Create App Tutorial

Objectives

• Describe how to create apps using the Create App tool

• Describe how to use the coding tutorial framework available to apps that are created with Create App

Notes

1. Being familiar with the "Build and Run cFS" tutorial is helpful but not required
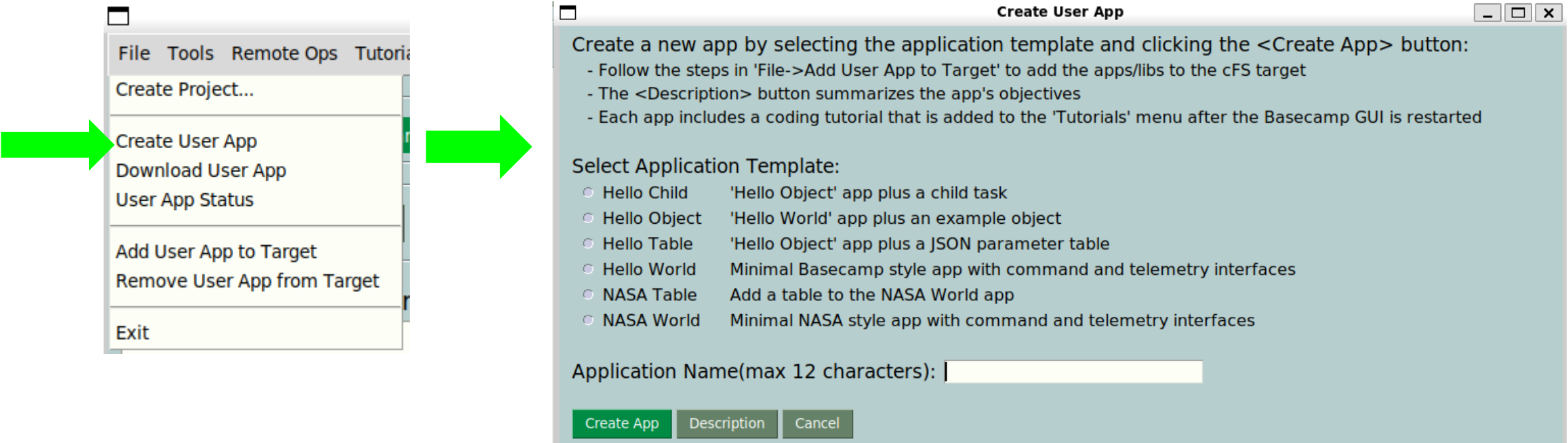
Lesson 1

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

Directory & File Highlights

```
cfs-basecamp
├-apps/
|
|
├-cfe-eds-framework/
|  ├-apps/
|  ├-build/
|  | └-exe/cpu1/cf/*.*  . . . . . . . . .  New app object & table files create during the cFS target build process
|  ├-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 created so it is loaded during cFE initialization
|  |  └-eds/
|  |     └-cfe_topicids.xml  . . . . . .  New app's command and telemetry app Topic IDs
|  ├-libs/
|  ├-Makefile
|  ├-osal/
|  ├-psp/
|  └-tools/
|
|
├-gnd-sys/
|  └-templates/   . . . . . . . . . . . .  Contains one template source code directory tree each app that can be created
|
|
└-usr/
   └-apps/ . . . . . . . . . . . . . . . . .  A new source code directory tree is created for each new app
```

Create App Menu

- Under File select 'Create User App' to get a menu of available app templates

File Menu:

File Tools Remote Ops Tutoria

Create Project...

