Hello World Tutorial

Objectives

- Describe how to create a new app using Basecamp's create app tool
- Introduce Basecamp's application framework design
- Provide hands-on exercises to help users better understand the design

Notes

1. Users will build and run the cFS in this tutorial, but the details of these activities are not explained. See the "Build and Run cFS" tutorial for more detail.

Lesson 1

Objectives

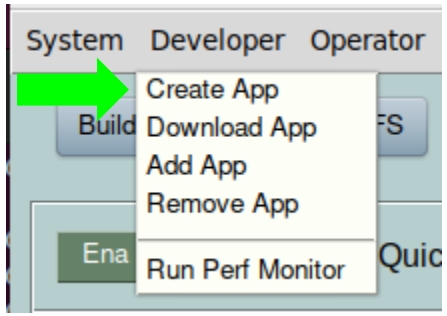
- Learn how to use the Create Application tool to create a new application
- Learn how to integrate the new app into the cFS build and runtime systems
- Use the GUI to verify the app is functioning properly within the system

Directory & File Highlights

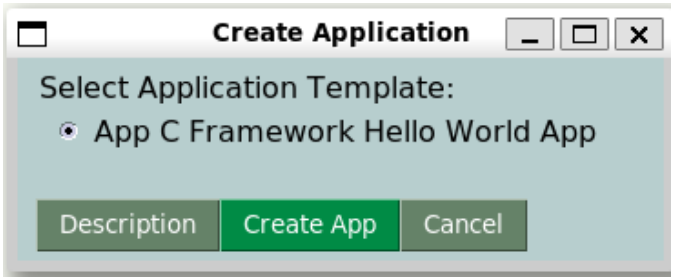
```
cfs-basecamp
├--apps/
│
├--cfe-eds-framework/
│  ├--apps/
│  ├--build/
│  │  └- exe/cpu1/cf/*.*  . . . . . . . New app object & table files
│  ├--cfe/
│  ├--basecamp_defs/
│  │  ├--cpu1_*.json   . . . . . . . . . New app JSON table files to be copied to build/exe/cpu1/cf/
│  │  ├--targets.cmake   . . . . . . . . New app name added to cpu1_APPLIST and table files to cpu1_FILELIST
│  │  ├--cpu1_cfe_es_startup.scr . . . . New app entry so it is loaded during cFE initialization
│  │  └--eds/
│  │     └--cfe_topicids.xml  . . . . . . New app's command and telemetry app IDs
│  ├--libs/
│  ├--Makefile  . . . . . . . . . . . . . Controls the build process; GNU-make wrapper that calls the CMake tools
│  ├--osal/
│  ├--psp/
│  └--tools/
│
├--gnd-sys/
│  └--templates/  . . . . . . . . . . . . Contains directory with code generation template files
│
└--usr/
   └--apps/ . . . . . . . . . . . . . . . A new source code directory tree will be created for the new app
```

Create a new “Hello World” App

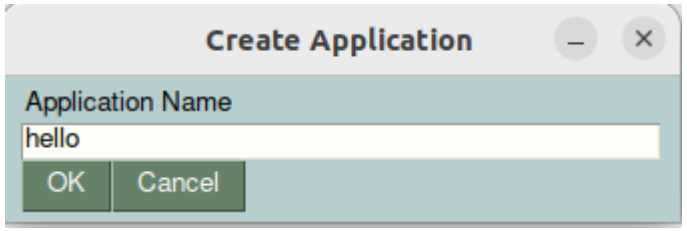
1. Under Developer select ‘Create App’



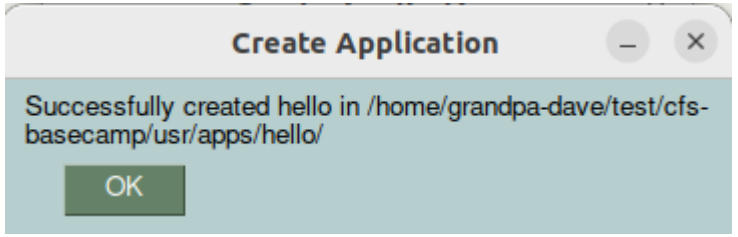
2. Select the radio button and click <Create App>



