**TEST RESULTS**

**AND EVALUATION**

**REPORT**

***RDAP service***

China Internet Network Information Center

4,2015

## Revision Sheet

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| **Release No.** | **Date** | **Revision Description** |
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|  | **Test Results and Evaluation Report**  **Authorization Memorandum** |

We have carefully assessed the Test Results and Evaluation Report for the . This document has been completed in accordance with the requirements of the following RFCs.

1. [RFC 7480]HTTP Usage in the Registration Data Access Protocol (RDAP)
2. [RFC 7481]Security Services for the Registration Data Access Protocol (RDAP)
3. [RFC 7482]Registration Data Access Protocol (RDAP) Query Format
4. [RFC 7483]JSON Responses for the Registration Data Access Protocol (RDAP)
5. [RFC 7484]Finding the Authoritative Registration Data (RDAP) Service
6. [RFC 7485]Inventory and Analysis of WHOIS Registration Objects

**TEST RESULTS AND EVALUATION REPORT**

## TABLE OF CONTENTS

[Revision Sheet 2](#_Toc416963719)

[TABLE OF CONTENTS 4](#_Toc416963720)

[1.0 GENERAL INFORMATION 6](#_Toc416963721)

[1.1 Purpose 6](#_Toc416963722)

[1.2 Scope 6](#_Toc416963723)

[1.3 System Overview 6](#_Toc416963724)

[1.4 Project References 6](#_Toc416963725)

[1.5 Acronyms and Abbreviations 7](#_Toc416963726)

[2.0 TEST ANALYSIS 9](#_Toc416963727)

[2.1 Installation Process 9](#_Toc416963728)

[2.2 Configuration 9](#_Toc416963729)

[2.2.1 Server Configuration 9](#_Toc416963730)

[2.2.2 Database Configuration 9](#_Toc416963731)

[2.3 System Function 10](#_Toc416963732)

[2.3.1 Query API 10](#_Toc416963733)

[2.3.2 Port 43 Proxy Interface 10](#_Toc416963734)

[2.3.3 Others 10](#_Toc416963735)

[2.4 Performance of the System 11](#_Toc416963736)

[2.5 Compatibility of the System 11](#_Toc416963737)

[2.6 Update API 12](#_Toc416963738)

[2.7 Quality of the Code 12](#_Toc416963739)

[2.8 Security Considerations 13](#_Toc416963740)

[2.9 Document Inspection 13](#_Toc416963741)

[3.0 SUMMARY AND CONCLUSIONS 15](#_Toc416963742)

[3.1 Demonstrated Capability 15](#_Toc416963743)

[3.2 System Deficiencies 15](#_Toc416963744)

[3.3 Recommended Improvements 18](#_Toc416963745)

[3.4 System Acceptance 18](#_Toc416963746)

**1 GENERAL INFORMATION**

# 1.0 GENERAL INFORMATION

## 1.1 Purpose

This document describes the test results and evaluation report for the RDAP service, so as to present the summarization and the analysis of the test results as well as the extent to which implementation meets its specified requirements.

## 1.2 Scope

The installation process, the configuration, the system function, the performance of the system, the compatibility of the system, the data update interface, the quality of the code and an overall assessment of the software are discussed.

## 1.3 System Overview

RDAP service is the new implementation of Registration Data Access Protocol. The following is a brief overview of this report.

1. Responsible organization

CNNIC

1. System name

RDAP service

1. Programming language

Java

1. Operational status

Operational

1. System environment and special conditions

Operating environment: Red Hat Enterprise Linux Server release 5.3, CentOS release 5.7, Win7, Win8, OS X 10.8.4.

