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Domain Related Group Support for EPP
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Abstract

This document defines an EPP extension allowing clients to learn about and manipulate related groups of domains, ie. groups of domains whose names are equivalent in a registry-defined way and are tied to a single registrant.

Discussion Venues

This note is to be removed before publishing as an RFC.

Discussion of this document takes place on the Registration Protocols Extensions Working Group mailing list (regext@ietf.org), which is archived at https://mailarchive.ietf.org/arch/browse/regext/.

Source for this draft and an issue tracker can be found at https://github.com/arnt/regext-epp-variants.

Status of This Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

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Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress."

This Internet-Draft will expire on 8 May 2026.

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1. Introduction

EPP is defined in [RFC5730]. EPP commands were developed to operate on a single object at a time. This document defines an EPP extension allowing clients to learn about and manipulate related groups of objects that have a characteristic that makes them equivalent.

Similar to EPP, the principal motivation for this extension was to provide a standard Internet domain name registration extension for use between domain name registrars and domain name registries. This protocol provides a means of interaction between a registrar's applications and registry applications. It is expected that this protocol will have additional uses beyond domain name registration.

As an example, the problem being considered is that spelling is not necessarily uniform. For example, an 竪 and an e may be regarded as equivalent in some languages, and as different in others.

Some registries plan to support this explicitly, with groups of domains that can only be registered by the same registrant. Having the same registrant is most commonly considered essential for equivalence, since if the domains are intended to be equivalent then the responsibility of maintaining that equivalence must be present. This is a specific example of the more general "Same Entity Principle", which in this specification is defined to mean that a related group MUST be created, managed, and deleted by the same entity. From a registry perspective the same entity would be a registrar; from the registrar's perspective the same entity would be the registrant.

This document does define what makes the domains in a related group equivalent. A registry policy MUST exist that specifies both that a registry supports related groups and that defines what domains are eligible to be a member of a related group. This policy MUST be agreed between a registry and a registrar. The policy and the establishment of the agreement is outside the scope of this specification.

A common policy expression among domain registries and registrars is to define a related group in terms of the script or language in use for an Internalized Domain Name (IDN). IDN variants can arise when different characters or sequences of characters in an IDN are considered equivalent in a particular language or script. Standard Label Generation Rules (LGRs) are used to specify the IDN table that establishes the variant relationships. This common policy expression is presumed and used as an example in this specification.

With this extension, registering a domain creates a related group and the first domain registered in the group becomes the group's Primary Domain. The creation of the Primary Domain MAY establish rules or guidelines regarding the domains that are eligible to be a member of the group, e.g., an LGR, an IDN table, and a Primary Domain taken together will define a variant group.

Subsequent domains in the same group can only be registered by the same registrar, which asserts that it is acting on behalf of the same registrant. Each domain in a related group may be the target of any EPP command, with the following restrictions.

* A <transfer> of any domain in any related group always acts on the entire group. This is required to ensure that the related group is always registered by the same registrant and managed via the same registrar. Registry policy MAY impose additional restrictions.

* The <delete> of a Primary Domain in any variant group always acts on the entire group. This is required to support the option where the Primary Domain establishes the rules or guidelines for the creation of other domains in the group.

This extension is backwards compatible with registrars that do not support related groups. Specifically, this extension supports registries that do support related groups interacting with registrars that do not support related groups. Registrars that do not support related group that attempt to act on a member of a related group inappropriately will receive a compatible error response with which they can continue to function. The compatible error response may not provide sufficient detail to fully understand the rejection but will be sufficient to ensure continuation of normal operations.

The remainder of this document describes the specific details.

TODO: login exchange of variant-aware

TODO: discussion of reference to EPP Extensibility and Extension Analysis https://docs.google.com/document/d/1WR00oB43XZCDqD0zvRvRajuWAq_9wQ3c0RrFKlGC3So/edit?tab=t.0

2. Requirements Language

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in BCP 14 [RFC2119] [RFC8174] when, and only when, they appear in all capitals, as shown here.

