

Domain Connect 2.0

Version 2.0 Revision 22 4/13/17 DRAFT

Your use of this document and the contents therein is subject to the following license terms.

The MIT License (MIT)

Copyright (c) 2016 GoDaddy Operating Company, LLC.

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Contents

1	<u>INTRODUCTION AND BACKGROUND</u>	<u>4</u>
1.1	TERMINOLOGY	4
1.2	PROBLEM STATEMENT	4
1.3	GOALS	5
1.4	TEMPLATES	5
1.5	SUMMARY	6
2	<u>PROTOCOL OVERVIEW</u>	<u>6</u>
2.1	THE SYNCHRONOUS FLOW	6
2.2	THE ASYNCHRONOUS FLOW	9
2.3	THE API	9
2.4	FLOWS INITIATED AT THE DNS PROVIDER	9
3	<u>DNS PROVIDER DISCOVERY</u>	<u>11</u>
4	<u>DOMAIN CONNECT ENDPOINTS</u>	<u>12</u>
4.1	SYNCHRONOUS FLOW: TEMPLATE	13
4.2	SYNCHRONOUS FLOW: INITIATION	13
4.3	ASYNCHRONOUS FLOW: OAUTH	14
4.4	OAUTH FLOW: SETUP	14
4.5	OAUTH FLOW: REQUESTING OAUTH TOKENS	15
4.6	OAUTH FLOW: GETTING AN AUTHORIZATION CODE	15
4.7	OAUTH FLOW: REQUESTING AN ACCESS TOKEN	15
4.8	OAUTH FLOW: MAKING REQUESTS WITH ACCESS TOKENS	16
4.9	OAUTH FLOW: APPLY TEMPLATE TO DOMAIN	16
4.10	REVERT TEMPLATE	18
4.11	OAUTH FLOW: REVOKING ACCESS	18
5	<u>DOMAIN CONNECT OBJECTS AND TEMPLATES</u>	<u>19</u>
5.1	TEMPLATE VERSIONING	19
5.2	TEMPLATE DEFINITION	19
5.3	TEMPLATE RECORD	20
6	<u>EXAMPLE TEMPLATE JSON FORMAT</u>	<u>23</u>
7	<u>OPERATIONAL AND IMPLEMENTATION CONSIDERATIONS</u>	<u>24</u>

1 Introduction and Background

GoDaddy has recently implemented a feature called Domain Connect that simplifies the interaction between Service Providers and GoDaddy (the DNS Provider).

Based on learnings, this document describes Domain Connect 2.0. This document is shared with the intent of it becoming an open standard that can be utilized by multiple DNS Providers and Service Providers to simplify this interaction across the internet.

1.1 Terminology

Service Providers refers to entities that provide products and services attached to domain names. Examples include web hosting providers (such as Wix or SquareSpace), email Service Providers (such as Microsoft or Google) and potentially even hardware manufacturers with DNS-enabled devices like home routers or automation controls (such as Linksys, Nest, and Philips).

DNS Providers refers to entities that provide DNS services such as registrars (like GoDaddy, eNom or Tucows) or standalone DNS services (like CloudFlare).

Customer/User refers to the end-user of these services.

Templates/Service Templates refers to a file that describes a set of changes to DNS and domain functionality to enable a specific service.

1.2 Problem Statement

Configuring a service at a Service Provider to work with a Domain is a complex task and is difficult for users.

Typically a customer will try to configure their service by entering their domain name with the Service Provider. The Service Provider then uses a number of techniques to discover the DNS Provider. This might include DNS queries to figure out the registrar and/or the nameserver running DNS.

Once the Service Provider discovers the DNS Provider, they typically give the customer instructions for proper configuration of DNS. This might include help text, screen shots, or even links to the appropriate tools.

This often presents a number of technologies or processes to the user that they don't understand. DNS record types, TTLs, Hostnames, etc. are all confusing to many users. And the instructions authored by the Service Provider are often out of date, further confusing the issue.

