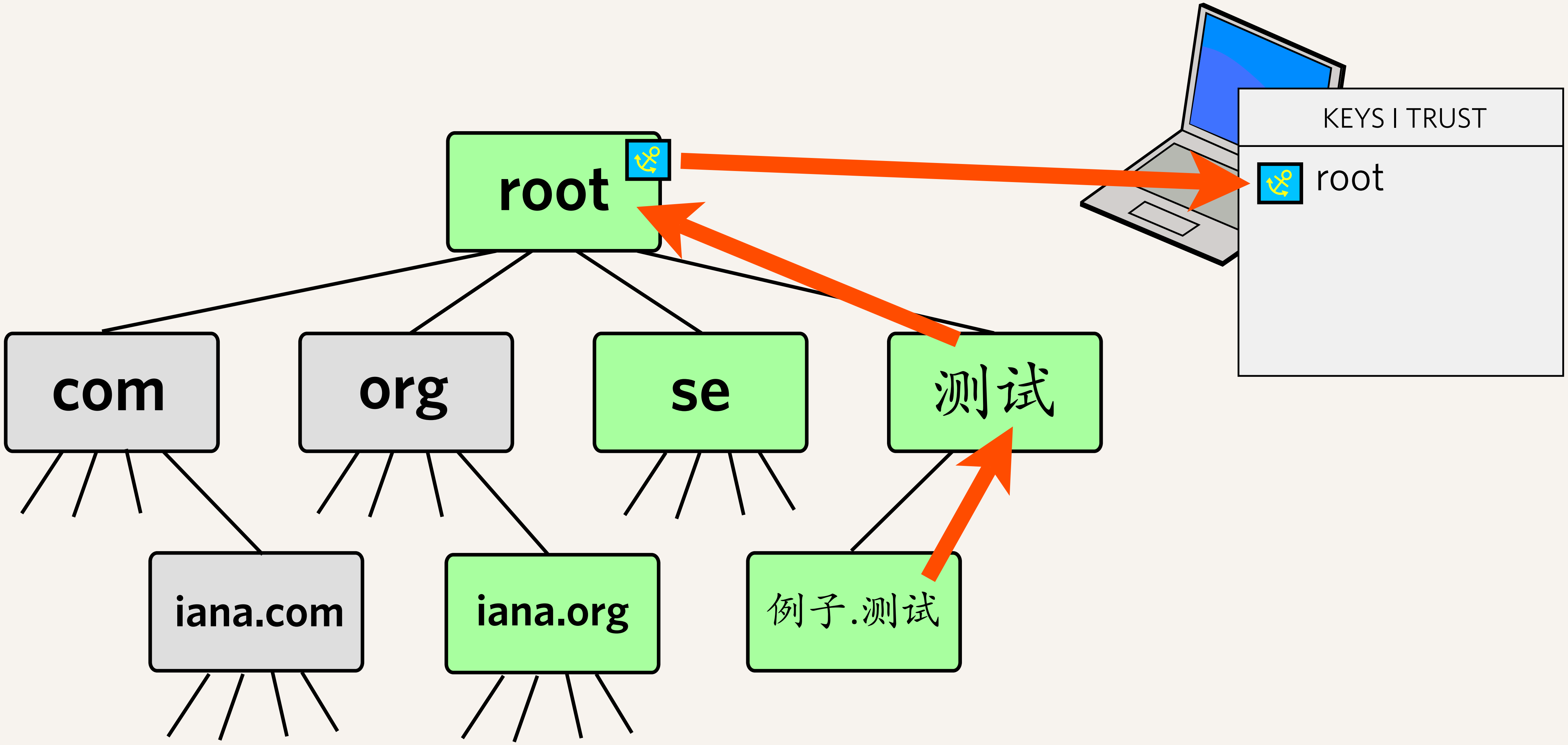
# Agenda

- Interim Trust Anchor Repository
- Process for implementation of RZM software
- Root server “hijacking”

