

# Trifolia-on-FHIR

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## Welcome

## Welcome

Trifolia-on-FHIR is an editor for FHIR resources that uses a FHIR server natively as its back-end. All STU3-compliant FHIR servers work with Trifolia-on-FHIR.

## Core Features

- Edit conformance resource types:
  - ImplementationGuide
  - StructureDefinition
  - ValueSet
  - CodeSystem
  - CapabilityStatement
  - OperationDefinition
  - Questionnaire
- Import and view any other resource in FHIR specification (such as Patient, Observation, MedicationStatement, etc.)
- Validate with the "Validation" tab on every resource editing screen, which uses [FHIR.js](#).
- Export:
  - Implementation Guides and associated resources
  - Bundles
  - FHIR IG Publisher packages
- Import any resource or transaction bundle.

## What's New

Release 1.0 on January 13, 2019

## Open-source

After careful consideration, we have decided to make Trifolia-on-FHIR an open-source product. The source code can be found on GitHub: <https://github.com/lantanagroup/trifolia-on-fhir>

We hope to achieve two primary goals by open-sourcing the product:

- Encourage other software developers to contribute to the product
- Expand the group of people who can use the product

## Requesting Support

Please be sure to provide your name and email address when submitting a support request. We use JIRA to capture the support requests, and it does not (at this time) require the user's name and email address. In the future, we hope to make these fields required. Until then, it is important that you provide your name and email address so that we know who to contact when a change has been made related to a request.

## FHIR IG Publisher

ToF uses an older version of the FHIR IG Publisher by default. The latest version of the FHIR IG Publisher has a number of issues which would prevent users from successfully publishing their implementation guide. Once these issues have been addressed/resolved, we will update ToF to use the newer version. Until then, you may encounter publishing issues with R4 implementation guides.

## Support for R4

ToF has the official R4 FHIR models loaded for use within the UI's validation. ToF is dependent on other tools, such as the HAPI FHIR server, and the FHIR IG publisher for to provide end-to-end implementation guide design and publication. If the underlying FHIR Server (ex: HAPI) or the FHIR IG publisher does not support the published FHIR R4 models, you may encounter various issues in the application.

## GitHub Integration

Trifolia-on-FHIR has integrated with GitHub so that resources can be imported and exported between the two services. This integration does have some limitations, which are described in the help documentation's "GitHub Integration" page.

## Development log

Only listing issues addressed after release 0.4.

Type	Summary
Defect	Popup for selecting a resource reference does not page
Improvement	Add additional validations for ImplementationGuide

Improvement	Remove checkmarks from optional fields
New Feature	GitHub Integration
Improvement	Page the concepts when editing a code system
Improvement	Change "Response Format" to "Output Format"
Improvement	Provide default values for IG fields
Improvement	Make it easier to add multiple resources to an IG
New Feature	Add tooltip icons to Value Set Editing
New Feature	Add tooltip icons to Code System Editing
Improvement	Allow type-ahead searching for new profile "Type" field

## Login

### Login

Click the "Login" button on the top right side of the screen. Trifolia-on-FHIR (ToF) re-directs users to identity/configure users' profile details. If you do not already have an account, you may register via this screen. Once you have registered and logged-in with the identity provider, your browser will redirect to the ToF homepage.

If this is your first time logging-in to ToF, you must create a Practitioner resource for ToF to identify you as the author of resources and associate your Practitioner with audit records when changing resources. If you configure ToF with multiple FHIR servers, you may need to create a new Practitioner resource for each FHIR server.

Users can click on their name at the top right side of the screen to further edit the Practitioner resource on the selected FHIR server.

## Navigation

### Navigation

The main navigation bar is on the top of the screen. Some menu items are hidden pending log-in.