1.3 Goals

The goal of the protocol defined in this specification is to create a system where Service Providers can easily enable their applications/services to work with the domain names of their customers. This includes both discovery of the DNS Provider and subsequent modification of DNS.

The system will be implemented using simple web based interactions and standard authentication protocols, allowing for the creation and modification of DNS settings through the application of templates instead of direct manipulation of individual DNS records.

1.4 Templates

Templates at the DNS Provider are core to this proposal, as they describe a service owned by a Service Provider and contain all of the information necessary to describe the changes to enable and operate/maintain a service. These changes are in the form of records/commands which map to records in DNS or other domain behavior (like redirects).

The individual records/commands may be identified by a groupId. This allows for the application of templates in different stages. For example, an email provider might first set a TXT record to verify the domain, and later set an MX record to configure email delivery. While done separately, both changes are fundamentally part of the same service.

Templates can also contain variable portions, as often values of data in the template change based on the implementation of the Service Provider (e.g. the IP address of a service).

Configuration and onboarding of templates between the DNS Provider and the Service Provider is initially seen as a manual process. The template is defined by the Service Provider and given to the DNS Provider. Future versions of this specification may allow for an independent repository of templates. For now the templates are all published at <http://domainconnect.org>

By basing the protocol on templates instead of DNS Records, several advantages are achieved. The DNS Provider has very explicit knowledge and control on the settings being changed to enable a service. And the system is more secure as templates are tightly controlled and contained.

All parties benefit by having an open standard. With more DNS Providers supporting the standard, more Service Providers are likely to adopt and vice versa.

The value to customers is simple. It makes configuration of services much easier for them. Instead of editing individual DNS records, a customer simply approves the application of a template to their domain.

1.5 Summary

- Connect is easy for customers with a simple confirmation dialog flow.
- Connect can make changes to DNS based on a service template and avoid exposing DNS to customers and Service Providers.
- Connect can have arbitrary parameters for known variables with values that change per user and not confuse users with their meanings or functionality.
- Connect has a simple integration strategy based on just a hyperlink to a page when a change is a single operation.
- For more complex integrations, Connect has an OAuth based implementation to provide an acceptable level of security, but allowing for the Service Provider to call an API to apply a template at a later time.
- Connect allows for the passing in of a domain name into the flow, or the selection of the domain name at the DNS Provider. This is controlled by the Service Provider who initiates the flow.

2 Protocol Overview

To attach a domain name to a service provided by a Service Provider, the customer would first enter their domain name.

Instead of relying on examination of the nameserver and mapping these to DNS Providers, DNS Provider discovery would be handled through simple records in DNS and an API. The Service Provider would query for a specific record in the zone to determine a REST endpoint, call an API and a Domain Connect compliant DNS Provider would return information about that domain at the DNS Provider.

For the application of the changes to DNS, there are two main use cases. The first is a synchronous web flow. The second is an asynchronous flow using OAuth and an API.

It should be noted that a DNS Provider may choose to only implement one of the flows. As a matter of practice many Service Providers are based on the synchronous flow, with only a couple of them based on the asynchronous OAuth flow. So many DNS providers may opt to only implement the synchronous flow.

2.1 The Synchronous Flow

This flow is tailored for the Service Provider that requires a one time and synchronous change to DNS.

The user would first enter their domain name at the Service Provider.

ACME Web Site Service Provider

Please enter the domain you wish to enable with your Acme Website and click Next.

Domain Name

[Next](#)

After the Service Provider determines the DNS Provider, the Service Provider would display a link to the user indicating that they can “Connect their Domain” to the service.

ACME Web Site Service Provider

It looks like the domain “example.com” is currently at Virtucon Domains. To configure This domain to work with Acme Websites, click Next.

[Next](#)

After clicking the link, the user is directed to a browser window on the DNS Provider’s site. This could be in place, another tab, or in a new browser window.