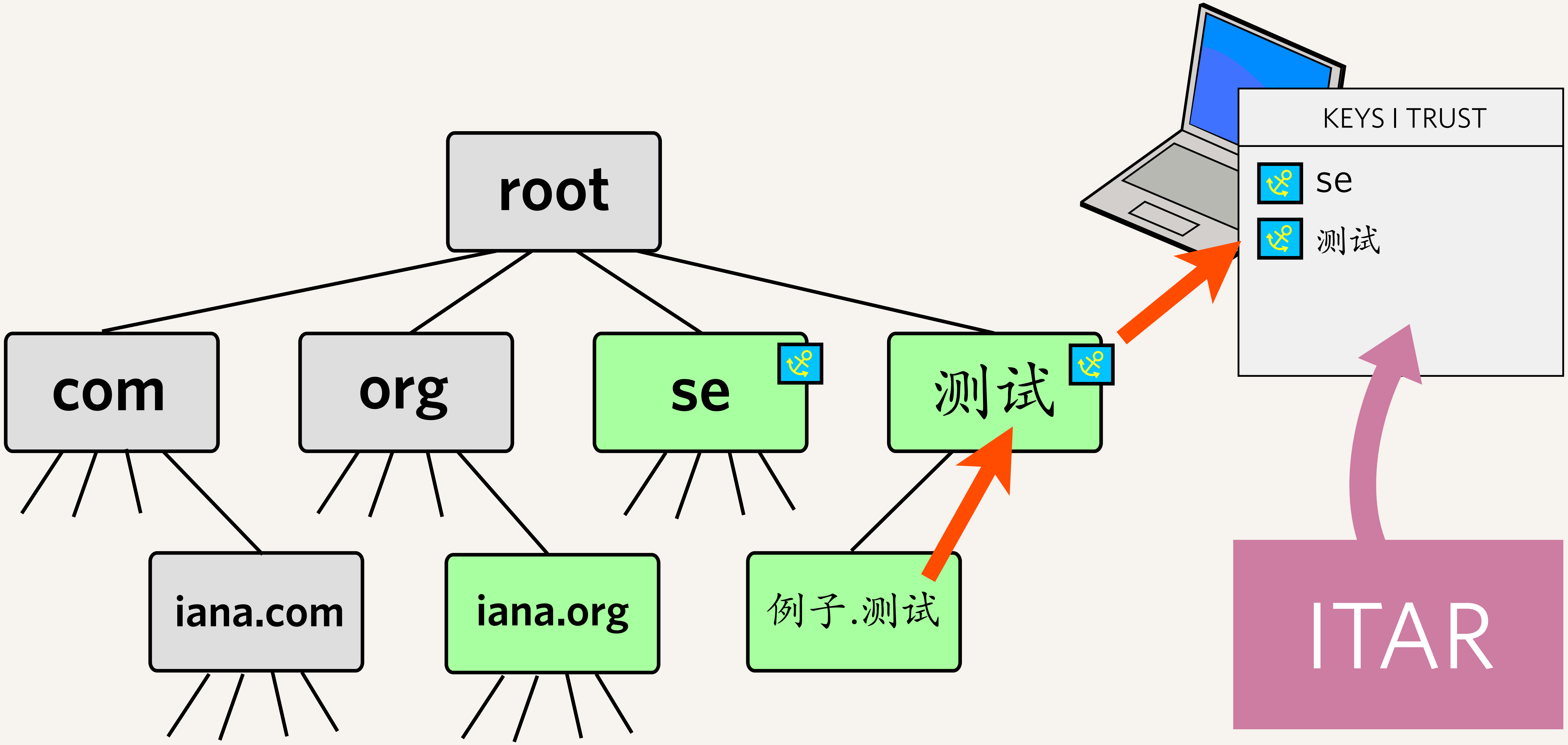
# Interim Trust Anchor Repository

# What is the ITAR?

- Interim Trust Anchor Repository
- A mechanism to publish keys of top-level domains that currently implement DNSSEC
- If the root zone is DNSSEC signed, such a repository is unnecessary
  - Therefore this is a stopgap measure
  - Should be decommissioned when the root is signed
- ICANN Board voted to implement in April 2008, based on community requests



# If the root was signed



It isn’t so there are multiple trust apexes

# Proposed registry details

- Inspired by recommendations of RIPE DNS WG
- Supports different types of DNSSEC signing
  - DS hashes either SHA-1 or SHA-256
  - DNSKEYs in any algorithm (agnostic implementation)
- Published in  number of formats
  - List on website; XML structured format; Master file format
  - Should work with major software implementations
  - Implementors should not be putting special ITAR provisions in code — this is meant to go away when the root is signed!

