

Appendix B - Registrar Testing

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Testing CORE GatewayNG Registrar System

The test cases described in detail in this Appendix do not cover all of the gates identified in the main document. It merely serves as an approach to test the registrar's main features that are easily accessible without internal knowledge. As such we are providing sample test cases for the UA-readiness gates G1, G2, G3, G4, G5, and G6 thereby implicitly also testing the internal gates G7, G8, G9, and G11.

In order to make it easier for the reader to find their way in the test cases, colour codes have been used. For each test case the expected outcome is stated followed by either a green **success** or red **fail** keyword. Furthermore, the respective output of the test case has been marked with a **green** or **red** background to easily see where the result is expected to be found.

This appendix is part of the following three-part report:

1. [Universal Acceptance \(UA\) Roadmap for Domain Name Registry and Registrar Systems.](#)
2. [Appendix A - Registry Testing](#)
3. [Appendix B - Registrar Testing](#)

1 Testing the Control Panel (Web Interface) - G4, G5

The test cases within this section reflect the UA-readiness gates G4 and G5 as visualized in *Figure 2: Domain Registrar High-Level System Architecture* in the [main document](#). Testing a registrar's web interface will be different for each registrar system as there is no common standard and registrars are free to offer any kind of features and functionality. Nevertheless, it is likely that standard functionality (create, read, update, delete) will be available. Together with the optional searching/filtering of objects, these will be the test cases we are looking at.

1.1 Contact

1.1.1 Summary

Operation	Outcome	Comment
Create	fail	δοκιμή@テスト.ドメイン名 incorrectly flagged as invalid
Create (adjusted)	fail	Used 测试@测试.测试 as email address
Create (adjusted)	success	Used example@xn--0zwm56d.xn--0zwm56d as email address
Update	success	
Search	partial success	Domain name in email address is not normalized to U-label notation; searching by using the A-label version (测试@xn--0zwm56d.xn--0zwm56d) does not find the contact
View	success	Domain name in email address is not normalized to U-label notation, it is displayed the way it was created

For the Contact test cases only the email address was of concern. Any other data, which may contain the full range of Unicode characters (e.g., internationalized address data), is ignored in the context of Universal Acceptance.

It should be tested that an EAI is accepted when storing and updating contacts and that the email address is correctly displayed when viewing the contact. In cases where searching in the contact space is supported, the contact must be found when specifying the email address. Care should be taken that the domain name of the email address is supported in A-label as well as U-label format and both formats are considered as equal when searching by email address. While this list of tests is intended to be a reasonably complete list, there is no guarantee for completeness and there may be other checks depending on the actually deployed software.

Testing the GatewayNG registrar system resulted in one problem:

1. No EAI was accepted, neither <δοκιμή@テスト.பரிட்சை> nor <测试@测试.测试> nor <example@grün.de> nor <grün@example.com> was accepted. The web interface uses vue.js [vue] and the vuelidate [vuelidate] library 0.7.7. The library uses a regular expression for validation, which does not support any non-ASCII character. Starting with release 1.59 the GatewayNG software will switch to a simple regular expression, leaving the more complex validation to the backend Java code.

1.1.2 Detailed Test Descriptions

1.1.2.1 Create:

Enter δοκιμή@テスト.பரிட்சை as email address.

Expected outcome:

- Storage is possible: **fail**, email validation in Frontend fails
- Display of contact shows the same values: unable to check

Alter test to use different email address: 测试@测试.测试

Expected outcome:

- Storage is possible: **fail**, email validation in Frontend fails
- Display of contact shows the same values: unable to check

Alter test to use a ASCII-only email address: example@xn--0zwm56d.xn--0zwm56d

Expected outcome:

- Storage is possible: **success**
- Display of contact shows the same values: **success**

1.1.2.2 Update

Same behaviour as create.

1.1.2.3 Search

Search the contacts by

- Email "example@xn--0zwm56d.xn--0zwm56d"

Expected outcome:

- Find the contact: **success**

Search contact by

- Email "example@测试.测试"

Expected outcome:

- Find the contact: **fail**

1.2 Host

1.2.1 Summary

Operation	Outcome	Comment
Create	success	Both A-label and U-label are supported
Update	n/a	No renaming of hosts is allowed.
Search	success	Searching by A-label also finds hosts created using U-labels and vice versa
View	success	Both A-label and U-label domain names are displayed at the same time

It should be tested that hosts are accepted in either A-label or U-label notation. In case searching in the host space is supported, the host must be found when specifying the host's domain name. Care should be taken that the domain name of the host is supported in A-label as well as U-label format and both formats are considered as equal when searching by domain name. It is suggested to store the host's domain name in a normalised form.

Testing the GatewayNG registrar system showed full support of A-label and U-label. For input, either of the two notations is accepted; for output always both versions are displayed next to each other. When searching for hosts, there is a single input field to enter the A-label or the U-label domain name, for both notations also a prefix search is supported.

1.2.2 Detailed Test Descriptions

1.2.2.1 Create

Enter “`پریکشا.اِختبار.آزمایشی`” as host name.

Expected outcome:

- Storage is possible: **success**
- Display of host shows the same domain name: **success**
- Display of A-labels of the host shows as “`xn--kgbechtv.xn--hgbk6aj7f53bba.xn--11b5bs3a9aj6g`”: **success**

1.2.2.2 Search

Search hosts by U-label “إختبار.آزمایشی.پरीक्षा” and by A-label “xn--kgbechtv.xn--hgbk6aj7f53bba.xn--11b5bs3a9aj6g”

Expected outcome:

- Find the corresponding host with U-label search: **success**
- Find the corresponding host with A-label search: **success**

1.2.2.3 Update

System does not allow renaming of hosts in general.

1.3 Domain

1.3.1 Summary

Operation	Outcome	Comment
Create	success	Both A-label and U-label are supported
Update	success	Both A-label and U-label are supported
Update (add variants)	success	Both A-label and U-label are supported
Update (add hosts)	success	Hosts in A-label and U-label format are supported
Search	success	Searching by A-label also finds domains created using U-labels and vice versa
View	success	Both A-label and U-label domain names are displayed at the same time
Check	success	Checking by A-label and U-label give the same result
Transfer	success	Both A-label and U-label domain names are supported

It should be tested that domains are accepted in either A-label or U-label notation. Where searching in the domain space is supported, the domain must be found when specifying the domain name. Care should be taken that the domain name is supported in A-label as well as U-label format and both formats are considered as equal when searching by domain name.

