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DTS FHIR Terminology Service: ValueSet Support

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1 Overview

One of the primary Resources in a FHIR Terminology Service is a ValueSet. From the [HL7 v3 Core Principles](#):

“A ValueSet selects a set of codes from those defined by one or more CodeSystems to specify which codes can be used in a particular context.”

This guide is intended to outline the usage of the FHIR Terminology Service to perform ValueSet specific operations within the context of DTS.

2 What is FHIR

From https://en.wikipedia.org/wiki/Fast_Healthcare_Interoperability_Resources:

*“**Fast Healthcare Interoperability Resources** (FHIR, pronounced "fire") is a draft standard describing data formats and elements (known as "resources") and an Application Programming Interface (API) for exchanging Electronic health records. The standard was created by the [Health Level Seven International](#) (HL7) health-care standards organization.”*

“FHIR provides an alternative to document-centric approaches by directly exposing discrete data elements as services. For example, basic elements of healthcare like patients, admissions, diagnostic reports and medications can each be retrieved and manipulated via their own resource URLs.”

3 What is a FHIR Terminology Service

From <https://www.hl7.org/fhir/terminology-service.html>:

“A service that lets healthcare applications make use of codes and value sets without having to become experts in the fine details of code system, value set and concept map resources, and the underlying code systems and terminological principles. A server that supports all the functionality described here can be described as a "FHIR Terminology Service", and SHALL conform to the [Terminology Service Capability Statement](#)”

4 What is DTS and its Relation to FHIR

Apelon’s Distributed Terminology System (DTS) is a high-quality open source solution for the acquisition, management, and practical deployment of standardized terminologies as well as the creation and management of local terminologies and ontologies. For more information on how to use DTS, refer to the DTS Editor User Guide.

DTS implements HL7’s FHIR Terminology Service API and augments it, allowing users access to a standards-based interface for easily searching and querying terminologies and value sets.

5 FHIR ValueSet Functions

As a FHIR Terminology Service utilizes REST based API, the following RESTFUL functions are available for usage against FHIR ValueSets in the DTS implementation of FHIR:

- POST: Creates a new ValueSet
- PUT: Update an existing ValueSet
- GET: Retrieve an existing ValueSet
- DELETE: Remove an existing ValueSet

A RESTFUL API Client (<https://getpostman.com>, <https://insomnia.rest>, etc.) is recommended for performing FHIR functions. Ensure the following settings are configured prior to performing RESTFUL operations in a RESTFUL API Client:

Headers:

- Accept:
application/fhir+xml; charset=UTF-8; fhirVersion=4.0
OR
application/fhir+json; charset=UTF-8; fhirVersion=4.0
- Content-Type:
application/fhir+xml; charset=UTF-8; fhirVersion=4.0
OR
application/fhir+json; charset=UTF-8; fhirVersion=4.0

Authorization:

- Type: Basic Auth (Use DTS Connection Credentials for User/Password)

Ensure DTS User has necessary permissions to create/delete FHIR CodeSystems:

- In the DTS Editor, navigate to **Options > User Manager**
- Select **New** to create a new role (i.e. FHIR)

- Select the **Namespace Admin**, **Subset Admin**, and **Authority Admin** checkboxes and hit **Save**
 - Selecting the **Manage** option next to a FHIR ValueSet from the Subsets tab will allow updates (PUT) to be made via FHIR API
- Select the **Roles by User** tab
- Select New and create a new user **with the same name as the one used to connect to DTS**
- Under the Roles section, select **Enable** for the new role entry (i.e. FHIR) and hit **Save**

5.1 Creating ValueSets

There are two ways to create FHIR ValueSets using DTS: Via a **POST** request utilizing the FHIR API or using the DTS Editor.

5.1.1 Creating a ValueSet with the FHIR API

Performing a **POST** request with a payload containing a FHIR formatted XML or JSON CodeSystem will create a new ValueSet against the DTS4 database. The URL format for performing a FHIR ValueSet **POST** is as follows:

base-url/ValueSet (i.e. localhost:8080/dtsserverws/fhir/ValueSet)

As a bare minimum, a new ValueSet must contain a FHIR URL for the **POST** to be successful. Further, ValueSets may be formatted as a definition of filters or as a list of codes from CodeSystems or other ValueSets. A few examples of very basic ValueSets in each format are as follows:

XML

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<ValueSet xmlns="http://hl7.org/fhir" xmlns:ns2="http://www.w3.org/1999/xhtml">
  <id value="example-valueset"/>
  <url value="http://apelon.com/fhir/ValueSet/example-valueset"/>
  <version value="Version 1"/>
</compose>
```

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```

    <include>
      <system value=" http://apelon.com/fhir/CodeSystem/example-codesystem"/>
    </include>
  </compose>
</ValueSet>

```

JSON

```

{
  "resourceType": "ValueSet",
  "url": "http://apelon.com/fhir/ValueSet/example-valueset",
  "id": "example-valueset",
  "version": "Version 1",
  "compose": [
    {
      "include": [
        {
          "system": "http://apelon.com/fhir/CodeSystem/example-codesystem"
        }
      ]
    }
  ]
}

```

DTS will generate a FHIR ValueSet **version**, **status**, and **id** attribute on all FHIR ValueSet. For example, if version is specified in the FHIR CodeSystem element, this value is respected (as long as it is unique), otherwise DTS will create a version designator of the form “V1”, “V2”, etc. If the specified version or id is non-unique, DTS will return an error upon **POST**.