3. Terms

Allocated Member: A domain that has been created in the registry, and which is related to an existing Primary Domain.

Allocatable Member: A domain that has not been allocated but is allocatable (e.g., according to a LGR in the case of an IDN variant), and which is conceptually related to an existing Primary Domain.

Activated Member: An Allocated Member domain that is in the DNS.

Blocked domain: A domain that cannot be allocated due to its status value in relation to the Primary Domain name.

Exempted domain: A preexisting domain that exists as a stand-alone domain prior to the introduction of support for related groups and would be part of a related group if it were allocated now. Exempted domains may exist with any registrant at any registrar. The exemption ends in one of two ways.

* When there is at most 1 allocated domain remaining at which time the registry MUST block all other labels of the related group until the registrar asserts knowledge of the related group.

* When the registrar asserts knowledge of the related group and, if present brings all labels in the related group together.

IDN Table: The combined information about what characters (code points) are available for domain registration as well as the variant relationships between those code points. IDN tables can be defined via RFC3743 or RFC4290 or LGRs (RFC7940). The latter one SHOULD be used as it also allows the formal definition of context rules, which is lacking in the former ones.

Label Generation Rules (LGR): The preferred way of defining IDN tables. Among others, they define the variant relationships as well as their disposition values (blocked or allocatable). The formal definition of LGRs can be fond in RFC7940. Status Value is the generic term in this specification to which the IDN disposition value would be assigned.

Primary Domain: The chronologically first domain in a related group. While the related group relationship is symmetric, the status value of its members is not. It can either be blocked or allocatable. The Primary Domain name therefore partitions the related group into allocatable members and blocked members. In the case of a related group of TLDs, there can be a primary domain per TLD.

Related Domain: A domain in a related group which is not a Primary Domain.

Related Group: An implicit set of domains defined by a policy set by a registry. The related domain relationship is symmetric and transitive. Hence, an arbitrary element of a related group defines the whole group. The group is not expressed explicitly in EPP, because it can be impractically large. At the time of writing, an IDN domain is registered whose variant set would contain 10孫竅オ variants.

Same Entity Principle: A requirement that all domains within a related group either belong to the same entity (i.e., the same registrant via the same registrar) or are withheld for that entity. No other entity is allowed to activate any domain within the same related group.

Status Value: While a related group relationship is symmetric, a group member has exactly one of two status values which are not necessarily symmetric. A member can be "allocatable" (i.e., available for the same entity) or "blocked" (i.e., not available for anybody).

4. Architectural Principles

There are three principles REQUIRED to be true at all times when this extension is in use. There MUST NOT be any exceptions at any time.

4.1. Backwards Compatibility

Support for Related Groups is optional and therefore it is REQUIRED that a registry supporting Related Groups MUST be backwards compatible with a registrar that does not support Related Groups. Backwards compatibility is defined to mean that a registrar will receive a response that is fail-safe but the registrar may not be able to fully understand the reason for the rejection.

A registry that does not support related groups will behave normally when interacting with a registrar that supports related groups.

4.2. Same-Entity Management

Domains defined to be eligible to be in a related group MUST be managed by the same entity. This has three requirements.

1. Registrars MUST ensure that domains in a related group are managed by the same registrant.

2. Registries MUST ensure that domains in a related group are managed by the same registrar.

3. A registry that is a member of a related group MUST manage all registries in the group.

4.3. Related Groups as a Set

Most EPP commands may be executed independently on any member of the related group. However, commands that change the membership or status of members in a related group, or change the Same-Entity Management requirement, MUST operate on the related group as a set.

As explained in detail in later sections, there are currently two commands with explicit requirements as of the time of publication of this document.

5. Technical Principles

The following technical principles have guided the developed of this extension and established operational requirements.

* The members of a related group are defined by registry policy and that policy must be agreed by both the registry and the registrar. The establishment of this policy and the method by which the parties agree is outside the scope of this specification.

