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CLOUD FOUNDRY
SUMMIT



10 common errors when pushing applications to CloudFoundry

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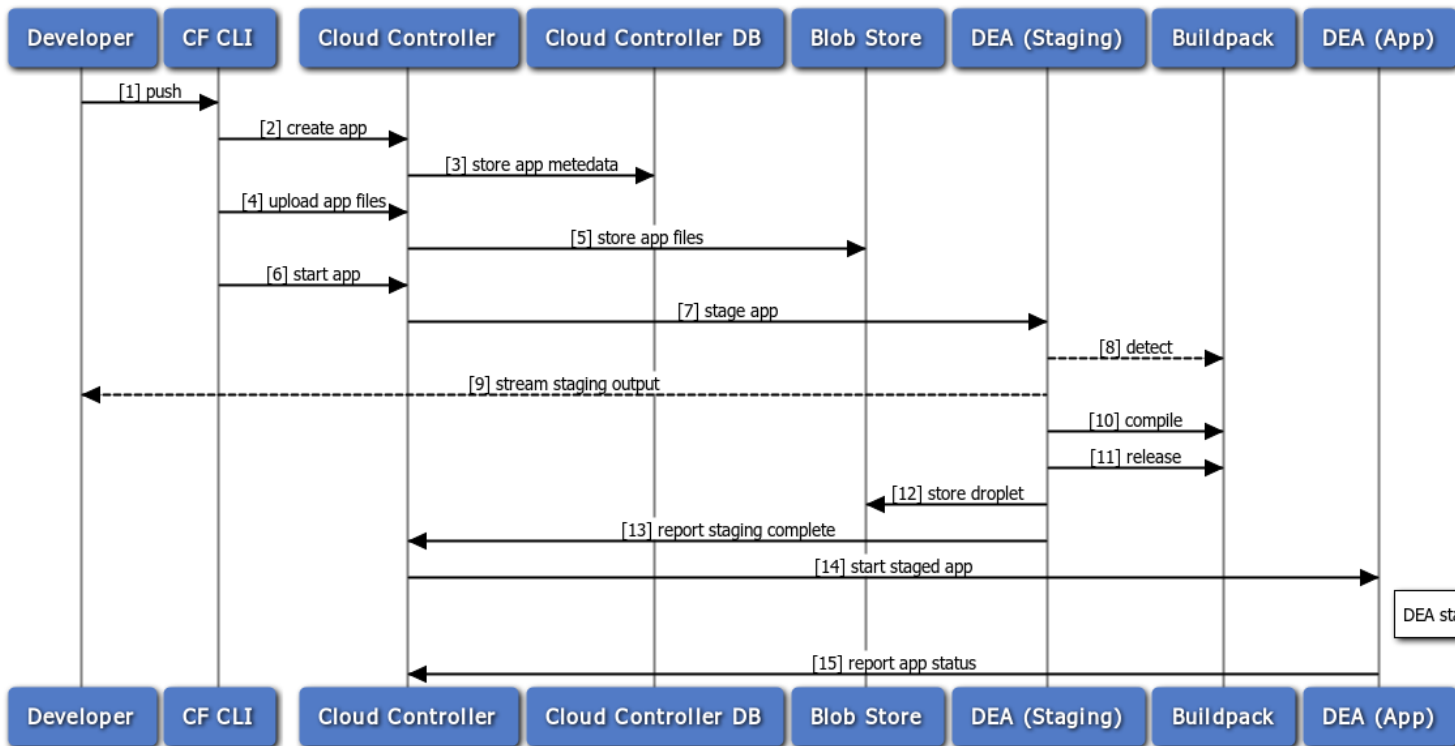
IBM Bluemix runtime architect