Limitations:

1. Within ValueSet composition, an ‘exclude’ element cannot exist within an ‘include’ element. An ‘exclude’ element must exist on the first level of a composition, as is consistent with FHIR R4.

5.1.1.1 DTS Subset Display Name

When Posting a ValueSet, the DTS Subset Display Name is determined by the FHIR_Url of the ValueSet. The following set of rules describes how the DTS Subset Display Name is determined. For more information on the valueSetPrefix, please refer to the DTS FHIR Configuration Guide.

1. If the ValueSet URL string starts with the valueSetPrefix, then set the DTS Subset Display Name to the remainder of the URL string unless there is no remainder.
 - a. If there is no remainder but there is a “/” in the URL string, then set the DTS Subset Display Name to the text after the last “/” in the URL string.
 - i. If there is no text after the last “/” then set the DTS Subset Display Name to the entire URL string.
 - b. If there is no remainder and there is no “/” in the URL string, then set the DTS Subset Display Name to the entire URL string.
2. If the ValueSet URL string does not begin with the valueSetPrefix, then:

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- a. If there is a “/” in the URL string, then set the DTS Subset Display Name to the text after the last “/” in the URL string.
 - i. If there is no text after the last “/” then set the DTS Subset Display Name to the entire URL string.
- b. If there is no “/” in the URL string, then set the DTS Subset Display Name to the entire URL string.

5.1.1.2 ValueSet Prefix Rules Examples

Rule 1

valueSetPrefix: http://apelon.com/Prefix1/ValueSet/

ValueSet URL: http://apelon.com/Prefix1/ValueSet/TestValueSet

DTS Subset Display Name: TestValueSet

Explanation: This uses Rule 1. The ValueSet URL string starts with the valueSetPrefix, so the DTS Subset Display Name is set to the remainder of the URL string.

Rule 1.i

valueSetPrefix: http://apelon.com/Prefix1.i/ValueSet

ValueSet URL: http://apelon.com/Prefix1.i/ValueSet

DTS Subset Display Name: ValueSet

Explanation: This uses Rule 1.i. The ValueSet URL string starts with the valueSetPrefix, but there is no remainder (i.e. the ValueSet URL string matches the valueSetPrefix exactly). Since there is a “/” in the URL string, the DTS Subset Display Name is set to the text after the last “/” in the URL string.

Rule 1.i.a

valueSetPrefix: http://apelon.com/Prefix1.i.a/ValueSet/

ValueSet URL: http://apelon.com/Prefix1.i.a/ValueSet/

DTS Subset Display Name: http://apelon.com/Prefix1.i.a/ValueSet/

Explanation: This uses Rule 1.i.a. The ValueSet URL string starts with the valueSetPrefix, but there is no remainder (i.e. the ValueSet URL string matches the valueSetPrefix exactly). Since there is a “/” in the URL string and there is no text after the last “/”, the DTS Subset Display Name is set to the entire URL string.

Rule 1.ii

valueSetPrefix: Prefix1.iiValueSet

ValueSet URL: Prefix1.iiValueSet

DTS Subset Display Name: Prefix1.iiValueSet

Explanation: This uses Rule 1.ii. The ValueSet URL string starts with the valueSetPrefix, but there is no remainder (i.e. the ValueSet URL string matches the valueSetPrefix exactly). Since there is no “/” in the URL string, the DTS Subset Display Name is set to the entire URL string.

Rule 2.i

valueSetPrefix: http://apelon.com/Prefix2.i/ValueSet/

ValueSet URL: http://apelon.com/Prefix2.i/TestValueSet

DTS Subset Display Name: TestValueSet

Explanation: This uses Rule 2.i. The ValueSet URL string does not begin with the valueSetPrefix. Since there is a “/” in the URL string, the DTS Subset Display Name is set to the text after the last “/” in the URL string.

Rule 2.i.a

valueSetPrefix: http://apelon.com/Prefix2.i.a/ValueSet/

ValueSet URL: http://apelon.com/Prefix2.i.a/TestValueSet/

DTS Subset Display Name: http://apelon.com/Prefix2.i.a/TestValueSet/

Explanation: This uses Rule 2.i.a. The ValueSet URL string does not begin with the valueSetPrefix. Since there is a “/” in the URL string but there is no text after the last “/” the DTS Subset Display Name is set to the entire URL string.