Testing the GatewayNG registrar system showed full support of A-label and U-label. For input, either of the two notations is accepted; for output always both versions are displayed next to each other. When searching for domains, there is a single input field to enter either the A-label or the U-label domain name, for both notation also a prefix search is supported.

Variants are supported based on the configured IDN table. A variant label may be added either in A-label or U-label notation as long as it constitutes an allocatable variant according to the IDN table. When checking domains, all existing domains as well as all variants (independent of their allocation status) are considered as blocked.

1.3.2 Detailed Test Descriptions

1.3.2.1 Create

Enter "sëst.テスト" as domain name (choosing French language tag "fr").

Expected outcome:

- Storage is possible: **success**
- Display of domain shows the same domain name: **success**
- Display of A-label domain name shows as "xn--sst-jma.xn--zckzah": **success**

1.3.2.2 Edit (add variants)

Edit "sëst.テスト", add variants "sest.テスト" and "sést.テスト"

Expected outcome:

- Storage is possible: **success**
- Display of domain variant labels show the same values: **success**
- Display of A-labels of domain variant labels show as "sest.xn--zckzah" and "xn--sst-bma.xn--zckzah", resp.: **success**

1.3.2.3 Edit (add hosts)

Enter "ns1.mylabel.பரிட்சை", "ns1.测试.பரிட்சை", and "ns2.mylabel.xn--hlcj6aya9esc7a" as host labels.

Expected outcome:

- Storage is possible: **success**
- Host names are normalised and their U-label version is correctly displayed: **success**

1.3.2.4 Search

Search domains by U-label "sëst.テスト" and by A-label "xn--sst-jma.xn--zckzah"

Expected outcome:

- Find the corresponding domain with U-label search: **success**
- Find the corresponding domain with A-label search: **success**

1.3.2.5 Check (existing variant)

Enter "tést.テスト" as domain name.

Expected outcome:

- Check is executed: **success**
- Check result is "not available": **success**

1.3.2.6 Check (not registered variant)

Enter "tèst.テスト" as domain name.

Expected outcome:

- Check is executed: **success**
- Check result is "not available", blocked by variant: **success**

1.3.2.7 Check (unregistered label)

Enter "tost.テスト" as domain name.

Expected outcome:

- Check is executed: **success**
- Check result is "available": **success**

1.3.2.8 Transfer

Transfer the domain "tést.テスト" to another registrar.

Expected outcome:

- Domain transfer is initiated: **success**

1.3.2.9 Search transfer

Search transfer by U-label "tést.テスト" and A-label "xn--tst-jma.xn--zckzah"

Expected outcome:

- Find the corresponding pending transfer with U-label search: **success**
- Find the corresponding pending transfer with A-label search: **success**

2 Testing the Payload Interface - G5

The test cases within this section reflect the UA-readiness gate G5 as visualized in *Figure 2: Domain Registrar High-Level System Architecture* in the [main document](#). Whereas registries usually use a common standard for their automated interface, namely EPP (see also Appendix X: Registry Testing) there is no such standard for registrar systems. Some also employ EPP while others use SOAP, REST or their own proprietary API. The GatewayNG offers a simple API called Common Provisioning Protocol, historically often simply called Payload. The payload definition [GWPayload] specifies the syntax of requests accepted by the CORE GatewayNG and the corresponding responses.

The format consists of key/value pairs, where each pair is given on a separate input/output line of the request/response; key and value are separated by a colon.

While this protocol is specific to CORE's registrar system, the following examples can still be used to create analogous test cases for other registrar systems.

2.1 Contact

2.1.1 Summary

Operation	Outcome	Comment
Create	success	Used بازار@أكن.بازار as email address
Info	success	
Update	failure	Used δοκιμή@テスト.பரிட்சை as email address; request is rejected with reason "not a valid email address"
Update (adjusted)	success	Used 测试@测试.测试 as email address

For the Contact test cases only the email address was of concern. Any other data, which may contain the full range of unicode characters (e.g. internationalised address data), is ignored in the context of Universal Acceptance.

It should be tested that an EAI is accepted when storing and updating contacts and that the email address is correctly returned when inquiring the created contact.

Testing the GatewayNG registrar system resulted in two problems:

- The email address <δοκιμή@テスト.பரிட்சை> was not accepted. The cause being a faulty validation of the javax.mail library used to validate email addresses. See Section “Third-Party Library Usage” of the [main document](#) for details.

Starting with Release 1.59 of the GatewayNG the email validation has been adjusted and the above email address is considered valid and accepted.

- The domain name parts are not normalised to U-label notation, instead they are only normalised to lower-case and otherwise stored and displayed as given, resulting in searches (in the web interface) not finding contacts using the A-label notation when an email address was given in U-label notation.

2.1.2 Detailed Test Descriptions

2.1.2.1 Create

The formal definition of the example used in this test can be found in [GWContactCreate].

Request:

```
payload.version: 2.0
transaction.id: GWWeb-michael.bauland-1657264334464
core.member.id: CORE-1
request.type: contact.create
registry.id: doticann
contact.authinfo: 3-YZCHErXLKi1j3
contact.email: بازار@أكن.بازار
contact.i15d.address.city: பரிட்சை
contact.i15d.address.countrycode: AX
contact.i15d.address.postalcode: பரிட்சை
contact.i15d.address.state: பரிட்சை
contact.i15d.address.street.1: பரிட்சை
contact.i15d.name: பரிட்சை
contact.i15d.organization: பரிட்சை
```

Expected result code 10000: **success**

Response:

```
contact.id: C16-T
payload.version: 2.0
provider.chain.1.spec: {MEM-CORE1}{MEM-qrZmxW}
provider.chain.1.type: default
```

registry.transaction.id: 1657264564456-881
response.type: contact.create
result.code: 10000
result.msg: Command completed successfully
transaction.id: GWWeb-michael.bauland-1657264334464

2.1.2.2 Info

The formal definition of the example used in this test can be found in [GWContactInquire].