  The first iteration of this work focused on IDN variants, which have the advantage that there is a relatively formal process for defining the eligible elements of a group. However, Latin characters with diacritic marks are not always considered variants of Latin characters without diacritic marks and there are circumstances when it is desirable for them to be considerated equivalent. As a result this extension presumes the existence of a group and sets outside its scope the actual definition of the group.

* The registry policy MUST define the properties of a Related Group, which MUST include at least the following properties.

  - If the related group exists in a registry that itself is a member of a related group, then all related groups in any registry in the registry's related group MUST have the same members in all registries in the registry related group.

    This principle derives directly from the Same-Entity requirement.

In the case of IDNs, the LGR tables may be different in each registry but the tables MUST be harmonized.

- The first domain created in a related group is designated the Primary Domain.

  If the registry of the related group is itself a member of a related group, the Primary Domain in a related group MAY be different in each registry.

- The Primary Domain has at least two REQUIRED functions. First, it defines the members of the Related Group. Second, it defines the status values of the members of the Related Group.

* EPP today implicitly defines two status values for any domain: registered and available. This related group extensions adds the following status values.

  The Allocated status means that the member of the group is active in the registry. It may or may not be delegated in the DNS.

  The Allocatable status means that the member of the group is available to be allocated by the same-entity.

  The Blocked status means that the member of the group is not available to be allocated by anyone.

* The creation of a Primary Domain establishes the implicit existence of all members of the Related Group. If the registry of the related group is itself a member of a related group, the related group is implicitly created in all registries in the related group of the registry.

6. EPP Commands

In this section, the behavior of each EPP command when Related Groups are supported is specified.

6.1. EPP <check> command

The <check> command always acts on the target domain in the command. There is no change on the client side when using the <check> command.

When the server receives a <check> command from a group-agnostic client and the target domain is or could be a member of a related group, if that related group has at least one Allocated or Exempted member, the server’s response:

* MUST NOT include the <extension> element.

* MUST indicate ’availabe = "false"’.

* MAY indicate a reason of "Unavailable (except as member of group)".

What the server receive a <check> command from a group-aware client and the target domain is or could be a member of a related group, if that related group has at least one Allocated or Exempted member, the server’s response MUST contain an <extension> element with the following child elements:

* A <var:primary> element matching the Primary Domain for the related group.

* A <var:status> element, which explains in more detail the availability status of the queried domain.

The EPP <check> command may return six new results:

* AllocatableVariant: A variant of the domain is already active. Provisioning of this domain must be to the same registrant via the same registrar.

* NotSameEntity: The domain cannot be provisioned because it is a variant of a Primary Domain, and the Primary Domain belongs to a different client

* Blocked: The domain cannot be provisioned because its disposition value is blocked.

* Exempted: The domain cannot be provisioned because it is a variant of at least one exempted domain.

* PendingTransfer: The domain cannot be provisioned because it is a variant in a group that is currently being transferred to a different registrar.

* Custom: Additional custom value that may be used for server peculiarities.

6.2. EPP <info> command

The <info> command always acts on the target domain in the command. There is no change on the client side when using the <info> command.

The main part of the response MUST contain the actual data of the target domain name (contacts, hosts, status values, etc.).

When the server receives an <info> command from a group-agnostic client the response MUST contain the actual data of the domain, independent of whether it is a member of a related group. In addition, if the group-agnostic registrar is inquiring about a domain with a status of Allocatable, the response SHOULD be the same as if the client were inquiring about a reserved name.

When the server receives an <info> command from a group-aware client and the target domain is or could be a member of a related group, if that related group has at least one Allocated or Exempted member, the server's response MUST contain an <extension> element with the following child elements:

* A <var:primary> element matching the Primary Domain for the related group of the target domain, which MAY match the target domain.

* A list of all the Allocated and Exempted members of the related group.

If the registry of the target domain is itself a member of a related group and the target domain is or could be a member of a related group in any registry in that registry's related group, if any one of those target domain related groups has at least one Allocated or Exempted member, the server's response MUST contain an <extension> element with the following child elements:

* A <var:primary> element matching the Primary Domain for the related group of the target domain, which MAY match the target domain.