Rule 2.ii

valueSetPrefix: http://apelon.com/Prefix2.ii/ValueSet/

ValueSet URL: TestValueSet

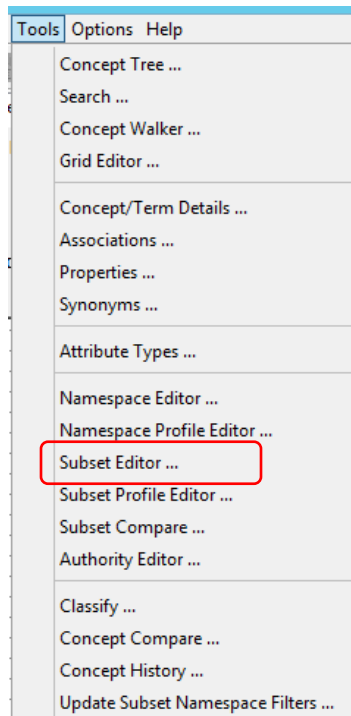
DTS Subset Display Name: TestValueSet

Explanation: This uses Rule 2.ii. The ValueSet URL string does not begin with the valueSetPrefix. Since there is not a “/” in the URL string the DTS Subset Display Name is set to the entire URL string.

5.1.2 Creating a ValueSet with the DTS Editor

Users may wish to create FHIR ValueSets from existing Subsets using the DTS Editor. This is done by configuring a Subset, which is DTS' term for an arbitrary collection of concepts, with special properties which allows it to be recognized by the FHIR API.

To create a FHIR ValueSet using the DTS Editor, first create a new Subset by clicking the **Subset Editor** under the **Tools** menu.



Then click **New** and assign the Subset a name. The ID can be specified here, or DTS will auto assign one that is unique to the DTS instance. (*Note: this is the Subset ID and is not the same as the **FHIR ValueSet ID** discussed above*). Add a description to clearly identify the Subset and specify the **Authority** governing the Subset, if any. If a **Profile** has been created it can be applied to the Subset here, rather than manually adding the property types as described in the following steps.

New Subset

Name: DemoValueSet

ID: (auto)

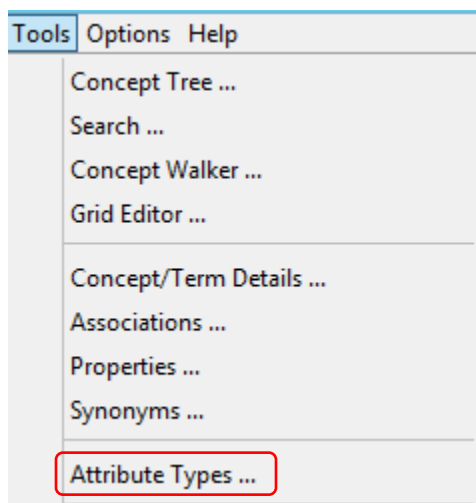
Description: A Demonstration ValueSet subset for DTS

Authority: Apelon FHIR Authority

Profile: - None -

OK Cancel

Once the Subset has been created, the recommended FHIR URL and FHIR ID property types need to be created. To do this, launch the **Attribute Types** editor from the **Tools** menu.



Select the **Subset** tab at the top and choose the recently created Subset in the dropdown menu. Select the **Property Type** tab, then **New** at the bottom, and enter the required information:

Name: FHIR_Url

ID: (leave this blank, automatically managed by DTS)

Subset: (should be auto-filled with the Subset name, ensure this is correct, if not cancel, and select the correct subset from the dropdown)

Modifies: Subset

Name: FHIR_Url

ID:

Subset: DemoValueSet

Modifies: Subset

New Apply Restore Delete

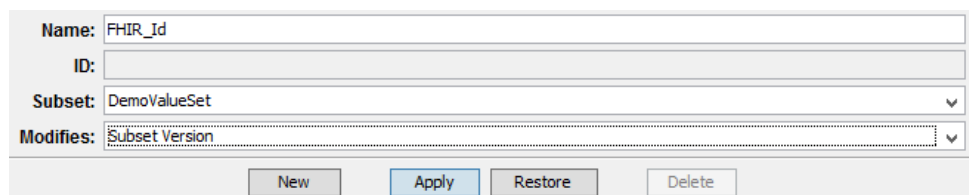
Click **Apply** to save this Property Type. Then click **New** to create the next required Property Type.