Request:

payload.version: 2.0
transaction.id: GWWeb-michael.bauland-1657265333394
core.member.id: CORE-1
request.type: contact.inquire
registry.id: doticann
contact.id: C16-T

Expected result code 10000: success

Check that email has the same value as in the create request: success

Response:

contact.authinfo: 3-YZCHErXLKi1j3
contact.datapolicy: restrictive
contact.email: بازار@اکان.بازار
contact.email.verification.status: unknown
contact.i15d.address.city: பரிட்சை
contact.i15d.address.countrycode: AX
contact.i15d.address.postalcode: பரிட்சை
contact.i15d.address.state: பரிட்சை
contact.i15d.address.street.1: பரிட்சை
contact.i15d.name: பரிட்சை
contact.i15d.organization: பரிட்சை
contact.id: C16-T
contact.status: ok
creation.date: 2022-07-08T07:16:04.456Z
creator.client.id: reg-990386
creator.core.member.id: CORE-1
payload.version: 2.0
provider.chain.1.spec: {MEM-CORE1}{MEM-qrZmxW}
provider.chain.1.type: default
registry.transaction.id: 1657265280103-885
response.type: contact.inquire
result.code: 10000
result.msg: Command completed successfully
sponsor.client.id: reg-990386

sponsor.core.member.id: CORE-1

transaction.id: GWWeb-michael.bauland-1657265333394

2.1.2.3 Update

The formal definition of the example used in this test can be found in [GWContactModify].

Request:

```
payload.version: 2.0
transaction.id: GWWeb-michael.bauland-1657265333394
core.member.id: CORE-1
request.type: contact.modify
registry.id: doticann
contact.id: C16-T
contact.email: δοκιμή@テスト.பரிட்சை
contact.i15d.address.city: பரிட்சை
contact.i15d.address.countrycode: AX
contact.i15d.address.postalcode: பரிட்சை
contact.i15d.address.state: பரிட்சை
contact.i15d.address.street.1: பரிட்சை
contact.i15d.name: பரிட்சை
```

Expected result code 10000: **fail**

Response:

```
payload.version: 2.0
response.type: contact.modify
result.1.code: 20005
result.1.error.1: not a valid email address
result.1.error.2: δοκιμή@テスト.பரிட்சை
result.1.key.1: contact.email
result.1.msg: Parameter value syntax error
result.code: 20101
result.msg: Payload specification violation
transaction.id: GWWeb-michael.bauland-1657265333394
```

2.1.2.4 Update (adjusted)

The formal definition of the example used in this test can be found in [GWContactModify].

Alter test to use different email address: 测试@测试.测试

Request:

```
payload.version: 2.0
transaction.id: GWWeb-michael.bauland-1657265333394
core.member.id: CORE-1
request.type: contact.modify
registry.id: doticann
contact.id: C16-T
contact.email: 测试@测试.测试
contact.i15d.address.city: பரிட்சை
contact.i15d.address.countrycode: AX
contact.i15d.address.postalcode: பரிட்சை
contact.i15d.address.state: பரிட்சை
contact.i15d.address.street.1: பரிட்சை
contact.i15d.name: பரிட்சை
```

Expected result code 10000: **success**

Response:

```
payload.version: 2.0
response.type: contact.modify
result.code: 10000
result.msg: Command completed successfully
transaction.id: GWWeb-michael.bauland-1657265333394
```

2.2 Host

The formal definition of the example used in this test can be found in [GWHostCreate].

2.2.1 Summary

Operation	Outcome	Comment
Create (U-label)	success	
Create (A-label)	success	
Info	success	The returned host is in A-label and U-label notation.
Update	n/a	No renaming of hosts is allowed.

Contrary to EPP the Payload protocol has no restriction to A-labels for host names. It therefore should be tested that host names are accepted both as A-labels and U-labels.

Testing the GatewayNG registrar system showed full support of arbitrary A-labels and U-labels.

2.2.2 Detailed Test Descriptions

2.2.2.1 Create (U-label)

The formal definition of the example used in this test can be found in [GWHostCreate].

Request:

```
payload.version: 2.0
transaction.id: GWWeb-michael.bauland-1657270363719
core.member.id: CORE-1
request.type: host.create
registry.id: doticann
host.name: 1.परीक्षा.إختبار.آزمایشی
```

Expected result code 10000: **success**

The A-label version of the host is correct: **success**

Result:

```
host.id: Hkeln11-ICANN
host.name: xn--kgbechtv.xn--1-omcp7bl4hw8bba.xn--11b5bs3a9aj6g
host.name.i15d: 1.परीक्षा.إختبار.آزمایشی
payload.version: 2.0
provider.chain.1.spec: {MEM-CORE1}{MEM-qrZmxW}
provider.chain.1.type: default
registry.transaction.id: 1657270419546-909
response.type: host.create
result.code: 10000
result.msg: Command completed successfully
transaction.id: GWWeb-michael.bauland-1657270363719
```

2.2.2.2 Create (A-label)

The formal definition of the example used in this test can be found in [GWHostCreate].

Request:

```
payload.version: 2.0
transaction.id: GWWeb-michael.bauland-1657270363719
core.member.id: CORE-1
request.type: host.create
registry.id: doticann
host.name: xn--kgbechtv.xn--1-omcp7b14hw8bba.xn--11b5bs3a9aj6g
```

Expected result code 10000: **success**

The U-label version of the host is correct: **success**

Result:

```
host.id: Hbsiw12-ICANN
host.name: xn--kgbechtv.xn--1-omcp7b14hw8bba.xn--11b5bs3a9aj6g
host.name.i15d: 1.परीक्षा.अख्तियार.आزمایشی
payload.version: 2.0
provider.chain.1.spec: {MEM-CORE1}{MEM-qrZmxW}
provider.chain.1.type: default
registry.transaction.id: 1657270522524-913
response.type: host.create
result.code: 10000
result.msg: Command completed successfully
transaction.id: GWWeb-michael.bauland-1657270363719
```

2.2.2.3 Info

The formal definition of the example used in this test can be found in [GWHostInquire].