* A list of all the related groups of the target domain with Allocated or Exempted members such that each related group list has its Primary Domain listed first.

6.3. EPP <transfer> command

The <transfer> command always acts on the target domain in the command. The use of the <transfer> command is extended if both the server and the client support related groups.

When the server receives a <transfer> command from a group-agnostic client and the target domain is or could be a member of a related group, if that related group has at least one Allocated or Exempted member the transfer request MUST be denied using 2305 "Object status prohibits operation".

When the server receives a <transfer> command from a group-aware client and the target domain is or could be a member of a related group, the request must include an <extension> element with a <var:primary> element matching the Primary Domain, including if the Primary Domain is the target domain. If the extension is not present the transfer request MUST be denied using ’2003 "Required parameter missing"’. Note that the <check> or <info> command MAY be used to identify the Primary Domain.

A valid transfer request MUST apply to all members of a related group. If the registry of the target domain is itself a member of a related group, then the transfer request MUST apply to all related groups in all registries of the registry’s related group.

The server’s response to the transfer request MUST contain an <extension> element with the following child elements;

* A <var:primary> element matching the Primary Domain for the related group of the target domain, which MAY match the target domain.

* A list of all the Allocated and Exempted members of the related group.

If the registry of the target domain is itself a member of a related group and the target domain is or could be a member of a related group in any registry in that registry’s related group, if any one of those target domain related groups has at least one Allocated or Exempted member, the server’s response MUST contain an <extension> element with the following child elements:

* A <var:primary> element matching the Primary Domain for the related group of the target domain, which MAY match the target domain.

* A list of all the related groups of the target domain with Allocated or Exempted members such that each related group list has its Primary Domain listed first.

TODO: It must be ensured that the poll message to the losing registrar also contains the full list of domains that will be transferred together with the primary domain.

6.4. EPP <create> command

The EPP <create> command's standard task is to provision a new domain. When related groups are supported, the <create> command MUST be used to create the Primary Domain and MUST NOT be used to provision any other member of the Primary Domain's related group. The task of converting an allocatable domain into an allocated domain MUST be performed using the <update> command.

When the server receives a <create> command from a group-agnostic client and the target domain is or could be a member of a related group, one of the following actions MUST be completed as appropriate.

* If any member of the related group is currently Allocated or Exempted, the command MUST be rejected and the response should be the same as if the domain to be created is reserved.

* If there are no members of the related group either Allocated or Exempted, the <create> MUST proceed according to the standard with the server implicitly reserving all other members of the related group such that they MUST NOT be allocated until such time as the client is group-aware and the client MUST indicate that the target domain is to be extended to be a Primary Domain as described in the <update> command.

When the server receives a <create> command from a group-aware client and the target domain is or could be a member of a related group, the command MUST include an <extension> element with the <var:primary> child element that must match the target domain. If not, the command MUST be rejected using '2003 "Required parameter missing"'.

Upon receiving a <create> command from a group-aware client with a valid <extension> element, one of the following actions MUST be completed as appropriate.

* If the target domain does not exist and any other member of the related group is Allocated or Exempted, the command MUST be rejected and indicate that it is an inappropriate use of the command.

* If the target domain does not exist and no other member of the related group is Allocated or Exempted, the <create> command MUST proceed according to the standard with the server implicitly noting to itself the existence of all other members of the related group and setting their status value as prescribed by registry policy. The response MUST include the <extension> element with the <var:primary> child element indicating the Primary Domain, which must match the target domain.

* If the target domain does exist, the <create> command MUST be rejected according to the standard. The response MUST include the <extension> element with the <var:primary> child element indicating the Primary Domain, which must match the target domain.

The EPP <create> command may have five new errors, as described in the <check> section above.

TODO: check alignment of the new error codes

6.5. EPP <update> command

The EPP <update>gt; command provides a transform operation that allows a client to change the state of a related domain object. It is extended to cover three new tasks:

* Activating an allocatable related domain in an existing related group.

* Deactivating an activated related domain name in an existing related group.