Mysql5, or higher version

Tomcat7, or higher version

The server language code is set to UTF-8

## 1.4 Project References

The list of the references that were used in preparation of this document:

1. *[RFC4780]HTTP Usage in the Registration Data Access Protocol (RDAP)*
2. *[RFC4781]Security Services for the Registration Data Access Protocol (RDAP)*
3. *[RFC4782]Registration Data Access Protocol (RDAP) Query Format*
4. *[RFC4783]JSON Responses for the Registration Data Access Protocol (RDAP)*
5. *[RFC4784]Finding the Authoritative Registration Data (RDAP) Service*
6. *[RFC4785]Inventory and Analysis of WHOIS Registration Objects*
7. *Software\_Requirements\_Specification-rdap*

## 1.5 Acronyms and Abbreviations

The list of the acronyms and abbreviations used in this document and the meaning of each:

NFKC: Unicode Normalization Form KC

RDAP: Registration Data Access Protocol service

REST: Representational State Transfer

**2 TEST ANALYSIS**

# 2.0 TEST ANALYSIS

Unit test, black box test, manual test, automated test, normative code inspection, document test, performance test and compatibility test throughout the project have been done. According to the references, we sort the test requirement, write test cases and execute test cases. In each iteration, we test the new functions, and at the same time check all the old functions. An overview of the overall tests as follows.

## 2.1 Installation Process

***Test Process Description*: according to the installation instruction, installing the software on the testing environment.**

Server can be installed following the installation instructions. Using the test-data provided by the instruction, user can test whether the server works normally or not. However, the user needs to meet the following requirements:

1. Familiar with the installation and use of JDK
2. Familiar with the installation and use of Mysql
3. Familiar with the installation and use of Tomcat
4. Familiar with the installation and use of maven

## 2.2 Configuration

### 2.2.1 Server Configuration

***Test Process Description*:** set each configuration item with the normal or abnormal value, and then check the system performance.

All of the items in the configuration files are valid, and the user can adjust configuration accordingly.

### 2.2.2 Database Configuration

***Test Process Description*:** for each table in the database, change the table data and then check the system performances.

The data in the database updates can take effect, which will influence the response information for query. The update for the RDAP\_POLICY will be effective after the server restart. However, the RDAP service server is the read-only service, so the user should ensure the validity of all data. The user who wants to use registered data needs to meet the following requirements:

1. Familiar with the registered data structure in the registry
2. Familiar with the structure of the database for the server
3. Familiar with the relationship between 1) and 2)
4. Familiar with legal judge for the response info
5. Familiar with storage the IP address using binary field type

## 2.3 System Function

***Test Process Description*:** in various system configurations, send all sorts of requests to the server, and then check the corresponding responses.

### 2.3.1 Query API

All IP, AS, domain name, nameserver and entity queries can have the reasonable response, and all domain name, nameserver or entity search can also have the reasonable response. However, there are still the following details that should be paid attention to:

1. Duplicate data in the response, Only “status”, “roles” will duplicate removal treatment
2. The max length of request URL depends on the configuration in Web container
3. To multi address redirect, return the head Location showing only one address
4. For domain or nameserver query, which not belong to the registrar, query the redirection table
5. For IP and AS query, first query the database, if there are no matched records, then query redirection table, if the redirection URL address is the service itself, return 404, else return 301
6. The address information for IPv6 having NULL field does not appear in the response; for IPv4 addresses, low value after conversion is more than 32 bits, the data do not appear in the response

### 2.3.2 Port 43 Proxy Interface

Because of the influence of the jwhois client, not all response from port43 is the same as the response from API with the same query. But, overall, the basic function can still work normally. For port43, there are still the following details of the processing described:

1. The language encoding settings of the client and server must be UTF-8, so the Unicode in the response can display normally
2. Port43 does not support visiting rdap server by HTTPS
3. Jwhois client has its own domain validation rules, the query which does not conform to the rules will be intercept, and this response is inconsistent with the API response
4. For unicode parameters, recommend using urlencode info by Jwhois client

### 2.3.3 Others

The system provides bootstrap update, authentication & authorization &policy, restrictions on the number of users, the rate limiting, case-foled&NFKC support, IRIs support, HTTP request header check, the request encoding format check, and so on. All of these are working properly. However, there are still the following details of the processing described:

1. Bootstrap update: there is no strict check on the data, the premise of the normal operation is that the data obtained from IANA is correct
2. Authentication & authorization & policy: implementation is one way which described in the drafts, but not all of them
3. HTTP request header check: just check that a few related to the system

## 2.4 Performance of the System

***Test Process Description*:** in the specified environment, detect the processing ability of the system.

The performance of the tested system is good.