Name: FHIR_Id

ID: (leave this blank, automatically managed by DTS)

Subset: (should be auto-filled with the Subset name, ensure this is correct, if not cancel, and select the correct subset from the dropdown)

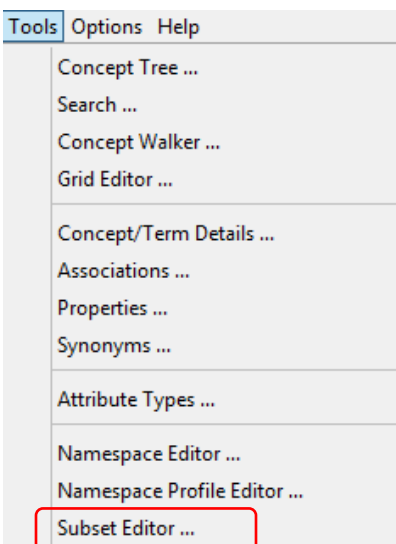
Modifies: Subset Version

A screenshot of a web form titled 'Property Type Editor'. It contains four input fields: 'Name' with the value 'FHIR_Id', 'ID' which is empty, 'Subset' with a dropdown menu showing 'DemoValueSet', and 'Modifies' with a dropdown menu showing 'Subset Version'. Below the fields are four buttons: 'New', 'Apply' (highlighted in blue), 'Restore', and 'Delete'.

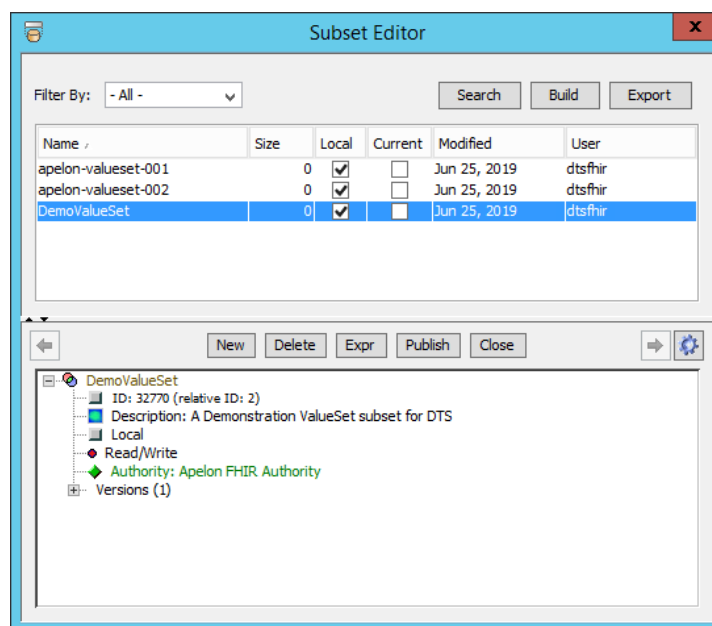
Click **Apply** to save this property. The Editor can now be closed, or click **New** to create additional optional properties (FHIR_Name, FHIR_Date, etc. See *FHIR ValueSet Attribute Table* below for a complete list of available attributes).

Once the FHIR_Url, FHIR_Id, and all other desired attributes have been added, select **Apply** and close the Attribute Type Editor.

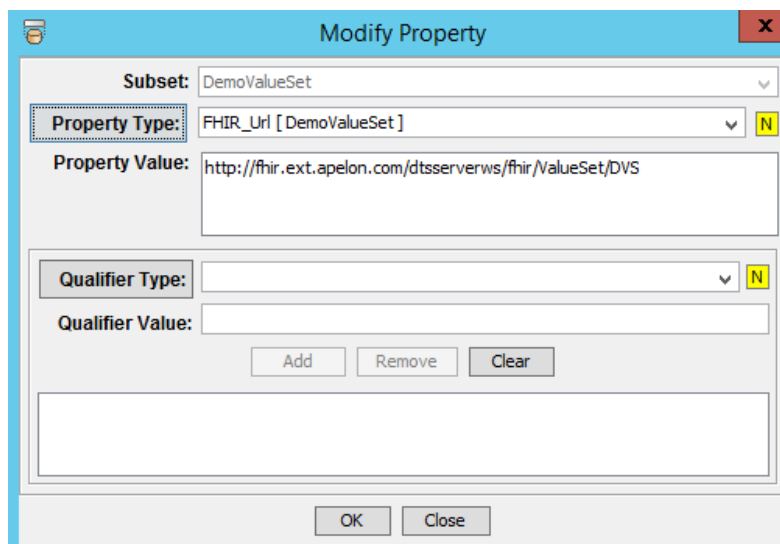
After creating the property types for the Subset, the values must be assigned. To do this with the DTS Editor first open the **Subset Editor** from the **Tools** menu.

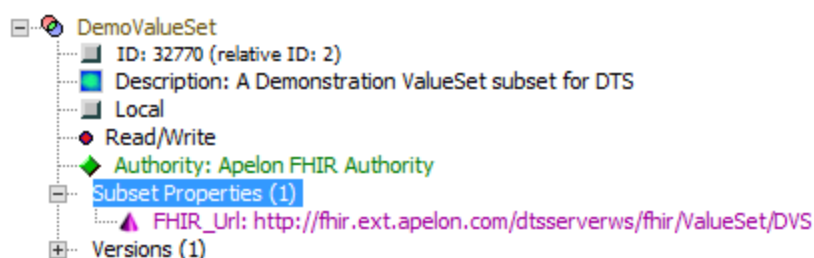


Then, navigate to the new Subset. Scroll alphabetically or search using the **Search** button at the top to locate it.