- Home - This is the first screen users see after login. It presents high-level information about ToF.
- Browse/Edit - Search, select, delete, and create new resources depending on the resource type selected in the sub-menu.
  - Implementation Guides
  - Profiles
  - Capability Statements
  - Operation Definitions
  - Value Sets
  - Code Systems
  - Questionnaires
- Export - Export implementation guides from ToF in various formats (i.e., bundles, HTML).
- Import - Import resources from other locations into ToF.

On the right-side of the navigation menu, users will find:

- Drop-down menu - Select FHIR servers
- Edit Practitioner/Profile - Edit the Practitioner resource associated with your account.
- Logout - Logs your account off ToF
- Open from Computer - Appear as an "upload" icon. Users can open a resource directly from their computers, either an XML file or JSON file, and edit the resource in ToF without saving the resource to the FHIR server. When saving, the browser prompts users to re-download the updated resource as an XML or JSON file depending on the format when opened.
- Help - Shown as a question-mark icon, which opens this help documentation in a new window.

### FHIR Versions

Depending on the FHIR server and the version it supports, the screens for editing resources may appear (e.g., STU3 vs. R4). The screens in ToF reflect the changes between STU3 and R4 resources. In STU3, for example, ImplementationGuide has "packages" with "resources" inside each package. In R4, ImplementationGuide has "resources" parallel to "packages," and each resource *references* a package.

### FHIR Versions

## FHIR Versions

Trifolia-on-FHIR supports multiple versions of the FHIR standard. ToF currently supports STU 3 and R4. Users can select a FHIR server with the drop down menu at the top right of every screen.

## Process

### Process

The work-flow for authoring an Implementation Guide:

1. Create an Implementation Guide
2. Create Profiles (StructureDefinition resources):
  - Create other resources (e.g., OperationDefinition, CapabilityStatement, ValueSet and CodeSystem) as needed for the profiles and implementation guide
  - Create samples of the profiles manually and import into ToF
3. Associate profiles, other conformance resources, and samples with the Implementation Guide
4. Export Implementation Guide using FHIR IG Publisher:
  - View the results of the export via the FHIR IG Publisher on the "Browse Implementation Guides" screen
  - The results include a Q/A tab, which identifies all errors the FHIR IG Publisher found during publication. Users should fix errors, when possible, and re-execute the export with the FHIR IG Publisher.
  - Users can download or upload the exported package to the appropriate GitHub repository for the Implementation Guide project.

## Guidelines and Best Practices

### Guidelines and Best Practices

Trifolia-on-FHIR has the functionality to allow users to completely customize resources. By following these guidelines, users can ensure the FHIR publisher successfully processes the Implementation Guide.

#### Implementation Guide

- The URL of the Implementation Guide must be in the format of `http[s]://xxx.yyy/zzz/aaa/ImplementationGuide/my-ig-id`. For example: `http://myproject.com/someRoot/ImplementationGuide/myproject-ig`
- The "id" of the implementation guide must align with the URL of the implementation guide. For example: If the URL of your implementation guide is `http://myproject.com/someRoot/ImplementationGuide/myproject-ig`, the id must be "myproject-ig". Users can select the "Change this resource's ID" button on the "Browse Implementation Guide" screen.
- The Implementation Guide should have a description. The main screen of the FHIR IG Publisher export displays the description.
- All contacts in the Implementation Guide appear as authors in the FHIR IG Publisher export.
- ToF only exports resources referenced directly within the Implementation Guide resource. Confirm the Implementation Guide resource references all resources.

#### All Resources

All resources within an Implementation Guide need URLs in one format. Based on the example above, if your implementation guide's URL is `http://myproject.com/someRoot/ImplementationGuide/myproject-ig` then all profiles (StructureDefinition resources) within the Implementation Guide must have URLs that start with `http://myproject.com/someRoot/StructureDefinition/`.

## System Requirements

### System Requirements

Users will need a modern browser (e.g., Chrome, Firefox, Internet Explorer, Safari) to use Trifolia-on-FHIR.