This link would pass the domain name being modified, the service being enabled, and any additional parameters needed to configure the service.

Once at the DNS Provider site, the user would be asked to authenticate.

Virtucon Domains

Please sign in to Virtucon Domains

Login

Password

After authenticating at the DNS Provider, the DNS Provider would verify the domain name is owned by the user. The DNS Provider would also verify other parameters passed in are valid and would prompt the user to give consent for making the change to DNS.

Virtucon Domains

It looks like you want to make your domain example.com work with ACME Web Sites.

Click Confirm to make the changes or Cancel

Assuming the user grants this consent, the DNS changes would be applied. Upon successful application of the DNS changes, the pop-up window or tab would be closed or the page would be navigated back to a callback URL.

2.2 The Asynchronous Flow

The OAuth flow is tailored for the Service Provider that wishes to make changes to DNS asynchronously with respect to the user interaction, or wishes to make multiple or additional changes to DNS over time.

The OAuth based authentication and authorization flow begins similarly to the web based synchronous flow. The Service Provider determines the DNS Provider, opens a consent dialog, the user signs in, and the ownership of the domain is verified.

However, instead of applying the DNS changes on user confirmation, OAuth access is granted to the Service Provider. An OAuth access code is generated and handed back to the Service Provider. The Service Provider then requests an access (bearer) token.

The permission granted in the OAuth token is a right for the Service Provider to apply a template to the specific domain owned by a specific user.

The Service Provider would call an API that applies this template to the domain, including any necessary parameters along with the access token(s). As in all OAuth flows, access can be revoked by the user at any time. This would be done on the DNS Providers user experience.

2.3 The API

If the OAuth flow is used, once a Service Provider has an OAuth token the Domain Connect API becomes available for use. The Domain Connect API is a simple REST service.

This REST service allows the application or removal of the changes in the template on a domain name. The domain name, user, and template must be authorized through the OAuth token and corresponding access token.

Additional parameters named keys are expected to be passed as name/value pairs on the query string of each API call.

2.4 Flows Initiated at the DNS Provider

It may be desired to expose different services available from the DNS Provider, mainly to expose interesting services that the user could attach to their domain. An example would be suggesting to a user that they might want to connect their domain to a partner Service Provider.

If the template for the service is static, it is sometimes possible to simply apply the template, and be done.

However, often the template has some dynamic elements. For this scenario, the DNS Provider need simply call a URL at the Service Provider. The Service Provider can then sign the user in, collect any necessary information, and call the normal web-based flows described above.

3 DNS Provider Discovery

In order to facilitate discovery of the DNS Provider from a domain name, a domain will contain a record in DNS.

This record will be a simple TXT record containing a URL used as a prefix for calling a discovery API. This record will be named `_domainconnect`.

An example of this record might contain:

```
https://domainconnect.godaddy.com
```

As a practical matter of implementation, the DNS Provider need not contain a copy of this data in each and every zone. Instead, the DNS Provider needs simply to respond to the DNS query for the `_domainconnect` TXT record with the appropriate data.

How this is implemented is up to the DNS Provider.

For example, the DNS Provider may not store the data inside a TXT record for the domain, opting instead to put a CNAME in the zone and have the TXT record in the target of the CNAME.

Once the URL prefix is discovered, it is used by the Service Provider to determine the additional settings for using Domain Connect on this domain at the DNS Provider. This is done by calling a REST API.

```
GET  
v2/{domain}/settings
```

This will return a JSON structure containing the settings to use for Domain Connect on the domain name (passed in on the path) at the DNS Provider. This JSON structure will contain the following fields.