To add the **FHIR_Url**, right-click this time on the Subset Name from the lower panel and select **Add Property**. In the Property Value text box, enter the URL for the ValueSet, and click **OK**. The **FHIR_Url** Subset Property will be visible when expanded.

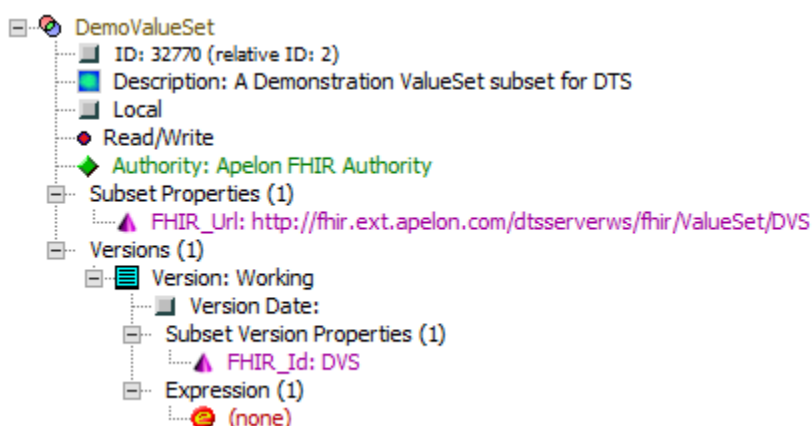




To add the **FHIR_Id**, right-click this time on the “Version: Working” item and select **Add Property**. In the Property Value text box, enter the ID for the ValueSet, and click **OK**. The **FHIR_Id** Subset Version Property will be visible when expanded.

The screenshot shows the 'Add Property' dialog box. The fields are as follows:

- Subset Version: DemoValueSet:Working
- Property Type: FHIR_Id [DemoValueSet]
- Property Value: DVS
- Qualifier Type: (empty)
- Qualifier Value: (empty)
- Buttons: Add, Remove, Clear
- Bottom Buttons: OK, Close



Adding other FHIR Attributes follows the same process as above. Remember that **FHIR_Url** is a *Subset* property, and not a Subset Version property.

5.2 Updating and Publishing FHIR ValueSet

5.2.1 Updating Existing ValueSet Versions

Updating an existing FHIR ValueSet completely replaces the current FHIR ValueSet version definition. Previous elements are deleted. The version attribute can be updated, as long as it is unique in the FHIR ValueSet's history. If not specified, the existing version attribute value is maintained.

Updating a FHIR ValueSet is similar to creating one in process. Performing a **PUT** request with a payload containing a *modified* FHIR formatted XML or JSON ValueSet will update a ValueSet version against the DTS4 database. The URL format for performing a FHIR ValueSet **PUT** is as follows:

base-url/ValueSet /{{FHIR_ID}} (i.e. localhost:8080/dtsserverws/fhir/ValueSet/example-valueset)

With the exception of the ValueSet FHIR ID and FHIR URL, all ValueSet FHIR properties can be updated using the aforementioned **PUT** method.

5.2.2 Publishing Version Updates to ValueSet

DTS supports versioning of FHIR ValueSet, meaning if a user wishes to create an entirely new version of a ValueSet without altering the previous version, it is possible to do so. This would require a **POST** request where the following conditions must be met:

- ValueSet FHIR ID and FHIR Version values are different from the previous version
- ValueSet FHIR URL remains the same

5.3 Retrieving FHIR ValueSet

Retrieving an existing FHIR ValueSet is done by performing a **GET** request. This function does not require a RESTFUL API Client and can be completed via most modern web browsers. The URL format for performing a FHIR ValueSet **GET** generally follows one of two schemes:

base-url/ ValueSet /{{FHIR_ID}} (i.e. localhost:8080/dtsserverws/fhir/ValueSet/example-valueset)

OR

base-url/ ValueSet?{{parameter}}={{value}} (i.e. localhost:8080/dtsserverws/fhir/ValueSet?version=V1)

For more information on retrieving FHIR Resources, refer to the **SearchingInDTSFHIR** documentation. This additional document is available for download at the Documentation center on ApelonDTS.org in the **DTS 4 FHIR Terminology Service Guides** package.

5.4 Deleting Existing ValueSet Versions

Deleting a FHIR ValueSet is similar to performing a **PUT** request to update an existing ValueSet version, except a payload is not required. Performing a **DELETE** request while specifying the ID of the ValueSet which is being deleted will mark the ValueSet as deleted. The URL format for performing a FHIR ValueSet **DELETE** is as follows:

base-url/ValueSet/{FHIR_ID} (i.e. localhost:8080/dtsserverws/fhir/ValueSet/example-valueset)

Upon deletion of a FHIR ValueSet, it can no longer be retrieved via the FHIR API. Only the latest version of a FHIR ValueSet can be deleted. Published ValueSets cannot be deleted.