Create User App
Download User App
User App Status

Add User App to Target
Remove User App from Target

Exit

Create User App window:

Create User App

Create a new app by selecting the application template and clicking the <Create App> button:
- Follow the steps in 'File->Add User App to Target' to add the apps/libs to the cFS target
- The <Description> button summarizes the app's objectives
- Each app includes a coding tutorial that is added to the 'Tutorials' menu after the Basecamp GUI is restarted

Select Application Template:
- Hello Child   'Hello Object' app plus a child task
- Hello Object   'Hello World' app plus an example object
- Hello Table   'Hello Object' app plus a JSON parameter table
- Hello World   Minimal Basecamp style app with command and telemetry interfaces
- NASA Table   Add a table to the NASA World app
- NASA World   Minimal NASA style app with command and telemetry interfaces

Application Name(max 12 characters): |

Create App   Description   Cancel

- The list of apps is created from the template directories in /gnd-sys/templates/
  - Users can extend this by adding their own templates (see Lesson TBD)

- New templates may be added to future Basecamp releases so the Create Application window may differ from what's above

Create a new "Hello World" App

1. Select the *Hello World* radio button and click <Create App>
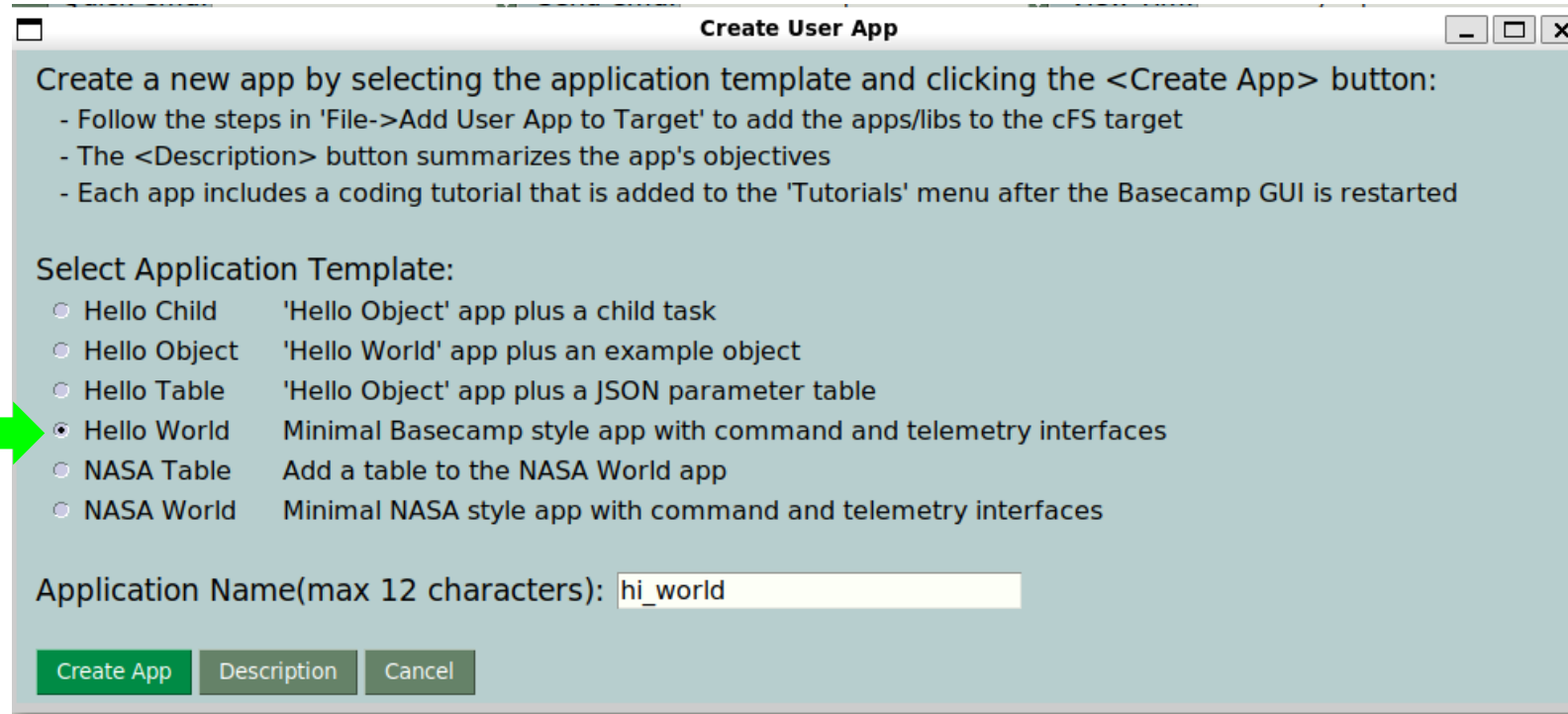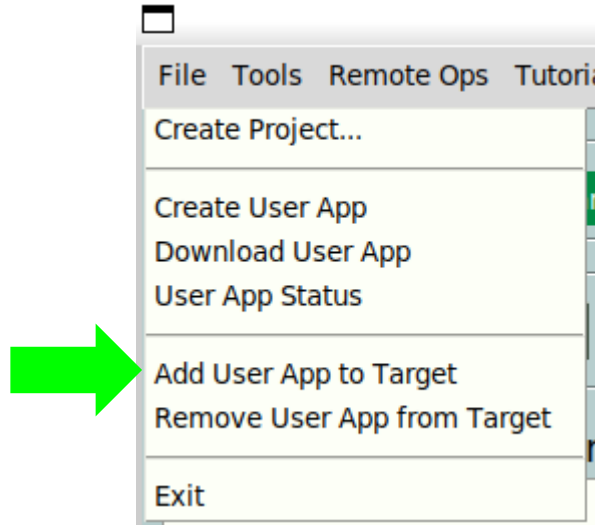