Field	Key	Type	Description
Provider Name	providerName	String	The name of the DNS Provider suitable for display on the Service Provider UX
UX URL Prefix for Synchronous Flows	urlSyncUX	String	The URL Prefix for linking to the UX of Domain Connect for the synchronous flow at the DNS Provider.
UX URL Prefix for Asynchronous Flows	urlAsyncUX	String	The URL Prefix for linking to the UX elements of Domain Connect

			for the asynchronous flow at the DNS Provider.
API URL Prefix	urlAPI	String	This is the URL Prefix for the REST API for the asynchronous OAuth API
Width of Window	width	Number	This is the desired width of the window for granting consent when navigated in a popup. Default value is 750px.
Height of Window	height	Number	This is the desired height of the window for granting consent when navigated in a popup. Default value is 750px.

As an example, the JSON returned by this call might contain.

```
{
  "providerName" : "GoDaddy",
  "urlSyncUX" : "https://domainconnect.godaddy.com",
  "urlAsyncUX" : "https://domainconnect.godaddy.com",
  "urlAPI" : "https://api.domainconnect.godaddy.com",
  "width" : 750,
  "height" : 750
}
```

If the DNS Provider is not implementing the synchronous flow, the urlSyncUX is not required. Similarly if the DNS Provider is not implementing the asynchronous flow the urlAsyncUX is not required.

4 Domain Connect Endpoints

Domain Connect contains endpoints in the form of URLs.

The first set of endpoints are for the UX that the Service Provider links to. These are for the UX which includes the synchronous flow where the user clicks on the link to configure the domain, and asynchronous OAuth flow where the user clicks on the link for consent.

The second set of endpoints are for the API, largely for the asynchronous OAuth flow via REST.

All endpoints begin with a root URL for the DNS Provider such as `https://connect.dnsprovider.com/` and may also include any prefix at

the discretion of the DNS Provider, for example,
<https://connect.dnsprovider.com/api/>

The root URLs for the UX endpoints and the API endpoints are returned in the JSON payload during DNS Provider discovery.

4.1 Synchronous Flow: Template

GET
`v2/domainTemplates/providers/{providerDomain}/services/{serviceName}`

This URL can be used by the Service Provider to determine if the DNS Provider supports a specific template.

Returning a status of 200 without a body indicates the template is supported.
Returning a status of 404 indicates the template is not supported.

4.2 Synchronous Flow: Initiation

GET
`v2/domainTemplates/providers/{providerDomain}/services/{serviceName}/apply?[properties]`

This is the URL used to apply a template to a domain. It is called from the Service Provider to start the Domain Connect Protocol.

This URL should be called in a new browser tab, or in a popup browser window. Upon completion of the application of the template, the DNS Provider would close this tab or window.

Parameters/properties passed to this URL include:

Property	Key	Description
Domain	domain	This parameter contains the domain name being configured.
Name/Value Pairs	Any key that will be used as a replacement for the “% surrounded” value(s) in a template.	Any variable fields consumed by this template. The name portion of this API call corresponds to the variable(s) specified in the template and the value corresponds to the value that should be used when applying the template.
Group Id	groupId	This OPTIONAL parameter specifies the group of changes from the template to apply. If no group is specified, all changes are applied. Multiple groups can be specified in comma delimited format.

An example query string is below:

```
GET https://web-  
connect.dnsprovider.com/v2/domainTemplates/providers/  
coolprovider.com/services/hosting/apply?www=192.168.42.  
42&m=192.168.42.43&domain=example.com
```

This call indicates that the Service Provider wishes to connect the domain example.com to the service using the template identified by the composite key of the provider (coolprovider.com) and the service owned by them (hosting). In this example, there are two variables in this template, “www” and “m” which both require values (in this case each requires an IP address). These variables are passed as name/value pairs.

Note: There are circumstances where the Service Provider may wish to verify that the template was successfully applied. Without domain connect, this typically involved the Service Provider querying DNS to see if the settings had been applied.

This same technique works with Domain Connect, and if necessary can be triggered either manually on the Service Provider site or automatically upon page/window activation in the browser.

Automatic notification via callback URLs were considered in earlier drafts, and subsequently dropped due to their lack of reliability and difficulty in getting a consistent implementation across DNS Providers.