Request 1:

```
payload.version: 2.0
transaction.id: GWWeb-michael.bauland-1657270363719
core.member.id: CORE-1
request.type: host.inquire
registry.id: doticann
host.id: Hbsiw12-ICANN
```

Expected result code 10000: **success**

The A-label version is correct: **success**

The U-label version is correct: **success**

Result:

```
creation.date: 2022-07-08T08:55:22.524Z
creator.client.id: reg-990386
creator.core.member.id: CORE-1
host.id: Hbsiw12-ICANN
host.name: xn--kgbechtv.xn--1-omcp7b14hw8bba.xn--11b5bs3a9aj6g
host.name.i15d: 1.परीक्षा.अख्तियार.अزمایشی
host.status: ok
payload.version: 2.0
provider.chain.1.spec: {MEM-CORE1}{MEM-qrZmxW}
provider.chain.1.type: default
registry.transaction.id: 1657271307006-919
response.type: host.inquire
result.code: 10000
result.msg: Command completed successfully
sponsor.client.id: reg-990386
sponsor.core.member.id: CORE-1
transaction.id: GWWeb-michael.bauland-1657270363719
```

2.2.2.4 Update

As modifying hosts does not allow changing the domain name of the host, there is nothing to test here.

2.3 Domain

2.3.1 Summary

Operation	Outcome	Comment
Create (U-label)	success	
Create (A-label)	success	
Info	success	The returned domain is in A-label and U-label notation.
Update (setting variants)	success	Submitting variants in A-label and U-label notation
Check (variant)	success	Checking a non-existing domain, which is a variant of an existing domain reports the domain as blocked
Check (non-variant)	success	Checking a non-existing domain, which is not a variant of an existing domain reports the domain as available
Transfer	success	Starting a transfer using the A-label and U-label notation

Contrary to EPP the Payload protocol has no restriction to A-labels for host names. It therefore should be tested that domain names are accepted both as A-labels and U-labels.

The support of variants and IDN script/language values is also tested.

Testing the GatewayNG registrar system showed full support of arbitrary A-labels and U-labels.

2.3.2 Detailed Test Descriptions

The formal definition of the example used in this test can be found in [GWDomainCreate].

2.3.2.1 Create (U-label)

Request:

```
payload.version: 2.0
transaction.id: GWWeb-michael.bauland-1657793947373
core.member.id: CORE-1
request.type: domain.create
registry.id: doticann
domain.name: k st. st
domain.name.language: fr
domain.authinfo: abcdefghijk
contact.1.id: REG-CEUOBXDWZJF2
contact.1.type: admin
contact.2.id: REG-CEUOBXDWZJF2
contact.2.type: registrant
contact.3.id: REG-CEUOBXDWZJF2
contact.3.type: tech
contact.4.id: REG-CEUOBXDWZJF2
contact.4.type: billing
period.unit: y
period.value: 1
```

Expected result code 10000: **success**

The A-label version of the domain is correct: **success**

Result:

```
account.1.balance: -433.80
account.1.change: -7.80
account.1.currency: USD
domain.id: Dzdko9-ICANN
domain.name: xn--kst-jma.xn--zckzah
domain.name.il5d: k st. st
expiration.date: 2023-07-14T10:34:26.802Z
payload.version: 2.0
provider.chain.1.spec: {MEM-CORE1}{MEM-qrZmxW}
provider.chain.1.type: default
registrant.verification.started: true
registry.transaction.id: 1657794866802-2819
response.type: domain.create
result.code: 10000
result.msg: Command completed successfully
transaction.id: GWWeb-michael.bauland-1657793947373
```

2.3.2.2 Create (A-label)

The formal definition of the example used in this test can be found in [GWDomainCreate].

Request:

```
payload.version: 2.0
transaction.id: GWWeb-michael.bauland-1657793947373
core.member.id: CORE-1
request.type: domain.create
registry.id: doticann
domain.name: xn--kst-jma.xn--zckzah
domain.name.language: fr
domain.authinfo: abcdefghijk
contact.1.id: REG-CEUOBXDWZJF2
contact.1.type: admin
contact.2.id: REG-CEUOBXDWZJF2
contact.2.type: registrant
contact.3.id: REG-CEUOBXDWZJF2
contact.3.type: tech
contact.4.id: REG-CEUOBXDWZJF2
contact.4.type: billing
period.unit: y
period.value: 1
```

Expected result code 10000: **success**

The U-label version of the domain is correct: **success**

Result:

```
account.1.balance: -433.80
account.1.change: -7.80
account.1.currency: USD
domain.id: Dmjag10-ICANN
domain.name: xn--kst-jma.xn--zckzah
domain.name.i15d: këst.テスト
expiration.date: 2023-07-14T11:21:18.260Z
payload.version: 2.0
provider.chain.1.spec: {MEM-CORE1}{MEM-qrZmxW}
provider.chain.1.type: default
registrant.verification.started: true
registry.transaction.id: 1657797678260-2837
response.type: domain.create
result.code: 10000
result.msg: Command completed successfully
transaction.id: GWWeb-michael.bauland-1657793947373
```

2.3.2.3 Info

The formal definition of the example used in this test can be found in [GWDomainInquire]. In the first request, the domain is written in A-label notation, in the second request, the domain is written in U-label notation.

Request 1:

```
payload.version: 2.0
transaction.id: GWWeb-michael.bauland-1657793947373
core.member.id: CORE-1
request.type: domain.inquire
registry.id: doticann
domain.name: xn--kst-jma.xn--zckzah
```

Request 2:

```
payload.version: 2.0
transaction.id: GWWeb-michael.bauland-1657793947373
core.member.id: CORE-1
request.type: domain.inquire
registry.id: doticann
domain.name: këst.テスト
```

Expected result code 10000: **success**

Both requests return the same data: **success**

A-label and U-label version of the domain is correct: **success**

Result:

```
contact.1.id: REG-CEUOBXDWZJF2
contact.1.type: registrant
contact.2.id: REG-CEUOBXDWZJF2
contact.2.type: tech
contact.3.id: REG-CEUOBXDWZJF2
contact.3.type: admin
contact.4.id: REG-CEUOBXDWZJF2
contact.4.type: billing
creation.date: 2022-07-14T11:21:18.260Z
creator.client.id: reg-990386
creator.core.member.id: CORE-1
domain.authinfo: abcdefghijk
domain.id: Dmjag10-ICANN
domain.name: xn--kst-jma.xn--zckzah
domain.name.i15d: këst.テスト
domain.name.language: fr
domain.status: inactive
expiration.date: 2023-07-14T11:21:18.260Z
launch.phase: open
```

```
payload.version: 2.0
provider.chain.1.spec: {MEM-CORE1}{MEM-qrZmxW}
provider.chain.1.type: default
registry.transaction.id: 1657798105977-2844
response.type: domain.inquire
result.code: 10000
result.msg: Command completed successfully
sponsor.client.id: reg-990386
sponsor.core.member.id: CORE-1
transaction.id: GWWeb-michael.bauland-1657793947373
```

2.3.2.4 Update (setting variants)

The formal definition of the example used in this test can be found in [GWDomainModify]. One variant is set in A-label the other in U-label format.