2. A new directory with your new app's name was created under cfs-basecamp/usr/apps
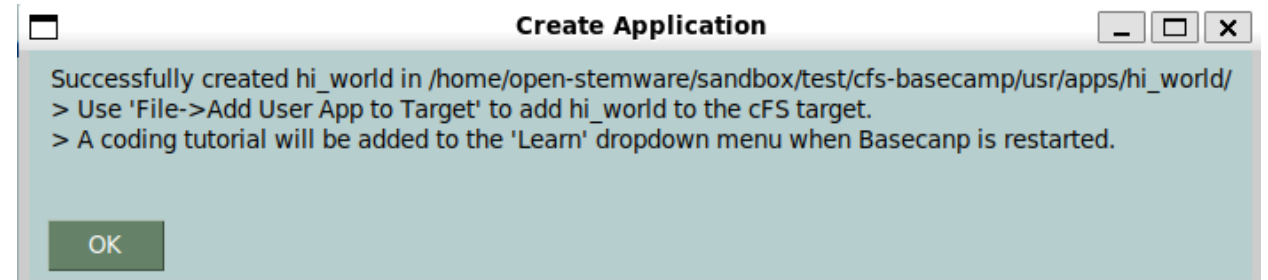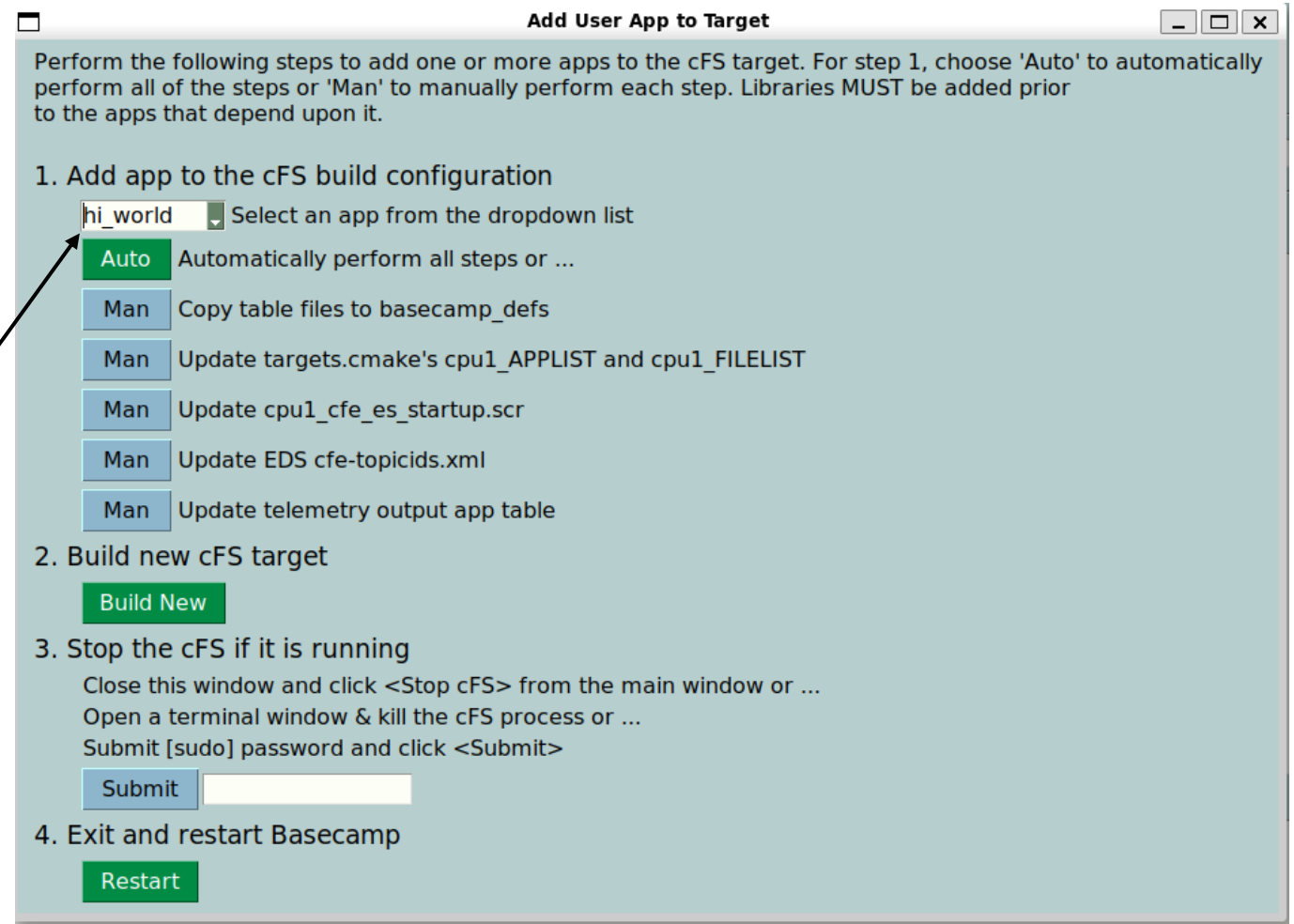
Add Hello World App to the cFS Target (1 of 2)