4.3 Asynchronous Flow: OAuth

Using the OAuth flow is a more advanced use case, needed by Service Providers that have more complex configurations that may require multiple steps and/or are asynchronous from the user’s interaction.

Details of an OAuth implementation are beyond the scope of this specification. Instead, an overview of how OAuth fits with Domain Connect is given here.

4.4 OAuth Flow: Setup

Service providers wishing to use the OAuth flow must register as an OAuth client with the DNS provider. This is envisioned as a manual process.

To register, the Service Provider would provide (in addition to their template) one or more callback URLs that specify where the customer will be redirected after the provider authorization. In return, the DNS provider will give the Service Provider a

client id and secret which will be used when requesting tokens as part of the OAuth process flow.

4.5 OAuth Flow: Requesting OAuth tokens

4.6 OAuth Flow: Getting an Authorization Code

GET v2/domainTemplates/providers/{providerName}/services/{serviceId}

To initiate the OAuth flow the Service Provider would link to the DNS Provider to gain consent. This endpoint is similar to the synchronous flow described above, and will handle authenticating the user and asking for the user's permission to allow the Service Provider to make the specified changes to the domain.

Upon successful authorization, the DNS Provider will direct the end user's browser to the redirect URI provided in the request, appending the authorization code as a query parameter of "code".

Upon error, the DNS provider will direct the end user's browser to the redirect URI provided in the request, appending the error code as a query parameter "error".

The following table describes the values to be included in the query string parameters for this request.

Property	Key	Description
Domain	Domain	This parameter contains the domain name being configured.
Client Id	client_id	This is the client id that was provided by the DNS provider, to the service provider during registration
Redirect URI	redirect_uri	The location to direct the clients browser to upon successful authorization, or upon error
Response type	response_type	OPTIONAL. If included should be the string 'code' to indicate an authorization code is being requested.
Scope	scope	This is the name of the template that is being requested. AKA the service name.
State	state	OPTIONAL but recommended. This is a random, unique string passed along to prevent CSRF. It will be returned as a parameter when redirecting to the redirect_url described above.

4.7 OAuth Flow: Requesting an Access Token

POST /v2/oauth/access_token

Once authorization has been granted the Service Provider must use the Authorization Code provided to request an Access Token. The OAuth specification recommends that the Authorization Token be a short lived token, and a reasonable recommended setting is ten minutes. As such this exchange needs to be completed before that time has expired or the process will need to be repeated.

This token exchange is done via a server to server API call from the Service Provider to the DNS Provider.

The Access Token granted will also have a longer lifespan, but also can expire. To get a new access token, the Refresh Token is used.

The following table describes the POST parameters to be included in the request.

Property	Key	Description
Authorization Code/Refresh Code	code	The authorization code that was provided in the previous step when the customer accepted the authorization request, or the refresh_token for a subsequent access token.
Redirect URI	redirect_uri	OPTIONAL. If included, needs to be the same redirect uri provided in the previous step, simple for verification.
Grant type	grant_type	The type of code in the request. Usually the string 'authorization_code' or 'refresh_token'
Client ID	client_id	This is the client id that was provided by the DNS provider, to the Service Provider during registration
Client Secret	client_secret	The secret provided to the Service Provider during registration

Upon successful token exchange, the DNS Provider will return a response with 4 properties in the body of the response.

Property	Description
access_token	The access token to be used when making API requests
token_type	Always the string "bearer"
expires_in	The number of seconds until the access_token expires
refresh_token	The token that can be used to request new access tokens when this one has expired.

4.8 OAuth Flow: Making Requests with Access Tokens

Once the Service Provider has the access token, they can call the DNS Provider's API to make change to DNS on behalf of the user.