* Converting an Allocated or Exempted Domain into a Primary Domain and optionally converting other Exempted Domains that are eligible to be in the related group of the stated Primary Domain to be activated domains of the related group.

This extended <update> command is not valid for use by a group-agnostic client. Any use by a group-agnostic client MUST be rejected and indicate it is an inappropriate use of the command.

A group-agnostic client MUST only use the standard-defined <update> command and the server MUST only respond as defined by the standard.

The rest of this section specifies behavior when group-aware servers and group-aware clients are interacting and describes the three new tasks.

When the target domain of the update command is any member of the related group, including the Primary Domain of the related group, the client MUST include an <extension> element that MUST include at least the <var:primary> child element indicating the Primary Domain of the corresponding related group. The extension MAY include additional elements as indicated below to provision a new task. If the extension is not present the command MUST be rejected and indicate that a required parameter is missing.

If the Primary Domain and the target domain match, all other elements in the extension MUST be ignored and the update command MUST be processed as a standard defined update command acting on the Primary Domain.

The rest of this section specifies behavior when the target domain and the Primary Domain indicated in the extension do not match.

If the <var:status> child element is present in the extension, one of the following actions MUST be completed as appropriate.

* In order to Activate an Allocatable domain, the target domain MUST have a status of Allocatable and the extension MUST include the <var:status> child element with a value of "allocated". The server MUST update the status of the target domain and the response MUST include the extension element with both the Primary Domain indicated and the revised status indicated.

* In order to deactivate an Allocated domain, the target domain MUST have a status of Allocated and the extension MUST include the <var:status> child element with a value of "allocatable". The server MUST update the status of the target domain and the response MUST include the extension element with both the Primary Domain indicated and the revised status indicated.

* In all other cases, if the status element is present the command MUST be rejected and indicate an invalid parameter is present.

If the <var:status> child element is not present in the extension, then all elements other than the Primary Domain indication MUST be ignored and the update command MUST be processed as a standard defined update command acting on the target domain.

Note that depending on registry policy, the related domain may share attributes with the Primary Domain, e.g., nameservers. A registry policy MAY specify rules or guidelines for the set of elements required or permitted for a related domain according to the Primary Domain.

The EPP domain mapping from RFC3915 describes the elements that have to be specified within an <update>gt; command. The requirement to provide at least one <domain:add>gt;, <domain:rem>gt;, or <domain:chg>gt; element is updated by this extension such that at least one empty <domain:add>gt;, <domain:rem>gt;, or <domain:chg>gt; element MUST be present if this extension is specified within an <update>gt; command. This requirement is updated to disallow the possibility of modifying a domain object as part of the deactivation.

If a client wishes to convert an Exempted domain into the Primary Domain of a related group, the update command from the client MUST be provided as follows.

* The target domain of the update command and the Primary Domain in the extension MUST match.

* The target domain MUST have the status of Exempted.

* If there exists multiple Exempted domains that would ordinarily be members of the related group, they MUST all have the same Registrar of Record and it MUST match the update requesting registrar, and the extension MUST include a list of all Exempted domains, including the Primary Domain, that MUST match the list maintained by the registry.

If the update command is valid as indicated above, the server MUST change the status of the indicated domains from Exempted to Allocated, and MUST indicate the Primary Domain. The response MUST include an extension indicating the Primary Domain and the list of domains whose status changed from Exempte to Allocated.

If a previously group-agnostic client becomes group-aware and wishes to convert a registered domain to be a Primary Domain of related group, the update command from the client MUST be provided as follows.

* The target domain of the update command and the Primary Domain in the extension MUST match.

* The target domain MUST have the status of registered and MUST have the same Registrar of Record as the update requesting registrar.

If the update command is valid as indicated above, the server MUST change the status of the indicated domains to Allocated, and MUST indicate it as the Primary Domain. The response MUST include an extension indicating the Primary Domain.

6.6. EPP <delete> command

The <delete> command is extended to REQUIRE the deletion of all members of a related group if the Primary Domain is deleted.