1. Select File->*Add User App to Target*

2. Select "hi_world" from the dropdown menu

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

File Tools Remote Ops Tutoria

Create Project...

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Exit

Add User App to Target

Perform the following steps to add one or more apps to the cFS target. For step 1, choose 'Auto' to automatically perform all of the steps or 'Man' to manually perform each step. Libraries MUST be added prior to the apps that depend upon it.

1. Add app to the cFS build configuration

   hi_world   Select an app from the dropdown list

   Auto   Automatically perform all steps or ...

   Man   Copy table files to basecamp_defs

   Man   Update targets.cmake's cpu1_APPLIST and cpu1_FILELIST

   Man   Update cpu1_cfe_es_startup.scr

   Man   Update EDS cfe-topicids.xml

   Man   Update telemetry output app table

2. Build new cFS target

   Build New

3. Stop the cFS if it is running

   Close this window and click <Stop cFS> from the main window or ...
   Open a terminal window & kill the cFS process or ...
   Submit [sudo] password and click <Submit>

   Submit

4. Exit and restart Basecamp

   Restart

Add Hello World App to the 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
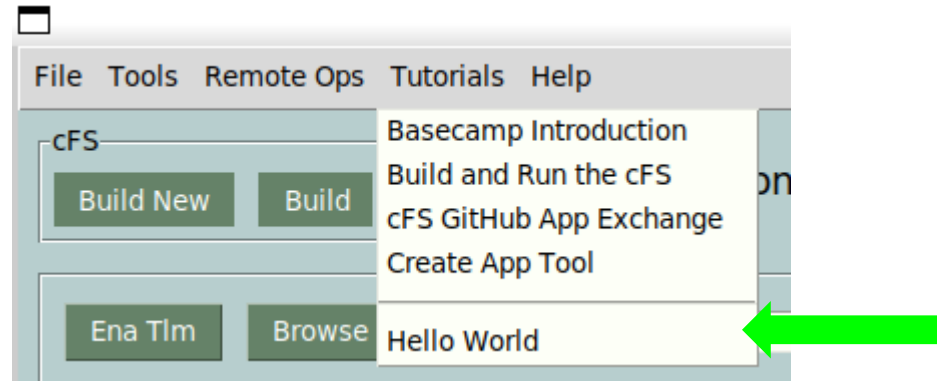
4. Stop the cFS if it is running

5. Restart Basecamp's GUI

   a. This causes Basecamp to use the new python libraries created by the cFS build process

Hello World App Coding Tutorial

- **The Hello World app template also contains a coding tutorial**

- **When the GUI was restarted it discovered this tutorial and added it to the Tutorials menu**

- **Unlike this tutorial that you're current reading, coding tutorials include hands-on exercises and the tutorial environment includes a text editor for doing the exercises**

- **Basecamp includes app templates that provide context for learning how to code common cFS app functions**

- **Educators can create their own app templates for teaching a specific app coding topic**

- **A python library that includes Electronic Data Sheet information is created as part of the cFS target build process. This library is used to populate the GUI menus.**

Telecommands
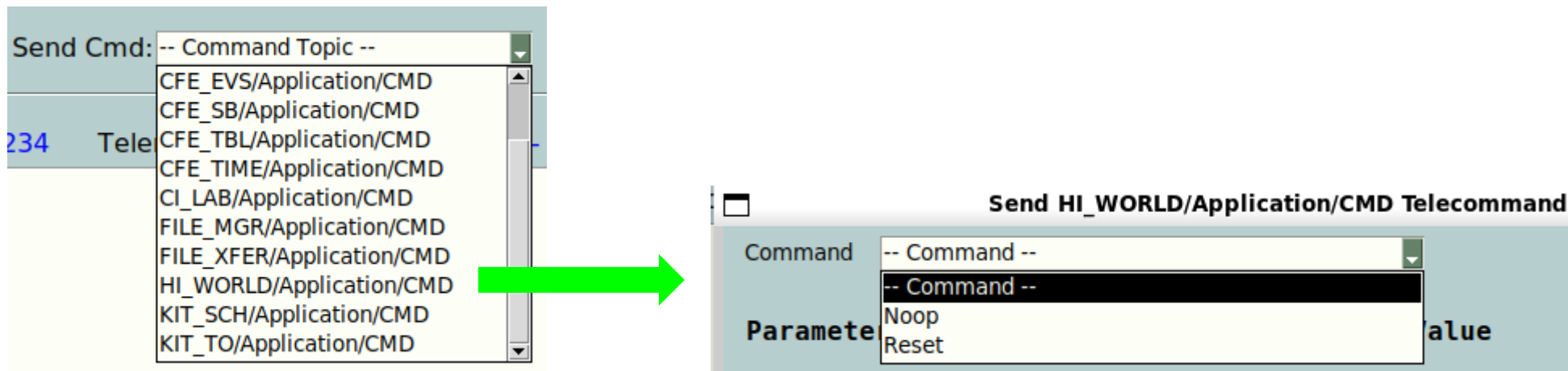
Hello World App Operational Interface (2 of 2))

Telemetry

The next lesson shows you how to run the Hello World app, introduces basic app design concepts and provides a roadmap for next steps