Some Steps towards Improving the Resiliency of the Internet Routing System:

The Role of a Registry Certificate Authority

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Vulnerability

• Internet hosts are the subject of constant malicious attack
• The DNS is the subject of continual attempts to subvert its correct operation
• Widespread malicious attacks on the Internet’s routing system are only a matter of time…
  – Attacks on the operation of the routing protocols
  – Attacks on weaknesses in the administrative systems used to manage routing configurations
Injecting Routes

- **Administrative system**
  - Customer passes prefix information to provider
  - Provider performs registry-based check on the relationship between the customer and the requested prefix
  - Passes the prefix and the customer details to the router config system
    - Pass prefix details to route neighbours

- **Router configuration**
  - Entry of static routes / route filter into config database
  - Periodic generation of router configs from database
Administrative Weaknesses

• Link between ISP’s records of customer and registry address records can be incomplete or inconsistent

• ISPs want to do the right thing by the customer and by their own business
  - Rapid service response
  - Respond positively to route requests
  - Spend minimal administrative overhead in operating the system
Potential Role of Key Certificates

- Registry records include public key for each allocated prefix
- Customer controls private key
- Administrative requests to ISP signed with private key of the corresponding prefix
- ISP uses registry public key to validate customer request
  - ISP passes signed request to neighbors who will receive the re-advertised route, signing the neighbor request with the ISP’s private key
Commentary

- Does not eliminate need for secure routing protocols
- Allows ISPs to use a trusted third party (Registry) to validate route requests:
  - Quickly
  - With minimal manual processing overhead
  - Accurately (*)
    * Any customer who leaks a private key is beyond help!
- Details and procedures need to be refined…