The peak performance and benchmark are as follows.

|  |  |  |
| --- | --- | --- |
| concurrency | | 80 |
| QPS | | 1253.22 |
| 95% Average Request Response Time | | 0.131 Second |
| WEB Server CPU Utilization | | 46% |
| Data Server CPU Utilization | | 75% |
| Web server info | tomcat-7.0.53 | |
| Operating system :Linux | |
| CPU: intel（R）xeon（R）, 8 cores | |
| Memory: 16G | |
| Database server info | Mysql- 5.1  set global query\_cache\_size=1\*1024\*1024\*1024;  set global query\_cache\_limit=1\*1024\*1024\*1024; | |
| Operating system :Linux | |
| CPU: intel（R）xeon（R）, 8 cores | |
| Memory: 16G | |
| Data info | auntum(320,000 records) | |
| domain(1,000,000 records) | |
| entity(1,400,000 records) | |
| nameserver(1,900,000 records) | |
| ip(28,000 records) | |

Table 1. Performance Data

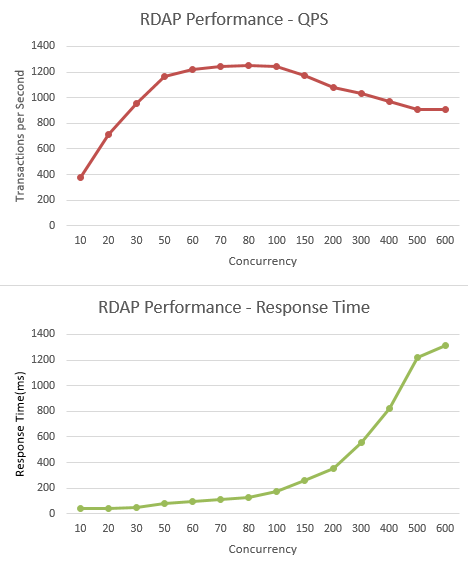


Figure 1. RDAP Performance – QPS and Response Time

## 2.5 Compatibility of the System

***Test Process Description*:** check if the system can work normally in different environment by robotframework.

System can work normally in the following system.

|  |  |  |  |
| --- | --- | --- | --- |
| Red Hat Enterprise Linux Server release 5.3 | Tomcat7 | Mysql5.1 | Jdk7 |
| Tomcat7 | Mysql5.6 | Jdk7 |
| CentOS release 5.7 | Tomcat7 | Mysql5.6 | Jdk6 |
| Win7 | Tomcat7 | Mysql5.6 | Jdk7 |
| Win8 | Tomcat7 | Mysql5.6 | Jdk7 |
| OS X 10.8.4 | Tomcat7 | Mysql5.6 | Jdk7 |

Table 2. Test Platform Environment

## 2.6 Update API

***Test Process Description*:** prepare all kinds of data, perform create, update, delete operations, check the corresponding responses and the correctness of the data in the database.

All reasonable IP, AS, domain, nameserver or entity data are available through the update API updates to the database. However, there are still the following details of the processing described:

1. Update API do not strictly check the input data, data validity guaranteed by the data provider
2. Part of the response code for the update API use the query API response code
3. Following data cannot be updated to the database: the leap second data, entity handle more than 100 characters in length

## 2.7 Quality of the Code

***Test Process Description*:** get the code quality measure data by SonarQube.

According to the monitoring data from SonarQube code quality control platform, whois is much better than other open source projects like Apache Maven, Struts 2 or OpenEJB.

|  |  |
| --- | --- |
| Lines of code | 20476 lines |
| Classes | 397 classes  1443 functions |
| Issues | 1 |
| Documentation | 91.9% docu.API |
| Duplications | 5.3%  2,776 lines、45 files |
| Complexity | 2.3 /function  8.3 /class  6.8 /file |
| Technical debt | 0.1 days |
| Unit Tests Coverage | 62.3% |

Table 3. Code Quality Statistical Results

## 2.8 Security Considerations

***Test Process Description*:** simulation using different modes, check the working condition of the server.

Based on the draft and the using habit of the user, the system realizes the basic security functions and provides security extension reference. The server supports Basic authentication and HTTP over TLS to protect the client’s credentials form disclosure while in transit. And the server also supports connection number limit, access rate limit, defense SQL injection and access control policy to ensure the safety of the access and the integrity of the data.