All calls to this API pass the access token in the Authorization Header of the request to the call to the API. More details can be found in the OAuth specifications, but as an example:

```
GET /resource/1 HTTP/1.1
Host: example.com
Authorization: Bearer mF_9.B5f-4.1JqM
```

4.9 OAuth Flow: Apply Template to Domain.

POST

v2/domainTemplates/providers/{providerId}/services/{serviceId}/apply?[properties]

The primary function of the API is to apply a template to a customer domain.

While the providerId and serviceId are also implied in the authorization, these are on the path for consistency with the synchronous flows. If not matching what is in the authorization, an error is returned.

In addition the call must accept the following parameters:

Property	Key	Description
Domain	domain	This contains the domain name being configured. It must match the domain in the authorization token.
Name/Value Pairs	Any key that will be used as a replacement for the “% surrounded” value(s) in a template.	Any variable fields consumed by this template. The name portion of this API call corresponds to the variable(s) specified in the record and the value corresponds to the value that should be used when applying the template as per the implementation notes.
Group ID	groupId	This OPTIONAL parameter specifies the group of changes in the template to apply. If omitted, all changes are applied. This can also be a comma separated list of groupIds.

An example call is below. In this example, it is contemplated that there are two variables in this template, “www” and “m” which both require values (in this case each requires an IP address). These variables are passed as name/value pairs.

POST

```
https://connect.dnsprovider.com/v2/domainTemplates/providers/coolprovider.com/services/hosting/apply?www=192.168.42.42&m=192.168.42.43
```

The API must validate the access token for the Service Provider and that the domain belongs to the customer and is represented by the token being presented. With these checks passing, the template may be applied to the domain after verifying that doing so would not cause an error condition, either because of problems with required variables or the current state of the domain itself (for example, already having a conflicting template applied).

Results of this call can include information indicating success, or an error. Errors will be 400 status codes, with the following codes defined.

Status	Response	Description
--------	----------	-------------

Success	204	A response of an http status code of 204 indicates that call was successful and the template applied. Note that any 200 level code should be considered a success.
Unauthorized	401,403	A response of a 401 indicates that caller is not authorized to make this call. This can be because the token was revoked, or other access issues.
Error	404, 422	This indicates something wrong with the request itself, such as bad parameters.
Failed	409	This indicates that the call was good, and the caller authorized, but the change could not be applied due to other conditions. This might be the application of a conflicting template or a domain state that prevents updates.

4.10 Revert Template

This call reverts the application of a specific template from a domain.

POST

v2/domainTemplates/providers/{providerId}/services/{serviceId}/revert?domain={domain}

This API allows the removal of a template from a customer domain using an OAuth request.

The provider and service name in the authorization must match the values in the URL. So must the domain name on the query string.

This call must validate that the template requested exists and has been applied to the domain by the Service Provider or a warning must be returned that the call would have no effect. This call must validate that there is a valid authorization token for the domain passed in or an error condition must be reported.

An example query string might look like:

```
POST
https://connect.dnsprovider.com/v2/domainTemplates/providers/coolprovider.com/services/hosting/revert?domain=example.com
```

Response codes are identical to above.

4.11 OAuth Flow: Revoking access

Like all OAuth flows, the user can revoke the access at any time using UX at the DNS Provider site. As such the Service Provider needs to be aware that their access to the API may be denied.

5 Domain Connect Objects and Templates

This section will describe templates.

5.1 Template Versioning

Templates are not versioned. Instead, if a breaking change is made to a template it is recommended that a new template be created. While on the surface versioning looks appealing, the reality is that the settings in a template rarely change. This is because a successful service will have many customers with settings in their DNS, some applied by templates and some manually applied.