Administrators must ensure the following requirements to install Trifolia-on-FHIR in their individual servers:

- Windows or Linux
- FHIR Server (STU3 or R4)
  - Must support creating resources via a PUT with an ID
  - Must support the \$validate operation

## Help

## Help

The help documentation is available in several formats:

- CHM
- DOCX
- PDF
- EPub

## Export

### Export

Select Export in the tabbed tool bar on the top of the screen.

The Export page contains form fields that allow users to specify the details of their exports. Users can export the Implementation Guides (IGs) saved under the Browse/Edit tab at the top right side of the screen. Users can export IGs as bundles or HTML with the IG Publisher. Once the form fields are complete, select the Export button on the left side of the scrolling tab at the bottom of the screen.

- Bundle exports produce a single download (pretty quickly) as a single XML file. This XML file is a FHIR [Bundle](#) that can be used to import the resources for the implementation guide in another FHIR environment.
- HTML exports produce a package (ZIP file) for use with the FHIR [IG Publisher](#). Depending on whether you select "Run IG Publisher", the IG Publisher will automatically be executed for the package, and the output from the IG Publisher will be included in the download. If you select *not* to execute the IG Publisher, the package will still be produced and can be downloaded.
  - The Export tool will take a few minutes to process. The length of time is correlated with the size of the export. Users will see the tool processing the export as lines of code executions. After completing the process, the export will automatically download to users' computers in a compressed folder.
  - When the IG Publisher is executed, the output from the IG Publisher is copied to a public location in Trifolia-on-FHIR for preview.

## Import

### Import

ToF allows users to import files, text, and VSAC content.

File imports allow users to drag-and-drop resources (e.g., StructureDefinitions, ValueSets, CodeSystems) from users' hard drives to the ToF tool.

VSAC imports require users' VSAC credentials, which are not persisted on the ToF server. If users select 'Remember VSAC Credentials,' the tool will store this information as cookies in the users' browser.

Users who upload more than 20 resources at once may experience a timeout error notification. In the event of a timeout error notification, users should reduce the size of the resource import.

Users can edit resource numbers based on individual needs.

## GitHub Integration

### Authentication

The import and export screens both contain options for GitHub. As soon as the GitHub option is selected in either screen, you are prompted to login with your GitHub credentials. Once logged in, your GitHub authentication token is stored in cookies so that you do not have to login every time you select "GitHub" under the import/export screens.

After you have logged into GitHub, a GitHub icon appears in the top-right corner of the all screens. When clicked, this icon logs you out of GitHub within ToF.

ToF uses a pop-up window to authenticate with GitHub. If your browser blocks the pop-up window, ToF will not be able to authenticate with GitHub and you will receive an error.

### Work Flow

The work flow within ToF for GitHub is to

1. Import resources from a GitHub repository into the selected FHIR server
2. Edit the resources using ToF
3. Export the resources back to the GitHub repository after they have the desired changes

## Extensions

When importing resources, two extensions are added to each resource representing the location within GitHub for where the resource came from. This enables ToF to know where in GitHub to export the resources back to.

If you are exporting *new* resources to GitHub, these extensions will not yet exist and you will need to specify where the resources should be stored during the export (which will create the two extensions on the resource).

## Limitations

- Trifolia only exports the individual resources associated with the implementation guide, and does not include the entire IG Publication package. For example, the "framework" (html templates) folder is not included in the export.
- Trifolia only allows importing FHIR resources. Trifolia-on-FHIR allows the user to select any JSON or XML file from GitHub. If the user selects an XML or JSON file that is not a FHIR resource, the import will fail.
- GitHub does not allow retrieving/updating very large files. For example, if attempting to import/export a large ValueSet resource, GitHub may fail with a "Payload too large" error.

## Glossary

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Acronym	Definition
ToF	Trifolia-on-FHIR
FHIR	Fast Healthcare Interoperability Resources
VSAC	Value Set Authority Center