Workshop on the Technical Evolution of the Whois Service

ICANN Meeting, Cartagena, Colombia

Elise Gerich

11:00 – 12:00 pm
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Agenda

- Introduction (Kurt Pritz)

- Background (Elise Gerich)

- Technical deficiencies of WHOIS (Harald Alvestrand)

- Staff analysis (Francisco Arias & Steve Sheng)

- Community Discussion

One World

One Internet

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Terminology

Whois (or WHOIS) in ICANN Debate Could Mean:	Terms Used In This Presentation
The WHOIS protocol - RFC 3912	WHOIS protocol
The Whois "service" - both the WHOIS protocol and Web-based Whois	Whois Service
The data collected at registration and made available to users	Domain Registration Data

WHOIS protocol

- Also known as port-43 Whois

- Specified in RFC 3912

- Client sends a request in one line (newline ends the request)

- Server sends the response (multiline) and closes connection

- For historic reasons, WHOIS lacks many of the protocol design attributes that would be expected from any modern protocol

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Web-based Whois Service

- Offered by registries, registrars and RIRs

- Usually in similar-looking output to WHOIS but in HTML; more user-friendly

- Some *R*s* offer a richer functionality, taking advantage of Web capabilities

Domain registration Data

- gTLD Registry Agreements, RAA specify what should be included and published

- Each ccTLD and RIR has its own set of data to publish

- Typically covers: the contacts associated with the resource (domain, IP block, etc.) and DNS servers, if applicable

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Harald Alvestrand

Google,

Board of Directors at ICANN,

Unicode, and Norid (.no)

Whois Service requirements

- In May 2009 the GNSO council requested an inventory of Whois Service Requirements

- Final report includes input from ALAC, GNSO, SSAC, and community input

Problems with WHOIS protocol

- Lack of standardization in query, output and error messages
- Lack of support for internationalized registration data (IRD) and domains (IDN)
- Lack of authentication and access control mechanisms to Domain Registration Data

Lack of Standardization

- The WHOIS protocol (RFC 3912) does not define query formats or encoding, has no structure for replies and error messages

- Such decisions are left to the registrars, registries and RIRs. This results in different query syntaxes, output formats, character encodings, and error messages

- Negative impact on user experience and legitimate use of automation

- No defense against illegitimate harvesting

Lack of Support for IRD and IDN

- WHOIS was defined for ASCII only

- Existing deployment is inconsistent with regard to character sets

- Internationalization and IDNs make this difficulty important

Lack of Authentication and Access Control

- WHOIS has no place to put an username, and no authentication mechanism

- The lack of authentication mechanisms makes adoption of access controls, auditing, or privacy measures impossible

Steve Sheng & Francisco Arias

ICANN Technical Staff

Outline

- Possible Solutions

- Comparison of Options

- Next steps

Possible Solutions

A. Extend the WHOIS protocol

C. Migrate to Internet Registry Information Service (IRIS)

D. Migrate to RESTful WHOIS Service (RWS)

E. Other?

Extending WHOIS

- A revised and extended WHOIS specification could be developed.

- Specification would include version selection, query and response formats, error messages, mechanism for signaling character encoding, etc.

- Authentication and access control mechanisms can also be added as extensions to WHOIS, but probably with considerable effort.

IRIS protocol

- At the time, developed as a successor to WHOIS

- Requires specialized client and server

- Uses XML encoding for queries and results

Migrating to IRIS

Addresses the deficiencies of WHOIS by

- Using XML encoding for both query and response to support multiple languages;

- Specifying a well-defined structure for query and result sets;

- Supporting authentication and access control in its application-transport layer protocol

RESTful Whois (RWS)

- Web-based Whois (uses HTTP) and conforms to the REST architectural approach

- Can be queried using Web browsers or command-line tools

- Queries expressed as an URI/URL, e.g., http://whois.tld/dom/icann.tld

- Responses in XML and HTML

Migrating to RWS

Addresses the deficiencies of WHOIS by:

- Using XML/HTML for responses supports multiple languages (character encodings)

- Specifying a well-defined structure for result sets

- HTTP, the transport for RWS already supports authentication and access control

Summary of Analysis

- Extending WHOIS can address the technical deficiencies, but requires significant change to the protocol, which would leave the client base obsolete.

- IRIS has the most features and is easily extensible, but it is costly to implement and there are no readily available resources.

- RWS has a number of features that addresses the deficiencies of WHOIS, is extensible to accommodate future improvements, and can be achieved at a reasonably low cost. It would integrate current WHOIS with web-based Whois.
  - Production RWS from ARIN
  - Pilot implementations from RIPE and ICANN

Next steps

Staff is seeking feedback from:

- Whois users,

- Registries (gTLDs and ccTLDs),

- Registrars,

- RIRs, and

- Other interested parties

Questions

i. Have we correctly summarized the problems of WHOIS protocol? Are there any other technical problems of the protocol that we missed?

ii. Have we correctly identified the potential solution space? Are there any other viable solutions that we have not identified?

iii. For the solutions that we identified, is our analysis correct? Are there any other factors we did not identify?

iv. Which of the three identified options is the most adequate and why?

Please submit your feedback to

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- Francisco Arias
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Backup slides

Extending WHOIS considerations

- **Uncertainties in Standardization:**
- The proposed WHOIS replacement (IRIS) protocol has already gone through the IETF process
- **Backward Compatibility:**
- Extending the protocol requires a method of signaling "version" to ensure backward compatibility
- **Obsolete client base:**
- Updating the protocol would require the use of new clients to access the Whois data

Migrating to IRIS considerations

- Complex protocol:
- Three layers: registry-specific (domain names, IP addresses, etc.), common registry (IRIS), and application-transport (BEEP, IRIS-LWZ, XPC)
- Requires not well-known transport protocol

- Lack of adoption:
- No available client implementations of the full IRIS protocol
- No full IRIS server implementations available for use, from either open-source or commercial developers

Migrating to RWS considerations

- RWS is not standardized yet and various implementations may have differing specifications

- Unclear whether there is sufficient stakeholder interest to pursue development of a technical standard

Comparison of Options

- Available Features

- Cost

- Extensibility

- Readily Available Resources

Available Features

- Extending WHOIS can address the deficiencies identified, but would require significant protocol change

- IRIS offers most features available

- RWS can address all the deficiencies in WHOIS once standardized, and offers a good number of additional features

Costs

- The cost of extending WHOIS includes standardization, as well as updating clients and servers

- Due to the lack of available client and server implementations for IRIS and the complexity of the protocol, implementing IRIS is likely to be costly for registrars and registries

- RWS is likely to be less costly than IRIS or extending WHOIS, due to the wide availability of clients, well known and widely adopted architectural standard (web-based Whois is already offered)

Extensibility

- Extending WHOIS is difficult
- IRIS is a layered protocol and each layer can be extended. Similar case can be made for RWS
- Both IRIS and RWS are based on XML schema and support versioning, so the data model can be easily extended

Readily Available Resources

- The existing WHOIS client is likely to be made obsolete once the protocol is updated, therefore requiring new or updated client.

- There are no IRIS clients available, IRIS uses not well-known protocols for transport; therefore few people would know how to write a client.

- RWS can use the web browser and command-line tools, such as curl and wget as clients, it can also benefit from existing technology to implement load-balance servers, cache answers to minimize network traffic, etc.