5.2 Template Definition

A template is defined as a standard JSON data structure containing the following data:

Data Element	Type	Key	Description
Service Provider Id	String	providerId	The unique identifier of the Service Provider that created this template. This is used in the URLs to identify the Service Provider. To ensure non-coordinated uniqueness, this would be the domain name of the Service Provider.
Service Provider Name	String	providerName	The name of the Service Provider. This will be displayed to the user.
Template Id	String	templateId	The name or identifier of the template. This is used in URLs to identify the template.
Template Name	String	templateName	The friendly name of this service. This will be displayed to the user.
Logo	String	logoUrl	A graphical logo for use in any web-based flow. This is a URL to a graphical logo sufficient for retrieval.
Description	Text	description	A textual description of what this template attempts to do. This is meant to assist integrators, and therefore should not be displayed to the user.
Launch URL	URL	launchUrl	(optional) A URL suitable for a DNS Provider to call to initiate the execution of this template. This allows the flow to begin with the DNS Provider as described above.
Template Records	Array of Template Records	records	A list of records and/or actions for the template.

5.3 Template Record

Each template record is an entry that contains a type and several optional parameters based on the value.

For all entries of a record other than “type” and “groupId”, the value can contain variables denoted by %<variable name>%. These are the values substituted at runtime when writing into DNS.

It should be noted that as a best practice, the variable should be equal to the portion of the values in the template that change as little as possible.

For example, say a Service Provider requires a CNAME of one of three values for their users: s01.example.com, s02.example.com, and s03.example.com.

The value in the template could simply contain %servercluster%, and the fully qualified string passed in. Alternatively, the value in the template could contain s%var%.example.com. By placing more fixed data into the template, the data is more constrained.

Each record will contain the following elements.

Data Element	Type	Key	Description
Type	enum	type	<p>Describes the type of record in DNS, or the operation impacting DNS.</p> <p>Valid values include: A, AAAA, CNAME, MX, TXT, SRV, NS, APEXCNAME, REDIR301, or REDIR 302</p> <p>For each type, additional fields would be required.</p> <p>A: host, pointsTo, TTL AAAA: host, pointsTo, TTL CNAME: host, pointsTo, TTL TXT: host, data, TTL MX: host, pointsTo, priority, TTL SRV: name, target, protocol, service, priority, weight, port, TTL NS: host, pointsTo, TTL APEXCNAME: pointsTo, TTL REDIR301: target REDIR302: target</p>
Group Id	String	groupId	This OPTIONAL parameter identifies the group the record belongs to when applying changes.
Host	String	host	<p>The host for A, AAAA, CNAME, TXT, and MX values.</p> <p>This is the hostname in DNS.</p>

Points To	String	points To	The pointsTo location for A, AAAA, CNAME, MX, and APEXCNAME records.
TTL	Int	ttl	This is the time-to-live for the record in DNS. Valid for A, AAAA, CNAME, TXT, MX, and SRV records
Data	String	data	This is the data for a TXT record in DNS
Priority	Int	priority	This is the priority for an MX or SRV record in DNS.
Weight	Int	weight	This is the weight for the SRV record
Port	Int	port	This is the port for the SRV record
Protocol	String	protocol	This is the protocol for the SRV record
Service	String	service	This is the protocol for the SRV record
Target	String	target	This is the target url for REDIR301 and REDIR302

Implementation Notes:

This template format is intended for internal use by a DNS Provider and there are no codified API endpoints for creation or modification of these objects. API endpoints do not use this object directly. Instead, API endpoints reference a template by ID and then provide key/value pairs that match any variable values in these record objects.

However, by defining a standard template format it is believed it will make it easier for Service Providers to share their provisioning across DNS Providers. Further revisions of this specification may include a repository for publishing and consuming these templates. For now templates are maintained at <http://domainconnect.org>

Implementers are responsible for data integrity and should use the record type field to validate that variable input meets the criteria for each different data type.

Certain record types may not be valid with others (e.g. a redirect and an A record), and it is up to the DNS and Service Providers to author templates appropriately.

Additional record types and/or extensions to the data that can be set into the template can be implemented on a per DNS Provider basis. For example, if a DNS Provider supports additional record types, these can be added as necessary.

Similarly other providers may not wish to support certain record types (redirects, APEXCNAME). Should this be the case, a Service Provider depending on this functionality would not be able to operate with said DNS Provider.