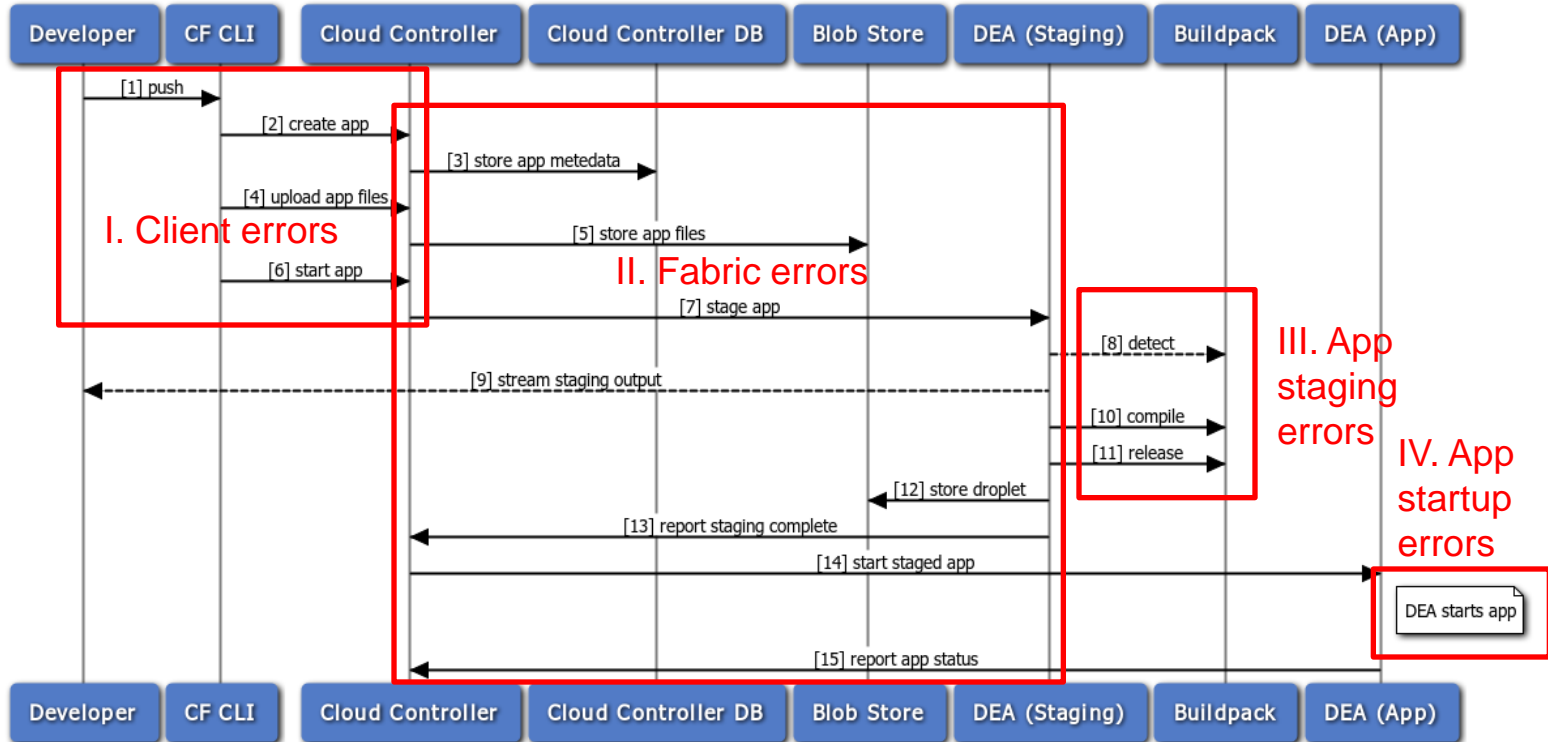
Agenda

- What happens during an app push
- Client errors
- Fabric errors
- App staging errors
- App startup errors

What happens during an app push



What may go wrong



I. Client errors

- ERR 1s (before you start)
 - Cause 1: Not a developer in the space
 - Cause 2: Too old of CLI client
 - Cause 3: Pushing from a wrong directory
 - Forgetting to specify the app package
 - Cause 4: Picking up an unexpected manifest.yml
- ERR 2: the route is already in use
 - Solution:
 - Specify a unique host name via “-n absolutelyunique”
 - Use “--no-route” or “--random-route”
- ERR 3: exceeding your organization's memory limit
- ERR 4: too much disk requested (default limit is 1G)



I. Client errors

- ERR 5: app file upload failed
 - Cause 1: network connectivity issue

```
$ cf push jacklarge  
Updating app jacklarge in org myorg / space myspace as myself...  
OK
```

```
Uploading jacklarge...  
Uploading app files from: e:\Backd\Mails\test  
Uploading 1.1G, 1 files  
Error uploading application.  
Error performing request: Put https://xyz/v2/apps/51cb5e33-8.../bits?async=true: dial tcp: i/o timeout  
FAILED
```