If a **POST** or **PUT** request is made after a FHIR ValueSet has been deleted, the request payload will overwrite the deleted version.

5.5 FHIR ValueSet Attribute Table

The table below shows the correspondence between ValueSet attributes and DTS Subset Version Properties. Required DTS Properties are marked with an asterisk (*).

Table 1. FHIR Element DTS Representation – ValueSet Attribute

FHIR Element		DTS Representation	
<i>Element</i>	<i>Sub-element</i>	<i>Property/Qualifier</i>	<i>Value (interpreted from FHIR attribute value)</i>
contact		FHIR_Contact	contact.name
	telecom	FHIR_Telecom	telecom.system@ telecom.use@ telecom.value
copyright		FHIR_Copyright	copyright.value
date		FHIR_Date	date
description		FHIR_Description	Description.value
display		FHIR_Display ²	concept.code [namespace_name]
		FHIR_DisplayName	concept.display
experimental		FHIR_Experimental	experimental.isValue
id		*FHIR_Id ¹	id.value
identifier		FHIR_Identifier	identifier.value&&identifier.system&&identifier.use&&identifier.type
immutable		FHIR_Immutable	immutable.isValue
compose.inactive		FHIR_Inactive	compose.inactive.isValue
jurisdiction		FHIR_Jurisdiction	jurisdiction.code1@jurisdiction.code2@...
compose.lockedDate		FHIR_LockedDate	NA
meta	lastUpdated	FHIR_Meta	lastUpdated
name		FHIR_Name	name.value
publisher		FHIR_Publisher	publisher.value
purpose		FHIR_Purpose	purpose.value
status		FHIR_Status	status.value
text		FHIR_Text	text.status.value
	div	FHIR_DivText	text.div.content

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title		FHIR_Title	title.value
useContext		FHIR_Use_Context	"FHIR_Use_Context"
		FHIR_Use ³	concept.text concept.coding.code@concept.coding.system@ concept.coding.display concept.coding.version concept.coding .userSelected
version		FHIR_Version	version.value
url		*FHIR_Url ¹	url

Notes:

1. **FHIR_Url** is a Subset Property.
2. **FHIR_Display** is a ValueSet-specific concept display name that overrides any CodeSystem display name for ValueSet expansions.
3. Multiple instances of this qualifier may be present on the property.

5.5.1 FHIR ValueSet Extensions

FHIR Extensions permit additional and/or locally-defined attributes to the standard FHIR attributes.

An extension has a url (required), a value type, and an associated value. An example of an extension to the *name* attribute is shown below:

```
<name>
  <extension url="http://hl7.org/fhir/StructureDefinition/iso-21090-name-use" >
    <valueCode value="I" />
  </extension>
  <text value="Chief Red Cloud"/>
</name>
```

Extensions are represented as instances of DTS Properties (if the extension is on a Resource) and DTS Qualifiers (if the extension is on a Resource Element). The type name of both of these DTS objects is "FHIR_Ext". The Property/Qualifier value is:

extension_url|subextension_url|extension_data_type|extension_value

The *extension_url* is the url of the (base) extension. When extensions are nested, the *subextension_url* is the url with a subexpression. If there is no subextension, the *subextension_url* is empty. On XML retrieval via GET, extensions are grouped with common url heads.

The *extension_data_type* is a code that represents FHIR data types. These codes are described in **Table 2** below. The *extension_value* is the DTS serialized representation of the FHIR data type. These representations are described in other DTS FHIR documents.

Table 2. FHIR Extension DTS Representation – Extension Data Types

Data Type	Code	Notes
Boolean	BN	

Canonical	CN	
Code	CD	
CodeableConcept	CC	
Coding	CG	
Date	DA	
DateTime	DT	
Decimal	DC	
Duration	DR	Not currently supported
Instant	IS	
Integer	IT	
Markdown	MD	Implemented as String
Period	PD	Not currently supported
Reference	RF	Not currently supported
String	ST	
Uri	UR	

Limitations:

1. Extensions are not supported on system-generated attributes such as *version*, *count*, *deleted*, etc.
2. Only two levels of extensions are supported (extension + sub-extension).
3. Search on extensions is not supported.