This extended <delete> command is not valid for use by a group-agnostic client. Any use by a group-agnostic client MUST be rejected and indicate it is an inappropriate use of the command.

A group-agnostic client MUST only use the standard-defined <update> command and the server MUST only respond as defined by the standard.

The rest of this section specifies behavior when group-aware servers and group-aware clients are interacting.

A group-aware client MUST NOT use the <delete> command to delete any member of a related group except the Primary Domain. Any other use MUST be rejected and indicate it is an inappropriate use of the command. Note that <update> command is used for this purpose.

When the server receives a <delete> command from a group-aware client, the command MUST include the <extension> element which MUST include the <var:primary> child element which MUST match the target domain name.

The delete command is extended such that all Allocated members of the related group defined by the Primary Domain MUST all be deleted at once. If it is not possible for any member of the related group to be deleted for any reason, the delete command MUST fail leaving all members of the related group intact.

If the delete command is successful, the response MUST include the extension element which MUST include both an indication of the Primary Domain and the list of all members of the related group that were deleted, including the Primary Domain.

6.7. EPP renew command

The EPP renew command is not extended.

The server MAY reject renewals while a related group is being transferred.

6.8. EPP <transfer> query command

The EPP <transfer> query command is not extended.

Note that because related groups are transferred as a group, the result of the a <transfer> query command is necessarily the same for all domains in a group. Therefore, the result of a <transfer> query command for any domain in a related group applies to all domains in the group.

7. Result codes

The following additional result codes are defined:

23x1: Change impossible because of a transfer in progress.

23x2: Change impossible because something is not a variant.

This error code is used when a change presupposes that two domains belong to the same variant group, but the EPP server’s implementation disagrees.

23x3: Change impossible due to invalid primary domain

This error code is used when the primary domain specified in the command is not registered, or is not registered via this registrar.

23x4: Change impossible due to unspecified primary domain

This error code is used when a command needs to specify a primary domain, and does not.

23x5: Specified domain is exempted

This error code is used when a domain specifies a primary domain, and the change is impossible because the specified domain is exempted instead.

23x6: Specified domain is allocatable, but not by you.

This result code is used when a domain is a member of a variant set, and the command did not refer to the primary domain.

8. Acknowledgements

The design of this extension is almost completely based on work done by and decisions made by the [EPDP] committee, which was reviewed by a small technical design team chaired by James Galvin. Members of this team included Dennis Tan, Rick Wilhelm, Edmon Chung, and Jennifer Chung. This text (in RFC format) was initially written by Arnt Gulbrandsen based on a conference presentation by James Galvin.

YOU YES YOU (<- insert name) have reviewed it and provided helpful comments or contributed in other ways.

9. Security Considerations

If two domains are different according to the DNS rules and identical in the eyes of the intended audience, then the audience may be confused. Confusion can always have security-related effects.

This extension expresses the relationships between variants clearly, making it a little more difficult for a would-be impersonator to register a variant of another registrant’s existing domain.

10. IANA Considerations

11. References

11.1. Normative References

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11.2. Informative References

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[EPDP] ICANN, "Phase 2 Initial Report of the EPDP on Internationalized Domain Names", 2024, <https://www.icann.org/en/public-comment/proceeding/phase-2-initial-report-of-the-epdp-on-internationalized-domain-names-11-04-2024>.

Appendix A. Open issues

Open issue: Assign numbers to the error codes, properly.

Open issue: Not clear that there are any security considerations here 窶the relationships between the domains may have some, but those exist outside EPP, EPP merely describes them. In Italian, caffe and caff竪 are variants of the same thing, it’s not clear that linking them in a protocol affects security in any way.

Open issue: Check how to insert a DS record in a variant domain.

Open issue: Can a unicode upgrade cause domains to become exempted? Yes, I think, and the terminology covers it, but as of now, it's difficult for the EPP client to understand the situation. Extending the <info> command would help here, perhaps.

Open issue: <Delete> now cascades and deletes many domains. Should it instead turn any variant domains into exempted domains?

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