Sample error

- Solution: fix network connectivity



I. Client errors

- Cause 2: too large to upload in time (default limit is 15m) or exceeding size limit (default is 1G)

```
$ cf push jacklarge
Updating app jacklarge in org myorg / space myspace as myself...
OK

Uploading jacklarge...
Uploading app files from: e:\Backd\Mails\test
Uploading 1.1G, 1 files
Done uploading
FAILED
Error uploading application.
The app package is invalid: Package may not be larger than 1073741824 bytes
```

Sample error

- Exclude unnecessary files using “.cignore”
 - Ignore local node_modules
- Instead of packaging all dependencies, install them during app staging by using a custom buildpack
- If the app has many files, try pushing repeatedly as each push tries to upload a delta and thus more files.

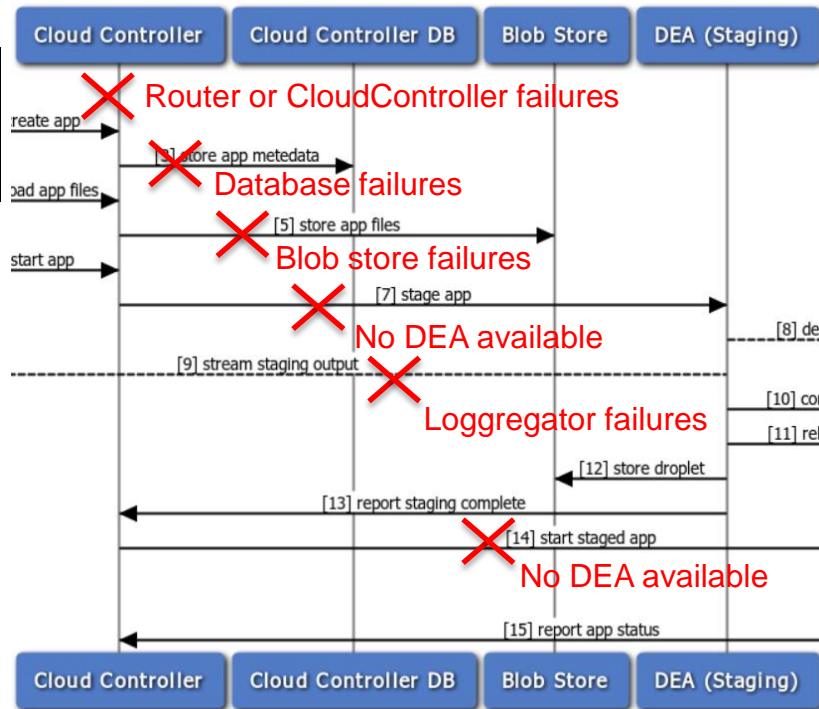


II. Fabric errors

○ ERR 6s:

Done uploading
 FAILED **Sample error**
 Error uploading application.
 Server error, status code: 500, error code: 0, message:

- Unable to connect
 - 500
 - 4xx
- Cause: various fabric component failures
- Diagnosis
- Turn on CF_TRACE to determine which step actually failed
 - Analyze fabric logs



III. App staging errors – buildpack err

○ ERR 7s: invalid buildpack name or url

```
Server error, status code: 400, error code: 100001, message: The app is invalid:  
buildpack notexist is not valid public url or a known buildpack name
```

- Cause 1: wrong buildpack name
 - Solution: run “cf buildpacks” to view available buildpacks; ask admin to install the missing ones using “cf create-buildpack”

```
Cloning into '/tmp/buildpacks/java-buildpack'...  
fatal: could not read Username for 'https://github.com': No  
such device or address  
Cloning into '/tmp/buildpacks/java-buildpack'...  
  
FAILED  
Server error, status code: 400, error code: 170001, message:  
Staging error: cannot get instances since staging failed
```

```
Cloning into '/tmp/buildpacks/nope-buildpack'...  
  
FAILED  
Server error, status code: 400, error code:  
170001, message: Staging error: cannot get  
instances since staging failed
```

- Cause 2: failed to clone buildpack code due to network problem or wrong buildpack url

III. App staging errors – buildpack err

○ ERR 8: detection failure

```
Server error, status code: 400, error code: 170003, message: An app was not successfully detected by any available buildpack
```

- Cause 1: wrong app package
 - Do not create a root folder inside the zip
- Cause 2: pushing from a wrong directory
- Cause 3: required buildpack not installed
 - Diagnosis: run “cf buildpacks” to view available buildpacks
 - Solution: ask admin to install the missing ones using “cf create-buildpack”
- Cause 4: buildpack defect: change app files in its detect code!!!