3. Provide an app name and click <OK>

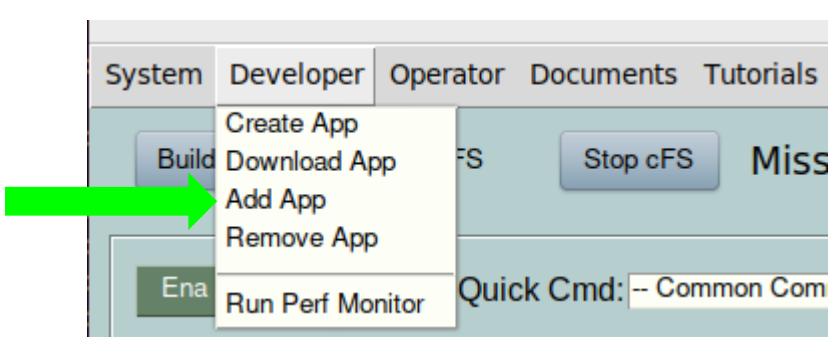


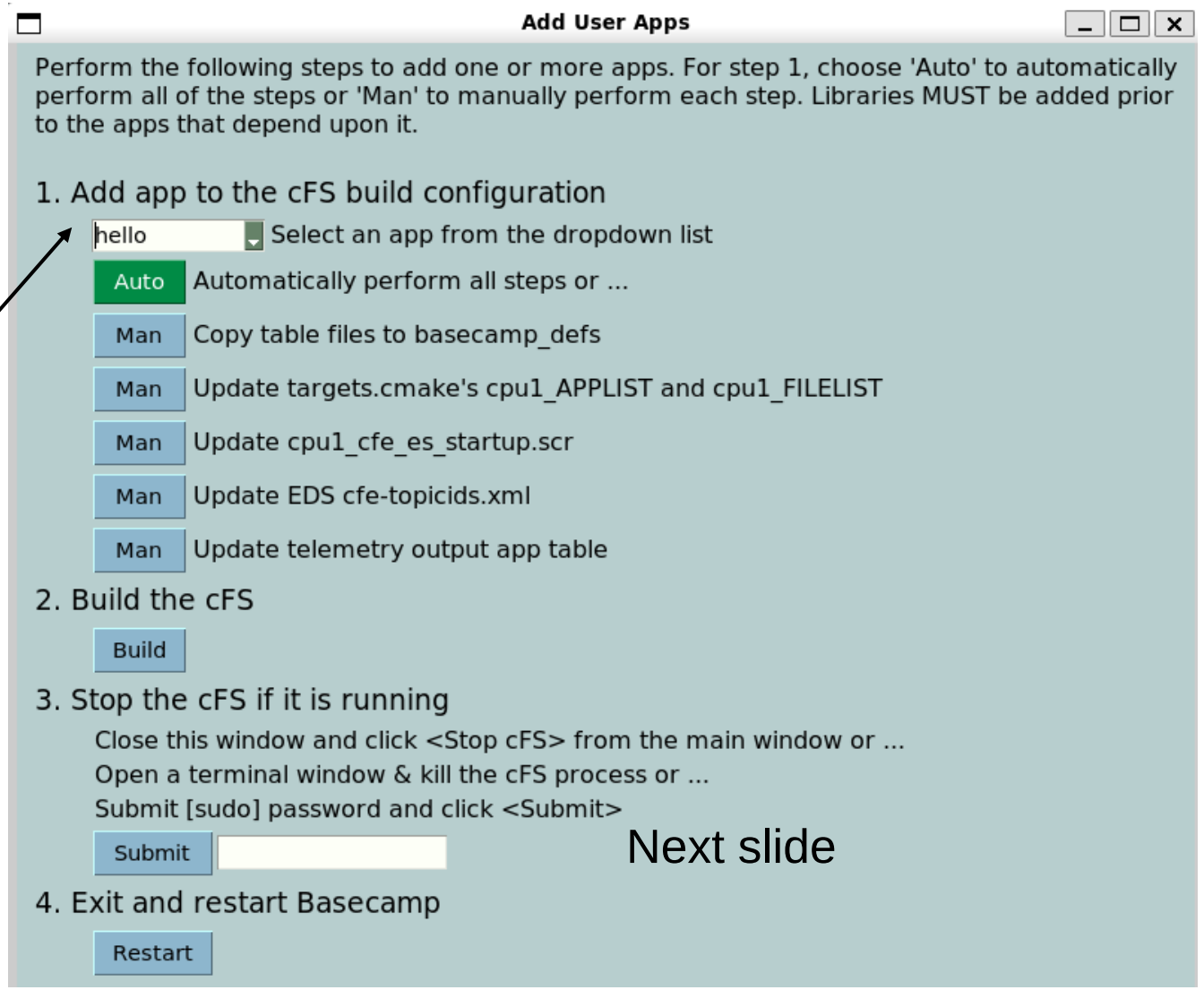
4. Basecamp created a new directory under cfs-basecamp/usr/apps with your new app’s name



Add New App to cFS Target (1 of 2)

