# Bridging Technical Possibilities With Policy Technicalities

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# Past, Present, and Future

- The Whois policies of today are severely constrained by the Whois protocol of yesterday.
- In the future, CRISP will allow greater flexibility for policy.
- The questions should no longer be “How do we do this?” but “What do we want?”

# The Past

- Whois was first described in RFC 812 in 1982.
  - It was titled “Nicname/Whois”
  - Its IANA port registration is under the “Nicname”.
  - RFC 812 describes Whois over NCP, not IP.
- By comparison, the first RFC to describe DNS was published in 1983.
- RFC 954, the most current specification for Whois, spends more text describing who from ARPANET & MILNET should be in the database than describing the protocol itself.

# The Present

- Nicname/Whois is used for many types of data:
  - domain registration data
  - IP address allocation data
  - Routing policy data
  - others… many we don’t even know about

# The Present Users

- Nicname/Whois users are no longer just a couple of node operators on ARPANET. They are:
  - Intellectual property holders
  - Law enforcement
  - Service providers
  - Network operators
  - Registrars
  - Registrants
  - DNS users
  - Abusive users

# The Future

- The CRISP working group of the IETF is working on a new specification for use by registries of Internet resources.
- It is applying what we have learned about operating services over the Internet from the 20 intervening years to the problems of today.

# CRISP Goals

- Access controls
  - allows service operators to differentiate between the varying types of users
- Internationalization (I18N)
  - provides a user experience beyond ASCII and creates an environment for localization (L10N).
- Decentralized
  - facilitates navigation between repositories without requiring aggregation of data

# Authentication vs. Authorization

- Authentication – the process used to verify the identity of a user
- Authorization – the access policies applied to a user based on authentication
- Authentication mechanisms facilitate authorization schemes.

# Today's Authentication

- Anonymous
  - because RFC 954 assumes all users to be equal
- Source IP address
  - this is an artifact of the Internet Protocol and was never intended as an authentication mechanism
- Hence, the authorization policies of today are limited.

# Modern Authentication and Authorization

- Authentication mechanisms
  - passwords, one-time passwords, digital certificates, references
- Authorization schemes
  - user-based, sequence-based, chain-based, attribute-based, time-based, referee-based

# Passwords

- An old idea still valid in today's world.
  - Newer technologies allow passwords to be passed securely on unencrypted channels.
  - The user experience is the same.
- Passwords allow for the well understood user-based authorization schemes.

# One-time Passwords

- One-time password systems are cryptographic mechanisms designed to keep pass phrases from being sent in the clear over unencrypted sessions.
  - However, their design limits their use to a finite number of authentications with both parties keeping track of the number of uses.
  - But the user experience is not much different than normal passwords.
- This allows for sequence-based authorization
  - access may be changed based on the number of times a user authenticates.

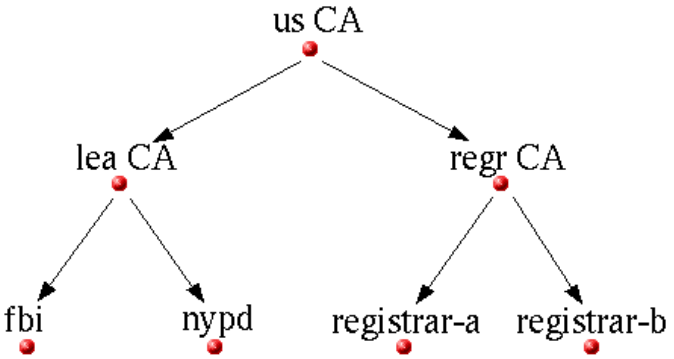
# Digital Certificates

- Use a branch of mathematics called public key cryptography to conduct authentication.
  - Used in conjunction with TLS, they also allow for server authentication and session encryption.
- Facilitate the following authorization schemes:
  - user-based
  - chain-based
  - attribute-based
  - time-based

# Certificate Chains

Authorization can be based on one of the certificates in the chain.

- Example:
  - If the certificate is signed by the “lea CA”
    - Allow access to all contact data
  - If the certificate is signed by the “regr CA”
    - Allow access only to all domain and registrant data

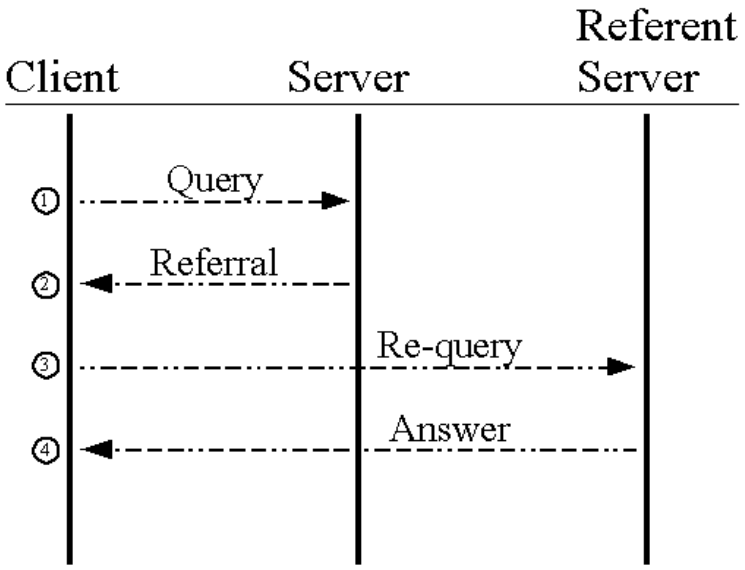


# Attributes in Certificates

- Information attributes in certificates are cryptographically secure.
- Example:
  - If the “Type” attribute in the certificate equals “LEA”
    - Allow access to all contact data
  - If the “Type” attribute in the certificate equals “Registrar”
    - Allow access only to all domain and registrant data

# Referrals

- The CRISP protocols allow a server to pass extra information via a client to a referent server.
- This information may contain authentication data, thus allowing a referee-based authorization policy.



# Conclusion

- CRISP will allow much more than is currently possible with Nicname/Whois.
- The question should no longer be:
  - How do we do this?
- The question should be:
  - What do we want?