III. App staging errors – compilation err

○ ERR 9: compilation step failed

```
Staging failed: Buildpack compilation step failed
```

```
FAILED
```

```
Server error, status code: 400, error code: 170004, message: App staging failed in the buildpack compile phase
```

● Diagnosis

- Turn on buildpack traces if supported
 - Java/Liberty buildpack: `cf set-env <appname> JBP_LOG_LEVEL DEBUG`
 - Node.js buildpack: `cf set-env <appname> npm_config_xyz` or include a `.npmrc` file in the app package root
 - `loglevel = silly`
 - PHP buildpack: `cf set-env <appname> BP_DEBUG true`
- Run `cf logs <appname> --recent` to get recent logs after the failure
- Run `cf logs <appname>` in another shell console during staging



III. App staging errors – compilation err

- Cause 1: wrong app package or files
 - Example: malformed package.json in a node.js app

```
2015-04-27T12:06:35.20-0400 [STG/0] ERR parse error: Expected separator between values at line 12, column 13
2015-04-27T12:06:35.20-0400 [STG/0] OUT Staging failed: Buildpack compilation step failed
```

- Cause 2: unable to reach external dependencies
 - Example: unable to reach NPM repo
 - Solution: check connectivity to external dependencies.
 - Make sure Security Group is set correctly to allow connections to those dependencies.

```
2015-04-27T12:18:47.65-0400 [STG/0] OUT -----> Installing dependencies
2015-04-27T12:19:58.33-0400 [STG/0] OUT npm ERR! network getaddrinfo ENOTFOUND
2015-04-27T12:19:58.33-0400 [STG/0] OUT npm ERR! network This is most likely not a problem with npm itself
2015-04-27T12:19:58.33-0400 [STG/0] OUT npm ERR! network and is related to network connectivity.
2015-04-27T12:19:58.33-0400 [STG/0] OUT npm ERR! network In most cases you are behind a proxy or have bad network settings.
```



III. App staging errors – compilation err

- Cause 3: staging timeout (default limit is 15 minutes), dies suddenly & quietly
 - Solution: do less time-consuming tasks during staging. E.g., cache large runtime binary files instead of downloading them
 - Note that `CF_STAGING_TIMEOUT` only controls the CLI wait time.
- Cause 4: staging uses too much memory (default limit is 1G), dies suddenly & quietly
 - Solution: make sure the buildpack releases memories diligently during staging
- Cause 5: staging uses too much disk (default limit is 2G)

```
2015-04-27T16:49:36.22-0400 [STG/0] ERR /tmp/buildpacks/java-buildpack/bin/compile:41:in `write': Disk quota exceeded - /tmp/staged/app/some_file (Errno: DQUOT)
```

- Solution: make sure the buildpack deletes temporary files diligently during staging

III. App staging errors – compilation err

- Cause 6: using unmatching buildpack level
 - Solution: avoid pushing with an external buildpack's master branch, better to use a released version, like
cf push <appname> -b <https://github.com/cloudfoundry/java-buildpack.git#v3.0>
- Cause 7: picked up by wrong buildpack (verify the detected_buildpack field)
 - Solution
 - Use “-b” option to specify the buildpack explicitly, could be the name of an installed admin buildpack (those listed by “cf buildpacks”)
 - Does the app contain some suspicious sign files?
- Cause 8: script permission in the buildpack, e.g., “x” bit not set
 - Solution: add “x” to all executable scripts in the buildpack