## 2.9 Document Inspection

***Test Process Description*:** documents verification and inspection.

All project documents are available, and have reference value.

**3 SUMMARY AND CONCLUSIONS**

# 3.0 SUMMARY AND CONCLUSIONS

## 3.1 Demonstrated Capability

The function of the system covers most MUST and SHOULD requirements in the drafts, at the same time the system also handles the security and scalability requirement.

## 3.2 System Deficiencies

|  |  |  |  |
| --- | --- | --- | --- |
| ID | Summary | Status | Remarks |
| #44 | Object response not contains 'notices' property | closed |  |
| #45 | Autnum look up not support NFKC | Wontfix | NFKC not used for autnum. |
| #46 | Advice to adjust the location of the 'lang' in the response | closed |  |
| #47 | The "title" data of the second “links” lost in the response | closed |  |
| #48 | The unicode character in 'notices' display garbled for some 400 Error Response | closed | Reason: some request responsed by filter wasn't set character Encoding Correctly. |
| #49 | Set " Accept: application / rdap+json; charset = xxx", server returns 500 error | closed | All request for malformed HTTP header will response 415 - 'Unsupported Media Type' |
| #50 | The 405 status\_code is not appeared with the HEADERS-Allow | closed | Conformed to rfc2616. |
| #74 | Query domain xn--123123.cn, response code is 400,the expected value is 200 or 404 | closed |  |
| #76 | 1.in-addr.arpa exsit in the database, response of query 0.0.0.1.in-addr.arpa is 404, the expected is 200 with the info of 1.in-addr.arpa in body | closed |  |
| #77 | Response of domain query in uppercase is 400,not match the domain in lowercase in the database | closed |  |
| #78 | Response of domain query /domain/1.25.in-addr.arpa.. is 404,the expected response is 400 | closed |  |
| #105 | Domain query，when enter invalid UTF-8 parameter value，the response code is 400，but the response information doesn't contain content-type and body .  /domain/%E%B8%AD%E5%9B%BD%E4%BA%92%E8%81%94%E7%BD%91%E7%BB%9C%E4%BF%A1%E6%81%AF%E4%B8%AD%E5%BF%83.cn | Wontfix | The container Tomcat intercept URI, directly back to the 400 and empty body. As a known problem in the system description |
| #106 | The response of the domain with lots of nameServers has not been truncated | Wontfix | only search and networks/autnums in entity should be truncated. |
| #107 | When the '\' in the query ,there is no response | Wontfix | The container Tomcat intercept URI, directly back to the 400 and empty body. As a known problem in the system description |
| #108 | The response of the domain search query for "中国\*" is 400,the expected value is 200 or 404 | closed |  |
| #109 | Domain-search，the response code is 500. | closed |  |
| #110 | The response of the search query having more than one '\*' is 200 | closed | The response of the search query having more than one '\*' is 200, the response of the search domain by nsIp or nameserver by ip query having '\*' is 400 |
| #111 | The response of the domain search query for "xn--tiq422d\*xn--fiqa61au8b7zsevnm8ak20mc4a87e.cn." is 404,the expected value is 200,because the domain "xn--tiq422d\*xn--fiqa61au8b7zsevnm8ak20mc4a87e.cn" is exist in database. | closed |  |
| #113 | The response of the query with Authorization info is 500 | closed |  |
| #114 | The response of the nameserver search query for "nameservers?name=ns.c\*.cn&name=cnnic" is 404,the expected value is 200. Contents following "&" should be truncated . | closed | Use first parameter |
| #189 | Search request with 200 response fallowing the ? and additional parameters have 404 response  218.241.106.149:8301/rdap/.well-known/rdap/entities?handle=n\*n  response:200  218.241.106.149:8301/rdap/.well-known/rdap/entities?handel=n\*n?/autnum/123  response:404 | closed |  |