Request:

```
payload.version: 2.0
transaction.id: GWWeb-michael.bauland-1657793947373
core.member.id: CORE-1
request.type: domain.modify
registry.id: doticann
domain.name: kēst.テスト
domain.variant.1.name: kest.xn--zckzah
domain.variant.2.name: xn--kst-bma.xn--zckzah
domain.name.language: fr
update: idn
```

Expected result code 10000: **success**

Result:

```
payload.version: 2.0
registry.transaction.id: 1657798981194-2850
response.type: domain.modify
result.code: 10000
result.msg: Command completed successfully
transaction.id: GWWeb-michael.bauland-1657793947373
```

2.3.2.5 Check (variant)

The formal definition of the example used in this test can be found in [GWDomainCheck].

Request:

```
payload.version: 2.0
transaction.id: GWWeb-michael.bauland-1657793947373
core.member.id: CORE-1
request.type: domain.check
registry.id: doticann
domain.1.name: xn--kst-bma.xn--zckzah
domain.1.name.language: fr
```

Expected result code 10000: **success**

Expected availability "false": **success**

Result:

```
domain.1.available: false
domain.1.name: xn--kst-bma.xn--zckzah
domain.1.name.il5d: kést.テスト
domain.1.reason: Blocked by variant
payload.version: 2.0
registry.transaction.id: 1657799223966-2852
response.type: domain.check
result.code: 10000
result.msg: Command completed successfully
transaction.id: GWWeb-michael.bauland-1657793947373
```

2.3.2.6 Check (non-variant)

The formal definition of the example used in this test can be found in [GWDomainCheck].

Request:

```
payload.version: 2.0
transaction.id: GWWeb-michael.bauland-1657793947373
core.member.id: CORE-1
request.type: domain.check
registry.id: doticann
domain.1.name: mést.テスト
domain.1.name.language: fr
```

Expected result code 10000: **success**

Expected availability "true": **success**

Result:

```
domain.1.available: true
domain.1.name: xn--mst-bma.xn--zckzah
domain.1.name.il5d: mést.テスト
payload.version: 2.0
registry.transaction.id: 1657799539851-2859
response.type: domain.check
result.code: 10000
result.msg: Command completed successfully
transaction.id: GWWeb-michael.bauland-1657793947373
```

2.3.2.7 Transfer

The formal definition of the example used in this test can be found in [GWDomainTransfer]. The domain is transferred both using the A-label and using the U-label notation.

Request 1:

```
payload.version: 2.0
transaction.id: GWWeb-michael.bauland-1657793947373
core.member.id: CORE-1
request.type: domain.transfer.request
registry.id: doticann
domain.name: xn--rst-bma.xn--zckzah
domain.authinfo: abcdefg
```

Request 2:

```
payload.version: 2.0
transaction.id: GWWeb-michael.bauland-1657793947373
core.member.id: CORE-1
request.type: domain.transfer.request
registry.id: doticann
domain.name: rést.テスト
domain.authinfo: abcdefg
```

Expected result code 10100: **success**

Result:

```
account.1.balance: -439.00
account.1.change: -5.20
account.1.currency: USD
payload.version: 2.0
registry.transaction.id: 1657799953537-2862
response.type: domain.transfer.request
result.code: 10100
result.msg: Command accepted
transaction.id: GWWeb-michael.bauland-1657793947373
```

3 Testing the Authoritative DNS Server - G1

The test cases within this section reflect the UA-readiness gate G1 as visualized in *Figure 2: Domain Registrar High-Level System Architecture* in the [main document](#). While running an authoritative DNS server for their domains is not mandatory for registrars, most registrars also offer this service for their customers. For this test case a domain needs to be created and “activated” at the registrars, i.e., it needs to be assigned name servers and the registrar needs to create a zone for the domain on those name servers.

3.1 DNS Query

For this test we will be using the domain `kest.テスト` as created in the Payload Domain test case. Its A-label notation is `xn--kst-jma.xn--zckzah`. To test the DNS server the open source tool “dig” is used.

3.1.1 Detailed Test Description

Query the domain name’s SOA record from the domain’s configured authoritative name server `ns1.sandbox.ironDNS.net`:

```
dig @ns1.sandbox.ironDNS.net xn--kst-jma.xn--zckzah SOA
```

Expected outcome:

- Status: NOERROR: **success**
- SOA record is returned in Answer Section: **success**

Result:

```
; <<>> DiG 9.10.3-P4-Ubuntu <<>> @ns1.sandbox.irondns.net xn--kst-
jma.xn--zckzah soa
; (2 servers found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 22312
;; flags: qr aa rd; QUERY: 1, ANSWER: 1, AUTHORITY: 1, ADDITIONAL: 1
;; WARNING: recursion requested but not available

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 4096
;; QUESTION SECTION:
;xn--kst-jma.xn--zckzah.      IN      SOA

;; ANSWER SECTION:
xn--kst-jma.xn--zckzah. 86400 IN      SOA  ns1.sandbox.irondns.net.
secretariat.corenic.org. 2022071501 10800 10800 604800 3600

;; AUTHORITY SECTION:
xn--kst-jma.xn--zckzah. 86400 IN      NS      ns1.sandbox.irondns.net.

;; Query time: 4 msec
;; SERVER: 2a01:5b0:0:126::12#53(2a01:5b0:0:126::12)
;; WHEN: Fri Jul 15 08:56:34 CEST 2022
;; MSG SIZE rcvd: 148

;; MSG SIZE rcvd: 87
```

4 Testing the Port 43 Whois Interface - G2

The test cases within this section reflect the UA-readiness gate G2 as visualized in *Figure 2: Domain Registrar High-Level System Architecture* in the [main document](#). For these test cases a domain, a contact, and a host need to be created.