IV. App startup errors

○ ERR 10: start app timeout or unsuccessful

```
-----> Uploading droplet (14M)
```

```
0 of 1 instances running, 1 starting  
0 of 1 instances running, 1 starting  
0 of 1 instances running, 1 down  
0 of 1 instances running, 1 down  
0 of 1 instances running, 1 down  
0 of 1 instances running, 1 starting  
0 of 1 instances running, 1 starting  
0 of 1 instances running, 1 down  
0 of 1 instances running, 1 down  
0 of 1 instances running, 1 starting  
0 of 1 instances running, 1 down
```

```
FAILED
```

```
Start app timeout
```

```
(Or, "Start unsuccessful")
```

```
$ cf app jackruby
```

```
Showing health and status for app jackruby in org myorg / space myspace as myself...
```

```
OK
```

```
requested state: started
```

```
instances: 0/1
```

```
usage: 128M x 1 instances
```

```
urls: jackruby.mybluemix.net
```

```
last uploaded: Wed Apr 29 18:40:40 UTC 2015
```

	state	since	cpu	memory	disk
#0	crashing	2015-04-29 02:42:28 PM	0.0%	0 of 0	0 of 0

IV. App startup errors

- Diagnosis
 - Run “cf logs <appname> --recent” to get recent logs after the failure
 - Run “cf logs <appname>” in another shell console during staging

```
2015-04-29T12:35:49.43-0400 [STG/27]   OUT ----> Uploading droplet (14M)
2015-04-29T12:35:54.37-0400 [DEA/27]   OUT Starting app instance (index 0) with guid ceb4f93b-6306-4842-8637-1d1731412bdc
2015-04-29T12:37:06.75-0400 [DEA/27]   ERR Instance (index 0) failed to start accepting connections
2015-04-29T12:37:06.76-0400 [API/8]    OUT App instance exited with guid ceb4f93b-6306-4842-8637-1d1731412bdc payload: {"cc_partition"=>"default", "droplet"=>"ceb4f93b-6306-4842-8637-1d1731412bdc", "version"=>"d237ca74-f30a-41fc-afd8-fe8f66152698", "instance"=>"b7e9b891ddd7474f828412bd1d7bb329", "index"=>0, "reason"=>"CRASHED", "exit_status"=>-1, "exit_description"=>"failed to accept connections within health check timeout", "crash_timestamp"=>1430325426}
2015-04-29T12:37:07.00-0400 [App/0]    ERR
...
```

```
2015-04-29T14:27:51.12-0400 [STG/8]   OUT ----> Uploading droplet (14M)
2015-04-29T14:27:54.83-0400 [DEA/8]   OUT Starting app instance (index 0) with guid ceb4f93b-6306-4842-8637-1d1731412bdc
2015-04-29T14:28:06.98-0400 [API/3]    OUT App instance exited with guid ceb4f93b-6306-4842-8637-1d1731412bdc payload: {"cc_partition"=>"default", "droplet"=>"ceb4f93b-6306-4842-8637-1d1731412bdc", "version"=>"73474c66-caaa-470b-ad88-28e854c7db83", "instance"=>"0baf945674c94a9db294caa6ce0b991d", "index"=>0, "reason"=>"CRASHED", "exit_status"=>0, "exit_description"=>"app instance exited", "crash_timestamp"=>1430332086}
2015-04-29T14:29:07.02-0400 [DEA/8]   ERR Instance (index 0) failed to start accepting connections
```

IV. App startup errors

- Cause 1: taking too long to start
 - General solution:
 - Increase startup timeout by specifying “-t” option when pushing, default is 60 seconds, and max is 180 seconds.
 - 180 seconds not enough?
 - Root cause 1: too much initialization during startup, such as loading lots of data
 - Solution 1: start with “--no-route”, then do “map-route” when initialization is done
 - Solution 2: lazy initialization and/or async initialization
 - Root cause 2: listening on the wrong port
 - Solution: make sure the app is listening on \$PORT
 - Root cause 3: reaching out to external network but timeout
 - Solution: check connectivity to external dependencies. Make sure Security Group is set correctly.