1. **Select *Add App* from the Basecamp Developer menu**

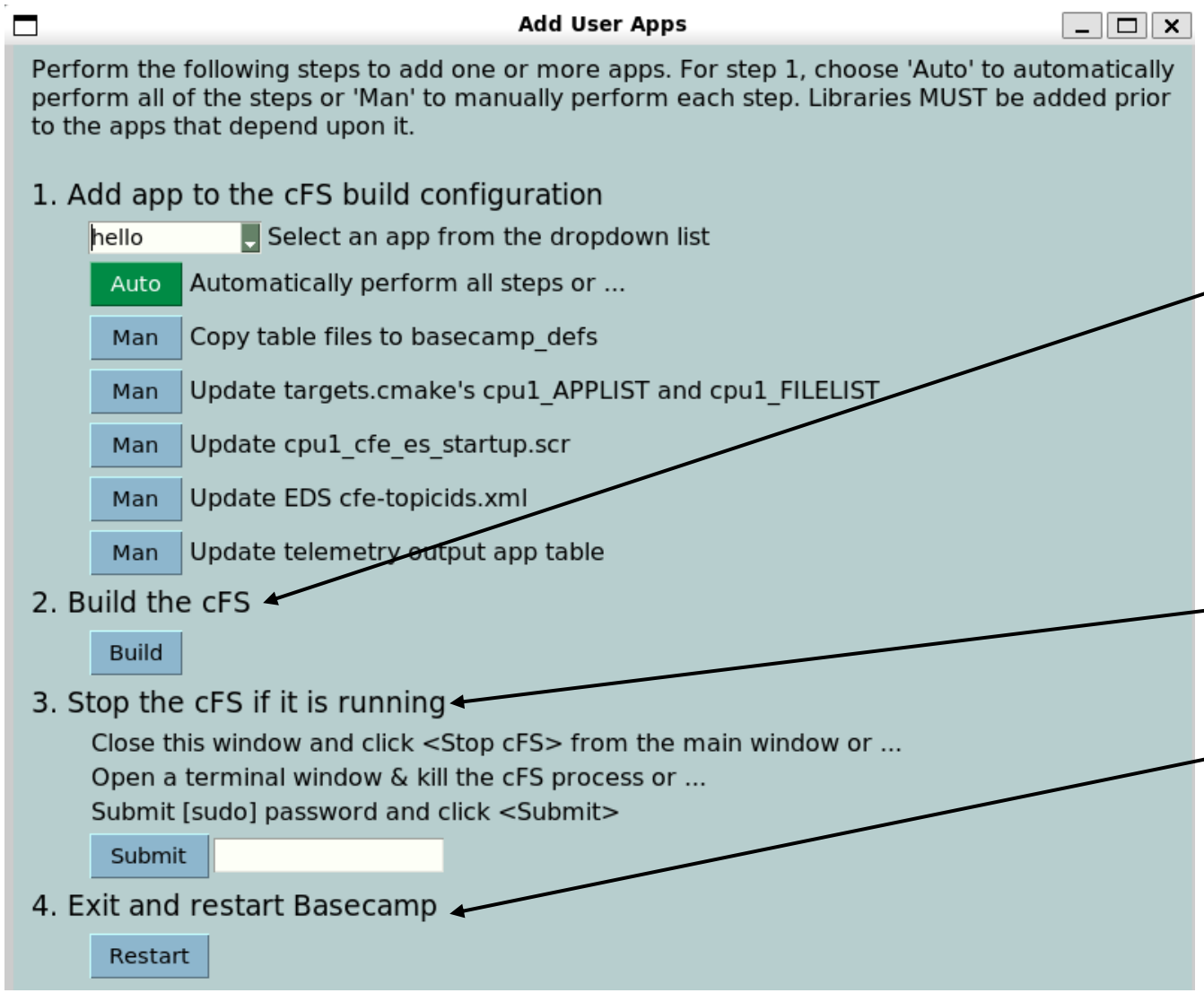




2. **Select the library/app from the dropdown menu you want to add to the build configuration**

   a. The autonomous option is recommended for normal user operations. The manual options are for educational situations.

Add New App to cFS Target (2 of 2)



3. **Build the cFS**
   a. This uses the 'make topicids' command option that is described in the 'Build and run cFS' tutorial

4. **Stop the cFS if it is running**

5. **Restart Basecamp's GUI**
   a. This causes Basecamp to use the new python libraries created by the cFS build process

Verify Hello World App Overview

- **Hello World is a simple application that either increments or decrements a counter based upon the app's 'Counter Mode'**
  - It defaults to Increment
- **Its table defines the counters upper and lower limits**