5.6 FHIR ValueSet Operations

5.6.1 ValueSet \$expand

The \$expand operation returns the list of codes specified in a ValueSet, as opposed to returning the ValueSet with its definition. Performing a **GET** request with the following format would yield the following results:

Request

GET base-url/ValueSet/\$expand

GET

[http://localhost:8080/dtsserverws/fhir/ValueSet/\\$expand?url=http://apelon.com/fhir/ValueSet/example-valueset](http://localhost:8080/dtsserverws/fhir/ValueSet/$expand?url=http://apelon.com/fhir/ValueSet/example-valueset)

Response

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<ValueSet xmlns="http://hl7.org/fhir" xmlns:ns2="http://www.w3.org/1999/xhtml">
  <id value="example-valueset"/>
  <meta>
    <lastUpdated value="2018-12-11T17:12:02.535-05:00"/>
  </meta>
</ValueSet>
```

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```

</meta>
<url value="http://apelon.com/fhir/ValueSet/example-valueset"/>
<version value="Version 1"/>
<status value="draft"/>
<expansion>
  <timestamp value="2018-12-11T17:12:15.414-05:00"/>
  <total value="3"/>
  <offset value="0"/>
  <contains>
    <system value="http://apelon.com/fhir/CodeSystem/example-codesystem"/>
    <code value="e-1"/>
    <display value="Example Code 1"/>
  </contains>
  <contains>
    <system value="http://apelon.com/fhir/CodeSystem/example-codesystem"/>
    <code value="e-1-1"/>
    <display value="Example Child Code 1"/>
  </contains>
  <contains>
    <system value="http://apelon.com/fhir/CodeSystem/example-codesystem"/>
    <code value="e-2"/>
    <display value="Example Code 2"/>
  </contains>
</expansion>
</ValueSet>

```

Below is a table depicting all IN parameters available for ValueSet \$expand operations along with whether each IN parameter is supported for usage within the DTS FHIR Terminology service.

Table 3. ValueSet \$expand IN Parameters

Name	Type	Description	Supported?
url	uri	The URL of the ValueSet	yes
valueSet	ValueSet	The value set is provided directly as part of the request	no
valueSetVersion	string	The version of the ValueSet	yes
context	uri	The context of the value set, so that the server can resolve this to a value set to expand	no
contextDirection	code	The purpose is to inform the server whether to use the value set associated with the context for reading or writing purposes (only if context parameter is provided)	no

filter	string	A text filter that is applied to restrict the codes that are returned	yes
date	dateTime	The date for which the expansion should be generated	yes
offset	integer	Paging support - where to start if a subset is desired (default = 0). Offset is the number of records (not number of pages)	yes
count	integer	Paging support - how many codes should be provided in a partial page view	yes
includeDesignations	boolean	Controls whether concept designations are to be included or excluded in value set expansions	yes
designation	string	A value that is either designation.language or designation.use.system designation.use.code	yes
includeDefinition	boolean	Controls whether the value set definition is included or excluded in value set expansions	yes
activeOnly	boolean	Controls whether inactive concepts are included or excluded in value set expansions	yes
excludeNested	boolean	Controls whether or not the value set expansion nests codes or not (i.e. ValueSet.expansion.contains.contains)	no
excludeNotForUI	boolean	Controls whether or not the value set expansion is assembled for a user interface use or not	yes
excludePostCoordinated	boolean	Controls whether or not the value set expansion includes post coordinated codes	no
displayLanguage	code	Specifies the language to be used for description in the expansions i.e. the language to be used for ValueSet.expansion.contains.display	no
exclude-system	canonical	Code system, or a particular version of a code system to be excluded from the value set expansion. The format is the same as a canonical	yes

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are written to R4 sequence (version 4.0.1)

		URL: [system] [version] - e.g. http://loinc.org 2.56	
system-version	canonical	Specifies a version to use for a system, if the value set does not specify which one to use. The format is the same as a canonical URL: [system] [version] - e.g. http://loinc.org 2.56	no
check-system-version	canonical	Specifies a version to use for a system. If a value set specifies a different version, an error is returned instead of the expansion. The format is the same as a canonical URL: [system] [version] - e.g. http://loinc.org 2.56	yes
force-system-version	canonical	Specifies a version to use for a system. This parameter overrides any specified version in the value set (and any it depends on). The format is the same as a canonical URL: [system] [version] - e.g. http://loinc.org 2.56.	no

5.6.2 ValueSet \$validate-code

The \$validate-code operations is a true/false check to determine whether a specified coded value from a CodeSystem exists in a ValueSet. Performing a **GET** request with the following format would yield the following results:

Request

GET base-url/ValueSet/\$validate-code?url={{value}}&system={{value}}&code={{value}}

GET [http://localhost:8080/dtsserverws/fhir/ValueSet/\\$validate-code?url=http://apelon.com/fhir/ValueSet/example-valueset&system=http://apelon.com/fhir/CodeSystem/example-codesystem&code=e-1](http://localhost:8080/dtsserverws/fhir/ValueSet/$validate-code?url=http://apelon.com/fhir/ValueSet/example-valueset&system=http://apelon.com/fhir/CodeSystem/example-codesystem&code=e-1)

Response

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<Parameters xmlns="http://hl7.org/fhir" xmlns:ns2="http://www.w3.org/1999/xhtml">
  <parameter>
    <name value="result"/>
    <valueBoolean value="true" id="7c576594-30fb-4a58-9651-2e898ef5148b"/>
  </parameter>
</parameter>
```