| #191 | The response of the query '/rdap/nameservers?ip=8.0.0.9&name=cnnic.cn' is 404  ip in the query have the relevant data in the database  the expect response is 200 | closed | Use first parameter |
| #192 | The response of the '/rdap/entity/inforesultsTruncated3' is 500 | closed |  |
| #193 | The response of the '/rdap/domain/f.f.f.ip6.arpa' is 404,200 is the expected, f.f.f.ip6.arpa have a matching data | closed |  |
| #194 | The networks in the entity's response contain entities info | closed |  |
| #195 | The networks info in the response of the '/rdap/entity/fullinfoe2' is inconsistent with the database | closed |  |
| #196 | The response of the '/rdap/entities?fn=好\*' is 404,the expect is 200  entity in database have the fn info begin with 好 | closed |  |
| #197 | Adr in the vcard is not show the pref info | closed |  |
| #198 | The response of the ip query with format error parameters is 404,the expect is 400 | closed |  |
| #235 | The response of the '/rdap/nameserver/ns.cnnic.cn' is 404, 200 is the expected | closed |  |
| #236 | Info of the Location in the redirect response is error  1) Location info not add the request object and parameters  2) Location info not display the unicode character, only use space replace | closed |  |
| #237 | Query as number not have the info in the database,but with the related redirect url is server itself, the response is 301, but 404 is the expect  ip query is similar | closed |  |
| #238 | Enter space before search parameters or enter space after serach parameters，the response code is 200，but 400 is expected. | closed | Only entity quert or search will trim enter space before or after the parameters |
| #243 | The response of the domain search using parameter without \* is 400, 200 or 404 is expected | closed |  |
| #429 | IPv4/IPv6 prefix entries having large CIDR(eg. 33/129) can update to the in database | closed |  |
| #430 | Autonomous Systems Number Ranges entries, which the start number is bigger than the end number, can update to the database. | closed |  |
| #446 | The response of the search domains by nsLdhName or nsIp has two domains with the same info.  /domains?nsLdhName=ns\*cnnic.cn  /domains?nsIp=218.241.111.96 | closed |  |
| #447 | Search domains by nsLdhName or nsIp, users without access authority to the qurey nameserver can also have the response info of the interrelated domains. | later |  |
| #448 | Search domains by nsLdhName using unicode name of the nameserver can have 200 response. | closed |  |
| #475 | Response for the IP networks query is 500  /ip/218.241.111.116 | closed |  |
| #476 | Response of the IP networks query with error parameter is 200, 400 is expected  /ip/::ffff:192.168.89.9. | closed |  |
| #478 | The v4 info in the response of the nameserver is not correct  query:  /nameserver/ns1.host.cn  v4 info:  ipAddresses:{v4:["0.218.241.111", "8.0.0.3", "8.0.0.4" ], v6:["1000::8004" ]},  data in the database:  NAMESERVER\_ID NAMESERVER\_IP\_ID HEX(IP)  3 5 00DAF16F60  3 9 808080808080800080808080808080  3 10 8080808080805C  3 11 01E240  3 36 08000003  3 37 08000004  3 40 10000000000000000000000000008004 | closed |  |
| #479 | The member uri should not appear in the auto generate links | closed |  |
| #480 | Auto generate links in the response for the entity query does not treatment the Unicode characters in the value or href correctly | closed |  |
| #488 | The notices in search-response which has been truncated is NULL  eg:  notices:[  {  }  ], | closed |  |

Table 4. BUG Detailed Information

## 3.3 Recommended Improvements

After test, we believe that system can do better in the following several aspects:

1. Implementation of one step to download and install
2. Implementation of the graphic operating system for backend configuration

## 3.4 System Acceptance

The testing has shown that the system is ready for release testing.