# Acceptance Model

- TLD operator can submit DS key data via web form
    - DS record validated against DNSKEY data in the DNS
        - Must match before the DS key is made active in the registry.
        - DNSKEY does not need to be in the DNS at time of submission (to allow for pre-deployment), but needs to validate prior to publication.
    - Administrative and Technical contacts for the domain must consent to the listing
- Revocation is similar process, without technical test

# Exit Strategy

- ITAR will be decommissioned within $x$ days of the DNS root being signed.

# Limitations

- The ITAR will only operate for top-level domains
  - i.e. the keying information that would otherwise go in the root.
  - IANA will not accept anchors for descendants of top-level domains
    - Even if the relevant TLD is not signed

# Why are we doing this?

- There is interest in having the DNS root zone signed with DNSSEC
- There are many unanswered questions that inhibit deployment
    - “Layer 9” issues — political, etc.
- IANA has had an operational testbed for some time signing the root zone
    - Aim is to be operationally ready once policy is set
- ITAR will assist early-adopters utilise the technology until root signing is solved

# Implementation of RZM Software

# Recap

- IANA is implementing “workflow automation” software
  - Supports all existing methods of root zone management
  - Also adds a new web-based management interface
- Originally driven by ccTLD community as a way to improve IANA’s performance
  - IANA’s performance has since improved by fixing other problems
- There are still reasons to implement the software
  - Reducing tedious manual processing, eliminate risk of re-entry errors, increased transparency in processing
- Software is based on a prototype developed by CENTR

# Current issues

- To implement software changes likely will require a contract amendment
- Key personnel changes at US Department of Commerce
- New process for implementation is being developed based on new requirements from USDOC
- Working with VeriSign in developing a concrete transfer proposal to obtain approval
    - VeriSign's scope is limited to changing the implementation phase to an internal customised EPP-based workflow

# Status on testing

- Working on experimental testing with TLD operators
  - Tried testing to the various scenarios, technical tests and so forth
- Moving to parallel operations
  - Manual processing will be “primary”
  - RZM processing will be performed at same time, making sure results match
- Once comfortable of no more bugs, and relevant certification is received, flip to make RZM “primary”.

# Root Server “Hijacking”

# Renumbering of the L Root Server

- 198.32.0.0/16 is a block set aside for Internet Peering Points (“Exchange Points”). It was previously listed in the ARIN database as “Exchange Point Blocks”, but now to “EP.NET LLC”.
- For historical reasons, “L” root service was placed in this block amongst another allocations for peering points. (Prior to ICANN’s existence)
- As part of moving “L” out of the USC-ISI building, ICANN obtained a new net block and IP address for the service.

# Renumbering (2)

- In liaison with the community and RSSAC, “L” was moved to the new IP address on 1 November 2007. ICANN undertook to continue service on the old IP address for a minimum of six months.
- Six months later, on 2 May 2008, ICANN discontinued service.
- The IP address kept responding to queries, surprising much of the Internet community.
    - The data being served matched that served by other root servers.

# What happened?

- EP.NET LLC entered into agreement with Community DNS to provide root service on the old L root IP address.
- ICANN was not informed of this, nor were the root operators, nor the community.
- Whilst arguably within rights to delegate service in such a way, we believe it was not in the interests to take this action.

# Lessons to be learnt

- There are secure routing technologies (rPKI), but they would not have helped as the IP address chain of custody was “correct”.
- Highlights issues unique to the root servers, as their old IP addresses are hard-coded in many places. Is the current IP address model for root servers correct?
- It is rather disappointing that the community was not engaged, nor was clear notice provided of the intent to continue service.
- While the net effect on end users of this event was nil, raises concerns about a bad actor doing the same thing with false data.
- More discussion at http://blog.icann.org/?p=309

# Thanks!

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