```

      <name value="display"/>
      <valueString value="Example Code 1"/>
    </parameter>
  </Parameters>

```

Below is a table depicting all IN parameters available for ValueSet \$validate-code operations along with whether each IN parameter is supported for usage within the DTS FHIR Terminology service.

Table 4. ValueSet \$validate-code IN Parameters

Name	Type	Description	Supported?
url	uri	The URL of the ValueSet	yes
context	uri	The context of the value set, so that the server can resolve this to a value set to validate against.	no
valueSet	ValueSet	The value set is provided directly as part of the request	no
valueSetVersion	string	The version of the ValueSet	yes
code	code	The code that is to be validated	yes
system	uri	The system for the code that is to be validated	yes
systemVersion	string	The version of the system, if one was provided in the source data	yes
display	string	The display associated with the code, if provided. If a display is provided a code must be provided	yes
coding	Coding	A coding to validate	yes
codeableConcept	CodeableConcept	A full codeableConcept to validate	yes
date	dateTime	The date for which the validation should be checked	yes
abstract	boolean	'abstract' is a property defined by many HL7 code systems that indicates that the concept is a logical grouping concept that is not intended	no

		to be used as a 'concrete' concept to in an actual patient/care/process record. If this parameter has a value of true, a concept designated as 'abstract' is appropriate/allowed to be used	
displayLanguage	code	Specifies the language to be used for description when validating the display property	

6 Supported Operators

The following operators are supported in ValueSet.compose.include/exclude:

Table 5. ValueSet.compose.include/exclude Operators

Operator	Definition	Notes
=	Concept attribute value equals	Case-insensitive, supports wildcards (*), see table below for supported attributes.
is-a	All concepts with a transitive is-a relation to named concept, includes target concept	Associated attribute must be “concept”. Value is code of target concept.
is-not-a	All concepts without a transitive is-a relation to named concept	Not supported
regex	Specified attribute of the concept matches the given regex	Not supported
in	Specified attribute of the concept is in the set of codes or concepts in the named value (comma-separated list)	Not supported
not-in	Specified attribute of the concept is not in the set of codes or concepts in the named value (comma-separated list)	Not supported

7 Supported Code Systems

The following table summarizes the direct CodeSystems (backed by DTS namespaces) accessible from FHIR. Supported CodeSystems can be used in ValueSet creation, as well as any properly configured “native” DTS namespace.

Table 6. Supported CodeSystems

CodeSystem	Uri/Attribute	Status
CPT	http://www.ama-assn.org/go/cpt	Supported
CVX	http://hl7.org/fhir/sid/cvx	Supported
FDA UNII	http://fdasis.nlm.nih.gov	Supported
FHIR	http://hl7.org/fhir	Not Currently Supported
HCPCS	https://www.cms.gov/Medicare/Coding/MedHCPCSGenInfo/index.htm	Supported
HL7 v2	http://hl7.org/fhir/v2/	Not Currently Supported
HL7 v3	http://hl7.org/fhir/v3/	Not Currently Supported
ICD-10-PCS	https://www.cms.gov/Medicare/Coding/ICD10/index.htm	Supported
ICD-10-R	http://hl7.org/fhir/sid/icd-10-r	Supported
ICD-10-US	http://hl7.org/fhir/sid/icd-10-us	Supported
ICD-9-CM	http://hl7.org/fhir/sid/icd-9-cm	Supported
LOINC	http://loinc.org	Supported
NCI Thesaurus	http://ncimeta.nci.nih.gov	Not Currently Supported
NDC	http://hl7.org/fhir/sid/ndc	Not Currently Supported
NDF-RT2	http://hl7.org/fhir/ndfrt	Supported
Place of Service	https://www.cms.gov/Medicare/Coding/place-of-service-codes/Place_of_Service_Code_Set.html	Supported
RxNorm R	http://www.nlm.nih.gov/research/umls/rxnorm	Supported
SNOMED CT	http://snomed.info/sct/900000000000207008	Supported
SNOMED CT AU Edition	http://snomed.info/sct/32506021000036107	Supported
SNOMED CT CA Edition	http://snomed.info/sct/20621000087109	Supported
SNOMED CT US Edition	http://snomed.info/sct/731000124108	Supported
States of the Union	http://apelon.com/states	Supported
UB 04 Revenue Codes (FL)	https://www.cms.gov/Medicare/CMS-Forms/CMS-Forms/CMS-Forms-Items/CMS1196256.html/fl42	Not Currently Supported
UB 04 Types of Bill Codes (FL)	https://www.cms.gov/Medicare/CMS-Forms/CMS-Forms/CMS-Forms-Items/CMS1196256.html/fl4	Not Currently Supported
UCUM	http://unitsofmeasure.org	Not currently supported