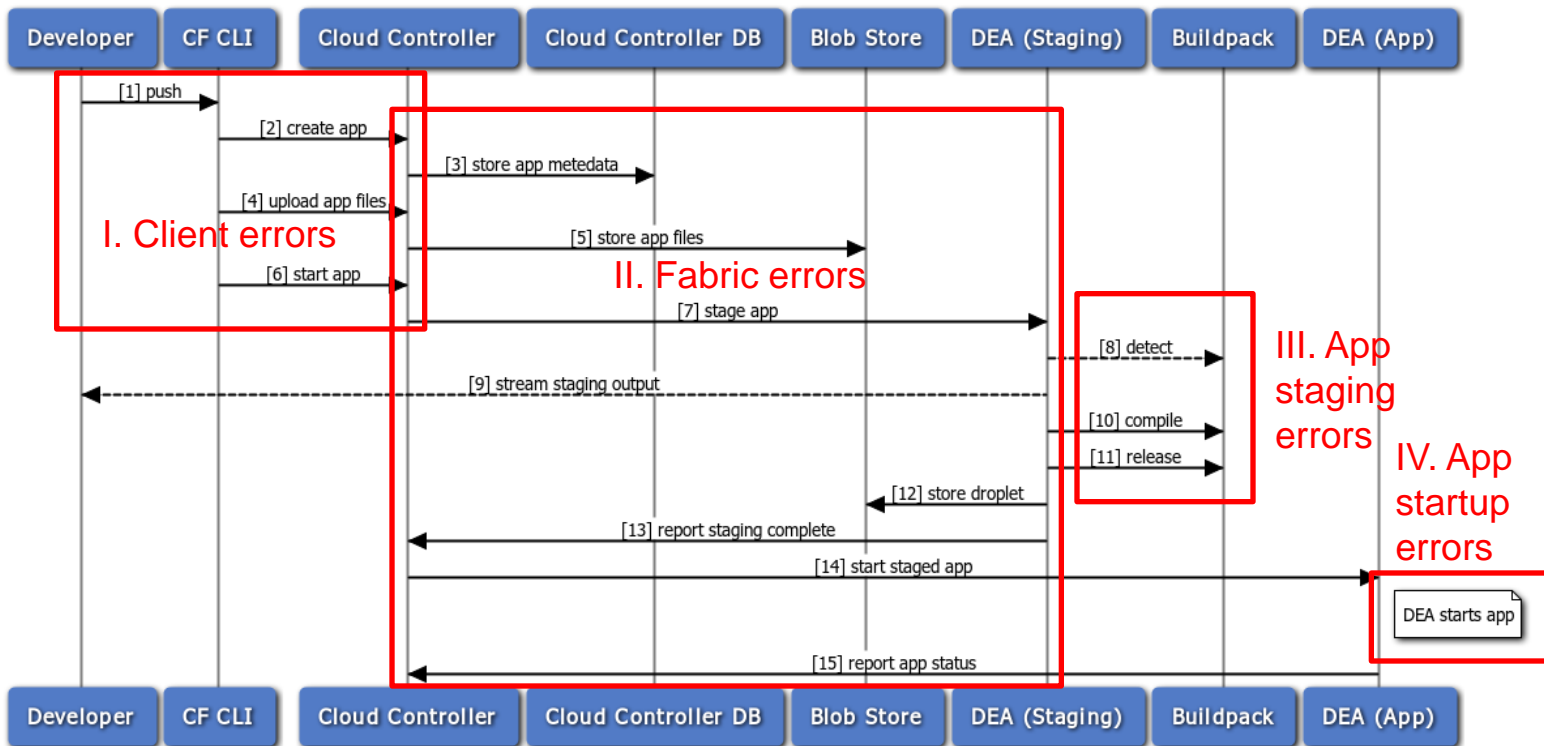
IV. App startup errors

- Cause 2: app logic error and exiting
 - Missing service binding?
- Cause 3: consuming too much memory
 - Solution:
 - Check for memory leakage
 - Repush with increased memory allocation
`cf push <appname> -m 2G`
- Cause 4: consuming too much disk (After reaching the quota, your app will fail to write any additional data to disk.)
 - Solution: repush with increased disk allocation
`cf push <appname> -k 2G`
Note: you cannot go beyond the max set by the provider, default is 2G.

IV. App startup errors

- Advanced diagnosis techniques
 - Keep the container alive after app crashing (so that you can do “cf files” etc.)
 - With IBM JDK, `-Xdump:tool` JVM option can be used to run some scripts before the JVM exits, e.g.:
`cf se <appname> JVM_ARGS -Xdump:tool:events=vmstop,exec="sleep 1d"`
Better together with: `-Xdump:heap+java:events=vmstop`
 - For general apps, modify the start command to add “;sleep 1d”
`cf push <appname> -c “<original_command> ;sleep 1d” --no-route`
 - Run an agent process as the main process to get the container up, then diagnose the app
 - cf-ssh
 - “Development mode” in Bluemix
- Final tip: “cf delete” to clean up the history and repush

Summary





Thanks!