4.1 Contact

4.1.1 Detailed Test Description

Query an existing contact via its handle:

```
whois -h whois-ua-test-rr-icann.knipp.de contact C10-T
```

Expected outcome:

- Email address is correctly returned: **success**

Result:

Registry Contact ID: C10-T

Contact Name: பரிட்சை

Contact Organization:

Contact Street: பரிட்சை

Contact City: பரிட்சை

Contact State/Province:

Contact Postal Code: பரிட்சை

Contact Country:

Contact Phone:

Contact Phone Ext:

Contact Fax:

Contact Fax Ext:

Contact Email: **example@xn--0zwm56d.xn--0zwm56d**

>>> Last update of Whois database: 2022-07-15T07:15:00.306Z <<<

4.2 Host

4.2.1 Detailed Test Description

Query an existing host via its domain name:

```
whois -h whois-ua-test-rr-icann.knipp.de host xn--kgbechtv.xn--1-omcp7b14hw8bba.xn--11b5bs3a9aj6g
```

Expected outcome:

- Host is found: **success**
- Host's U-label is correctly returned: **success**

Result:

```
Server Name: xn--kgbechtv.xn--1-omcp7b14hw8bba.xn--11b5bs3a9aj6g
```

```
Registrar: COREhub, S.R.L.
```

```
Registrar WHOIS Server: whois.corenic.net
```

```
Registrar URL: http://www.corenic.net
```

```
Internationalized Server Name: 1.परीक्षा.إختبار.ازمایشی
```

```
>>> Last update of Whois database: 2022-07-18T04:51:22.10Z <<<
```

4.3 Domain

4.3.1 Detailed Test Description

Query an existing domain via its domain name:

```
whois -h whois-ua-test-rr-icann.knipp.de xn--kst-jma.xn--zckzah
```

Expected outcome:

- Domain is found: **success**
- Domain's U-label is correctly returned: **success**
- Registrar email address is correctly returned: **success**
- Contact email addresses are correctly returned: **success**

Result:

Domain Name: xn--kst-jma.xn--zckzah

Internationalized Domain Name: k est. est

Registry Domain ID: Dmjag10-ICANN

Registrar WHOIS Server: whois.corenic.net

Registrar URL: http://www.corenic.net

Updated Date: 2022-07-14T11:43:01.93Z

Creation Date: 2022-07-14T11:21:18.260Z

Registrar Registration Expiration Date: 2023-07-14T11:21:18.260Z

Registrar: COREhub, S.R.L.

Registrar IANA ID: 15

Registrar Abuse Contact Email: example@xn--0zwm56d.xn--0zwm56d

Registrar Abuse Contact Phone: +34.343434

Reseller: CORE-1 (UA Test Client)

Domain Status: ok <https://icann.org/epp#ok>

Name Server:

DNSSEC: unsigned

IDN Tag: fr

URL of the ICANN WHOIS Data Problem Reporting System:

<http://wdprs.internic.net/>

>>> Last update of Whois database: 2022-07-18T04:55:22.306Z <<<

5 Testing the RDAP Interface - G3

The test cases within this section reflect the UA-readiness gate G3 as visualized in *Figure 2: Domain Registrar High-Level System Architecture* in the [main document](#). For these test cases a domain, a contact, and a host need to be created.

5.1 Contact

5.1.1 Detailed Test Description

Query an existing contact via its handle:

```
https://whois-ua-test-rr-icann.knipp.de/rdap/entity/C10-T
```

Expected outcome:

- Email address is correctly returned: **success**

Result:

```
{
  "rdapConformance": [
    "rdap_level_0", "icann_rdap_response_profile_0",
    "icann_rdap_technical_implementation_guide_0"
  ],
  "notices": [
    {
      "title": "Terms of Service",
      "description": [
        "cut"
      ],
      "links": [
        {
          "href": "https://whois-ua-test-rr-icann.knipp.de/rdap-tas"
        }
      ]
    }
  ],
  "remarks": [
    {
      "title": "REDACTED FOR PRIVACY",
      "description": [ "Some of the data in this object has been
removed" ],
      "type": "object redacted due to authorization"
    }
  ]
}
```

```

    }
  ],
  "objectClassName": "entity",
  "handle": "C10-T",
  "events": [
    {
      "eventAction": "last update of RDAP database",
      "eventDate": "2022-07-18T05:18:24.122Z"
    }, {
      "eventAction": "registration",
      "eventActor": "core",
      "eventDate": "2022-07-05T06:47:37.531Z"
    }, {
      "eventAction": "last changed",
      "eventActor": "core",
      "eventDate": "2022-07-05T08:14:07.951Z"
    }
  ],
  "links": [
    {
      "value": "https://whois-ua-test-rr-icann.knipp.de/rdap/entity/C10-T",
      "rel": "self",
      "href": "https://whois-ua-test-rr-icann.knipp.de/rdap/entity/C10-T",
      "type": "application/rdap+json"
    }
  ],
  "port43": "whois.corenic.net",
  "vcardArray": [
    "vcard", [
      [ "version", { }, "text", "4.0" ], [ "fn", { }, "text", "பரிட்சை" ],
      [ "adr", { }, "text", [ "", "", "பரிட்சை", "பரிட்சை", "", "பரிட்சை", ""
    ] ],
    [ "email", { }, "text", "example@xn--0zwm56d.xn--0zwm56d" ]
  ]
}

```

5.2 Host

5.2.1 Detailed Test Description

Query an existing host via its domain name in A-label and U-label notation:

```
https://whois-ua-test-rr-icann.knipp.de/rdap/nameserver/xn--kgbechtv.xn--1-omcp7b14hw8bba.xn--11b5bs3a9aj6g
```

```
https://whois-ua-test-rr-icann.knipp.de/rdap/nameserver/1.परीक्षा.إختبار.آزمایشی
```

Expected outcome:

- Host is found: **success**
- Host's A-label is correctly returned: **success**
- Host's U-label is correctly returned: **success**
- Both queries return the same data: **success**