Example Records: Single static host record

Consider a template for setting a single host record. The records section of the template would have a single record of type “A” and could have a value of:

```
[{
  ``type`` : ``A``,
  ``host`` : ``www``,
  ``pointsTo`` : ``192.168.1.1``,
  ``ttl`` : 600
}]
```

This would have no variable substitution and the application of this template to a domain would simply set the host name “www” to the IP address “192.168.1.1”

Example Records: Single variable host record for A

In the case of a template for setting a single host record from a variable, the template would have a single record of type “A” and could have a value of:

```
[{
  ``type`` : ``A``,
  ``host`` : ``@``,
  ``pointsTo`` : ``192.168.1.%srv%``,
  ``ttl`` : 600
}]
```

A query string with a key/value pair of

```
srv=2
```

would cause the application of this template to a domain to set the host name for the apex A record to the IP address “192.168.1.2” with a TTL of 600

Example: Multiple variable host record for A

In the case of a template for setting a single host record from multiple variables, the template would have a single record of type “A” and could have a value of:

```
[{
  ``type`` : ``A``,
  ``host`` : ``%hostname1%``,
  ``pointsTo`` : ``%hostip1%``,
  ``ttl`` : 600
}]
```

A query string with key/value pairs of

```
hostname1=example&hostip1=192.168.1.3
```

would cause the application of this template to a domain to set the host name “example” to the IP address “192.168.1.3” with a TTL of 600.

Example: Redirect

In the case of a template for setting an HTTP redirect, the template would have a record of type “REDIRECT” and could have a value of:

```
[{
  ``type`` : REDIR301,
  ``target`` : %url%
}]
```

A query string with key/value pairs of

url=http://www.example-two.com.

would cause the application of this template to signal to the DNS Provider to provision URL redirection to the target URL.

6 Example Template JSON Format

```
{
  "providerId": "example.com",
  "providerName": "Example Web Hosting",
  "templateId": "hosting",
  "templateName": "Wordpress by example.com",
  "logoUrl": "https://www.example.com/images/billthecat.jpg",
  "description": "This connects your domain to our super cool web hosting",
  "launchURL": https://www.example.com/connectlaunch,
  "records": [
    {
      "groupId": "service",
      "type": "A",
      "host": "www",
      "pointsTo": "%var1%",
      "ttl": "%var2%"
    },
    {
      "groupId": "service",
      "type": "A",
      "host": "m",
      "pointsTo": "%var3%",
      "ttl": "%var2%"
    },
    {
      "groupId": "service",
      "type": "CNAME",
      "host": "webmail",
      "pointsTo": "%var4%",
      "ttl": "%var2%"
    },
    {
      "groupId": "verification",
      "type": "TXT",

```

```
        "host": "example",
        "data": "%var5%",
        "ttl": "%var2%"
    }
}
]
```

7 Operational and Implementation Considerations

From a DNS Provider standpoint, it is envisioned that the user has appropriate warnings and checks in place to prevent accidental destruction of other records in DNS when applying a template or making manual changes in DNS.

For example, if the application of a template through the web based flow would interfere with previously set DNS records (either through another template or manual settings), it is envisioned that the user would be asked to confirm the clearing of the previously set template. If it would interfere with DNS records accessible through a previously issued OAuth flow, the provider could revoke the previously issued token.

Similarly, when granting an OAuth token that interferes with a previously issued OAuth token, access to the old token could automatically be revoked.

Manual changes to DNS through the DNS Provider could have appropriate warnings in place to prevent unwanted changes; with overrides being possible removing conflicting templates.

The behavior of these interactions is left to the sophistication of the DNS Provider.

Variables in templates that are hard-coded host names are the responsibility of the DNS Provider to protect. That is, DNS Providers are responsible for ensuring that host names do not interfere with known values (such as m. or www. or mail.) or internal names that provide critical functionality that is outside the scope of this specification.