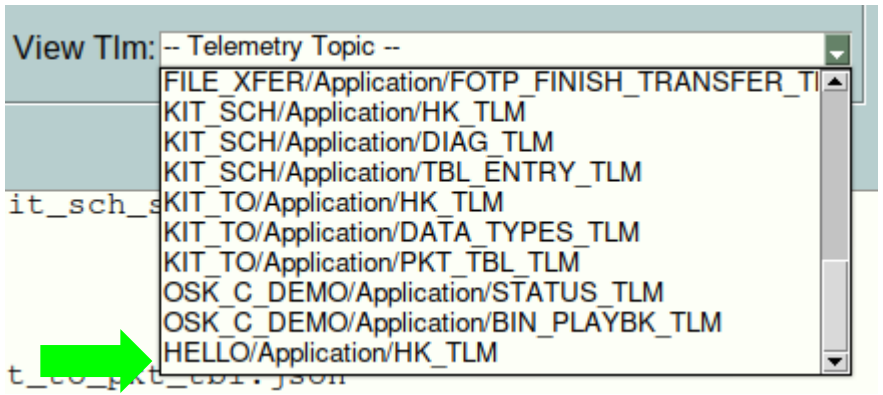
```
{
   "app-name": "HELLO",
   "tbl-name": "Limits",
   "description": "Example table",
   "low-limit":  0,
   "high-limit": 100
}
```

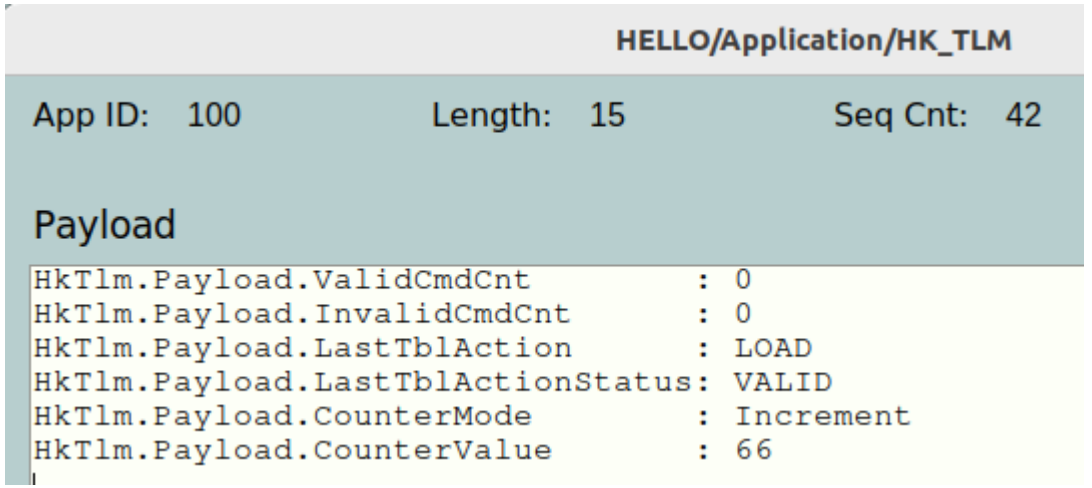
Verify Hello World App Operations (1 of 2)

- **When you start the cFS you should see the following event messages that indicate the app was initialized successfully**

```
EVS Port1 66/1/HELLO 4: JSON initialization file successfully processed with 10 parameters
EVS Port1 66/1/HELLO 25: Successfully replaced table 0 using file /cf/hello_tbl.json
EVS Port1 66/1/HELLO 100: HELLO App Initialized. Version 1.0.0
```

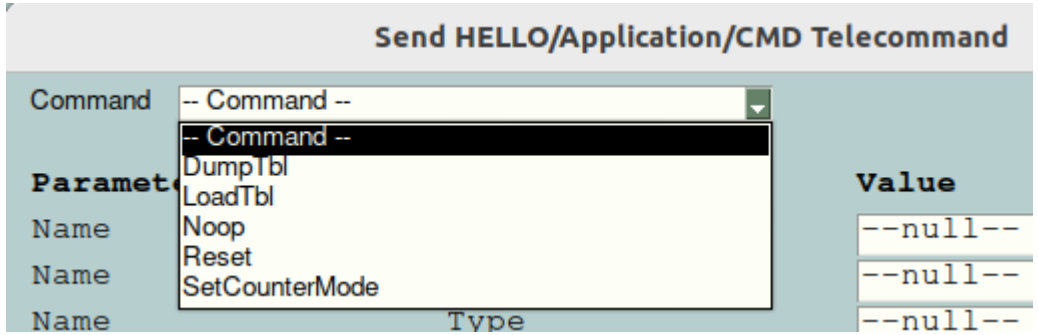
- **Open the Housekeeping telemetry screen and you should see**
  - The last table action was a load, and it was successful. This is the result of the table being loaded during initialization
  - The counter mode should be set to ‘Increment’ and the counter value should be incrementing





Verify Hello World App Operations (2 of 2)

- **Using the command menu, you can send commands to verify the app responds correctly**



- **The next lesson will guide you through making changes to the app**