Result:

```
{
  "rdapConformance": [
    "rdap_level_0", "icann_rdap_response_profile_0",
    "icann_rdap_technical_implementation_guide_0"
  ],
  "notices": [
    {
      "title": "Terms of Service",
      "description": [
        "cut"
      ],
      "links": [
        {
          "href": "https://whois-ua-test-rr-icann.knipp.de/rdap-tas"
        }
      ]
    }
  ],
  "objectClassName": "nameserver",
  "handle": "Hbsiw12-ICANN",
  "events": [
    {
      "eventAction": "last update of RDAP database",
      "eventDate": "2022-07-18T05:30:25.25Z"
    }, {
```

```
    "eventAction": "registration",
    "eventActor": "core",
    "eventDate": "2022-07-08T08:55:22.524Z"
  }
],
"links": [
  {
    "value": "https://whois-ua-test-rr-icann.knipp.de/rdap/nameserver/xn--kgbechtv.xn--1-omcp7b14hw8bba.xn--11b5bs3a9aj6g",
    "rel": "self",
    "href": "https://whois-ua-test-rr-icann.knipp.de/rdap/nameserver/xn--kgbechtv.xn--1-omcp7b14hw8bba.xn--11b5bs3a9aj6g",
    "type": "application/rdap+json"
  }
],
"ldhName": "xn--kgbechtv.xn--1-omcp7b14hw8bba.xn--11b5bs3a9aj6g",
"unicodeName": "1.परीक्षा.آزمایشی",
"port43": "whois.corenic.net"
}
```


5.3 Domain

5.3.1 Detailed Test Description

Query an existing domain via its domain name in A-label and U-label notation:

```
https://whois-ua-test-rr-icann.knipp.de/rdap/domain/xn--kst-jma.xn--zckzah
```

```
https://whois-ua-test-rr-icann.knipp.de/rdap/domain/köst.テスト
```

Expected outcome:

- Domain is found: **success**
- Domain's A-label is correctly returned: **success**
- Domain's U-label is correctly returned: **success**
- Both queries return the same data: **success**
- Registrar email address is correctly returned: **success**
- Contact email address is correctly returned: **success**

Result:

```
{
  "rdapConformance": [
    "rdap_level_0", "icann_rdap_response_profile_0",
    "icann_rdap_technical_implementation_guide_0"
  ],
  "notices": [
    {
      "title": "Status Codes",
      "description": [
        "For more information on domain status codes, please visit
https://icann.org/epp"
      ],
      "links": [
        {
          "href": "https://icann.org/epp"
        }
      ]
    }, {
      "title": "RDDS Inaccuracy Complaint Form",
      "description": [ "URL of the ICANN RDDS Inaccuracy Complaint
Form: https://icann.org/wicf" ],

```

```

    "links": [
      {
        "href": "https://icann.org/wicf"
      }
    ]
  }, {
    "title": "Terms of Service",
    "description": [
      "cut"
    ],
    "links": [
      {
        "href": "https://whois-ua-test-rr-icann.knipp.de/rdap-tas"
      }
    ]
  }
],
"objectClassName": "domain",
"handle": "Dmjag10-ICANN",
"status": [ "active" ],
"events": [
  {
    "eventAction": "last update of RDAP database",
    "eventDate": "2022-07-18T05:38:25.717Z"
  }, {
    "eventAction": "registration",
    "eventActor": "core",
    "eventDate": "2022-07-14T11:21:18.260Z"
  }, {
    "eventAction": "last changed",
    "eventActor": "core",
    "eventDate": "2022-07-14T11:43:01.93Z"
  }, {
    "eventAction": "expiration",
    "eventDate": "2023-07-14T11:21:18.260Z"
  }
],
"links": [
  {
    "value": "https://whois-ua-test-rr-icann.knipp.de/rdap/domain/xn--kst-jma.xn--zckzah",
    "rel": "self",
    "href": "https://whois-ua-test-rr-icann.knipp.de/rdap/domain/xn--kst-jma.xn--zckzah",
    "type": "application/rdap+json"
  }
]

```

```

    }
  ],
  "ldhName": "xn--kst-jma.xn--zckzah",
  "unicodeName": "këst.テスト",
  "variants": [
    {
      "relation": [ "registered" ],
      "variantNames": [
        {
          "ldhName": "kest.xn--zckzah",
          "unicodeName": "kest.テスト"
        }, {
          "ldhName": "xn--kst-bma.xn--zckzah",
          "unicodeName": "kést.テスト"
        }
      ]
    },
    {
      "idnTable": "fr"
    }
  ],
  "entities": [
    {
      "objectClassName": "entity",
      "handle": "REG-CEUOBXDWZJF2",
      "links": [
        {
          "value": "https://whois-ua-test-rr-icann.knipp.de/rdap/entity/REG-CEUOBXDWZJF2",
          "rel": "self",
          "href": "https://whois-ua-test-rr-icann.knipp.de/rdap/entity/REG-CEUOBXDWZJF2",
          "type": "application/rdap+json"
        }
      ]
    },
    {
      "roles": [ "registrant" ]
    },
    {
      "objectClassName": "entity",
      "handle": "REG-CEUOBXDWZJF2",
      "links": [
        {
          "value": "https://whois-ua-test-rr-icann.knipp.de/rdap/entity/REG-CEUOBXDWZJF2",
          "rel": "self",
          "href": "https://whois-ua-test-rr-icann.knipp.de/rdap/entity/REG-CEUOBXDWZJF2",

```

```

        "type": "application/rdap+json"
    }
],
"roles": [ "technical", "billing", "administrative" ]
}, {
    "objectClassName": "entity",
    "handle": "15",
    "publicIds": [
        {
            "type": "IANA Registrar ID",
            "identifier": "15"
        }
    ],
    "roles": [ "registrar" ],
    "entities": [
        {
            "objectClassName": "entity",
            "handle": "not applicable",
            "roles": [ "abuse" ],
            "vcardArray": [
                "vcard", [
                    [ "version", { }, "text", "4.0" ], [ "fn", { }, "text",
"Abuse Contact" ],
                    [ "adr", { }, "text", [ "", "", "", "", "", "", "" ] ], [
"tel", {
                        "type": "voice"
                    }, "URI", "tel:+34.343434"
                ], [ "email", { }, "text", "example@xn--0zwm56d.xn--
0zwm56d" ]
                ]
            ]
        }, {
            "objectClassName": "entity",
            "roles": [ "administrative" ],
            "vcardArray": [
                "vcard", [
                    [ "version", { }, "text", "4.0" ], [ "fn", { }, "text",
"COREhub, S.R.L." ],
                    [ "adr", { }, "text", [ "", "", "", "", "", "", "" ] ], [
"tel", {
                        "type": "voice"
                    }, "URI", "tel:+34.343434"
                ]
            ]
        }
    ]
}
]

```

```

    }, {
      "objectClassName": "entity",
      "roles": [ "technical" ],
      "vcardArray": [
        "vcard", [
          [ "version", { }, "text", "4.0" ], [ "fn", { }, "text",
"COREhub, S.R.L." ],
          [ "adr", { }, "text", [ "", "", "", "", "", "", "" ] ], [
            "tel", {
              "type": "voice"
            }, "URI", "tel:+34.343434"
          ]
        ]
      ]
    }, {
      "vcardArray": [
        "vcard", [
          [ "version", { }, "text", "4.0" ], [ "fn", { }, "text",
"COREhub, S.R.L." ],
          [ "adr", { }, "text", [ "", "", "", "", "", "", "" ] ]
        ]
      ]
    }, {
      "objectClassName": "entity",
      "handle": "CORE-1",
      "roles": [ "reseller" ],
      "vcardArray": [
        "vcard", [ [ "version", { }, "text", "4.0" ], [ "fn", { },
"text", "UA Test Client" ] ]
      ]
    }
  ],
  "secureDNS": {
    "delegationSigned": false
  },
  "port43": "whois.corenic.net",
  "lang": "fr"
}

```

6 Testing the Escrow Export - G10

The test case within this section reflects the UA-readiness gate G10 as visualized in *Figure 2: Domain Registrar High-Level System Architecture* in the [main document](#). For this test case domains, contacts and hosts must have been created before the Escrow's reference date.

6.1 Escrow

6.1.1 Detailed Test Description

After the respective objects have been created, the Escrow export needs to be triggered. The generated escrow file needs to contain all objects with their correct names.

Expected outcome:

- Domain (A-label) is contained: **success**
- Host (A-label) is contained: **success**
- Contact is contained with correct email address: **success**

Result:

Note that the Escrow generated by the GatewayNG is using the CSV format. It consists of two files. The first file contains the domain data, the second file contains details of the referenced handle. The content has been redacted to only show the tested objects.

Domain Escrow

```
domain-name,name-servers,expiration-date,rt-handle,ac-handle,tc-handle,bc-handle  
xn--kst-jma.xn--zckzah,ns1.mylabel.xn--hlcj6aya9esc7a ns1.xn--0zwm56d.xn--hlcj6aya9esc7a  
ns2.mylabel.xn--hlcj6aya9esc7a,2023-07-14T11:21:18.260Z,R10-C10-T,R10-C10-T,R10-C10-  
T,R10-C10-T
```

Referenced Handles

```
handle,name,organization,street1,street2,street3,city,state,postal-code,country,voice,voice-  
ext,fax,fax-ext,email
```

```
R10-C10-T,பரிட்சை,பரிட்சை,பரிட்சை,,,பரிட்சை,பரிட்சை,பரிட்சை,AX,,,,,example@xn-  
-0zwm56d.xn--0zwm56d
```

7 Testing Sending of Emails - G6

The test case within this section reflects the UA-readiness gate G6 as visualized in *Figure 2: Domain Registrar High-Level System Architecture* in the [main document](#). For this test case a contact and a domain need to exist.

7.1 Whois Accuracy Program

7.1.1 Detailed Test Description

The contact to be used should have a not yet validated email address for which mails can be received: michael@xn--igbi7fn.xn--mgbab2bd. Assign the contact to an existing domain as registrant contact. The registrar system should then validate the contact's email address according to the Whois Accuracy Program (WAP) as mandated by ICANN by sending a confirmation email to the address.

Expected outcome:

- The email is received: **success**
- The domain name of the connected domain is displayed correctly: **success**

Result:

Email with subject “[ACTION REQUIRED] E-mail address validation for 1 domain: **këst.テスト**” was received at michael@xn--igbi7fn.xn--mgbab2bd.

Adjust the test to use a contact with Unicode at the local part of the email address, i.e., grün@knipp.de.

Expected outcome:

- The email is received: **success**
- The domain name of the connected domain is displayed correctly: **success**

Result:

Email with subject “[ACTION REQUIRED] E-mail address validation for 1 domain: **këst.テスト**” was received at mailbox for **grün@knipp.de**.

7.2 Transfer Notifications

7.2.1 Summary

Testing the transfer notification email revealed that the email's subject did not have the correct encoding. It used ASCII instead of UTF-8, causing the subject not to be displayed correctly. Starting with Release 1.60 of the GatewayNG the encoding has been fixed and the domain name is displayed correctly in the email's subject.

7.2.2 Detailed Test Description

Initiate a transfer of an existing domain. Once the transfer is completed a confirmation e-mail is sent to the registrant contact.

Expected outcome:

- The e-mail is received: **success**
- The domain is displayed correctly:
 - Subject: **fail**
 - Body: **success**

Result:

Subject line: "incoming domain transfer notification: **r?st.???**"

Body (redacted): "the transfer of the domain '**rés.t.テスト**' (requested by you) is finished."

Bibliography

[GWContactCreate]	https://ua-test-rr-icann.knipp.de/api/docs/mp/section-2.1.html
[GWContactInquire]	https://ua-test-rr-icann.knipp.de/api/docs/mp/section-2.13.html
[GWContactModify]	https://ua-test-rr-icann.knipp.de/api/docs/mp/section-2.23.html
[GWDomainCheck]	https://ua-test-rr-icann.knipp.de/api/docs/mp/section-2.17.html
[GWDomainCreate]	https://ua-test-rr-icann.knipp.de/api/docs/mp/section-2.4.html
[GWDomainInquire]	https://ua-test-rr-icann.knipp.de/api/docs/mp/section-2.18.html
[GWDomainModify]	https://ua-test-rr-icann.knipp.de/api/docs/mp/section-2.25.html
[GWDomainTransfer]	https://ua-test-rr-icann.knipp.de/api/docs/mp/section-2.27.html
[GWHostCreate]	https://ua-test-rr-icann.knipp.de/api/docs/mp/section-2.3.html
[GWHostInquire]	https://ua-test-rr-icann.knipp.de/api/docs/mp/section-2.15.html
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[vue]	https://vuejs.org/
[vuelidate]	https://vuelidate.js.org/