



# Cloud Foundry – Logging And Trouble Shooting

# Objectives of CF – Logging And Trouble Shooting

- Purpose:
  - To learn pivotal cloud foundry Logging and Trouble Shooting
- Product:
  - Logging
  - Trouble Shooting
  - Understanding Application Deloyment
- Process:
  - To learn and deploy a service.

# Table of Contents

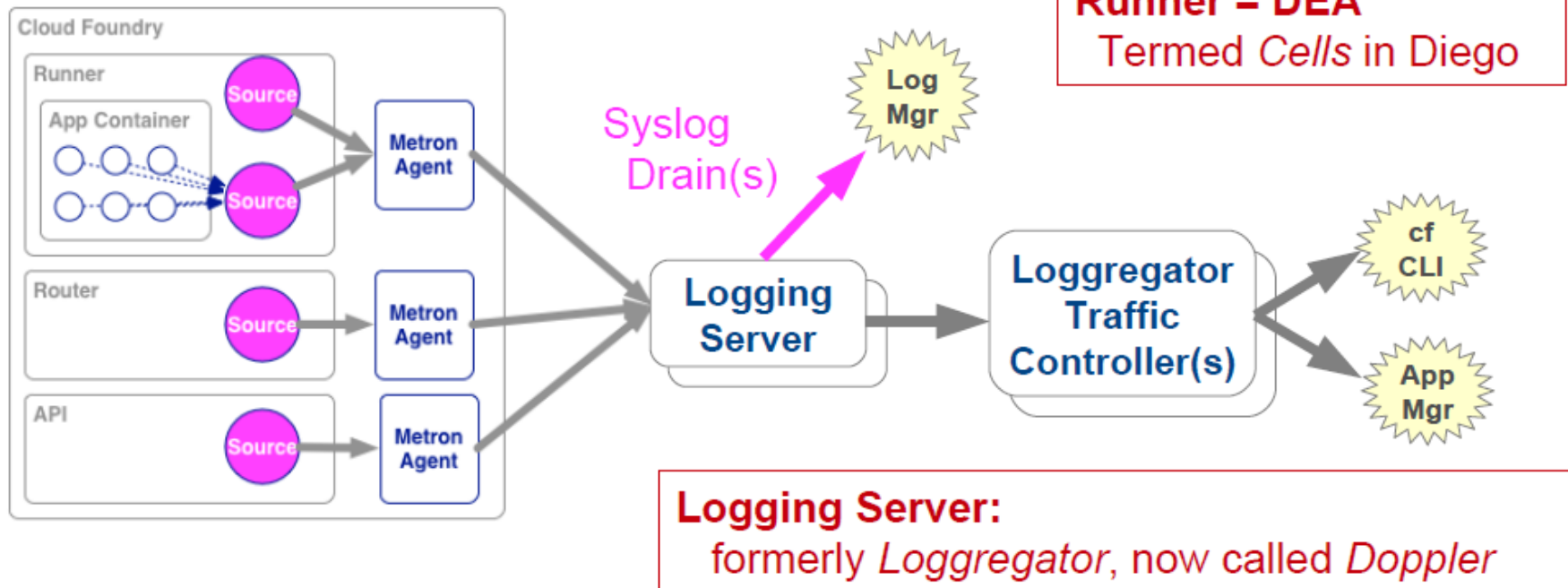
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- Logging
- Trouble Shooting
- How Deployment Happens

# LOGGING

# Log Aggregation Architecture

- **Collects** logging output from:
  - Application Instances, CF Components
- **Aggregates** into a consolidated log



# Logging Terminology

## ■ CF 1.3 or earlier

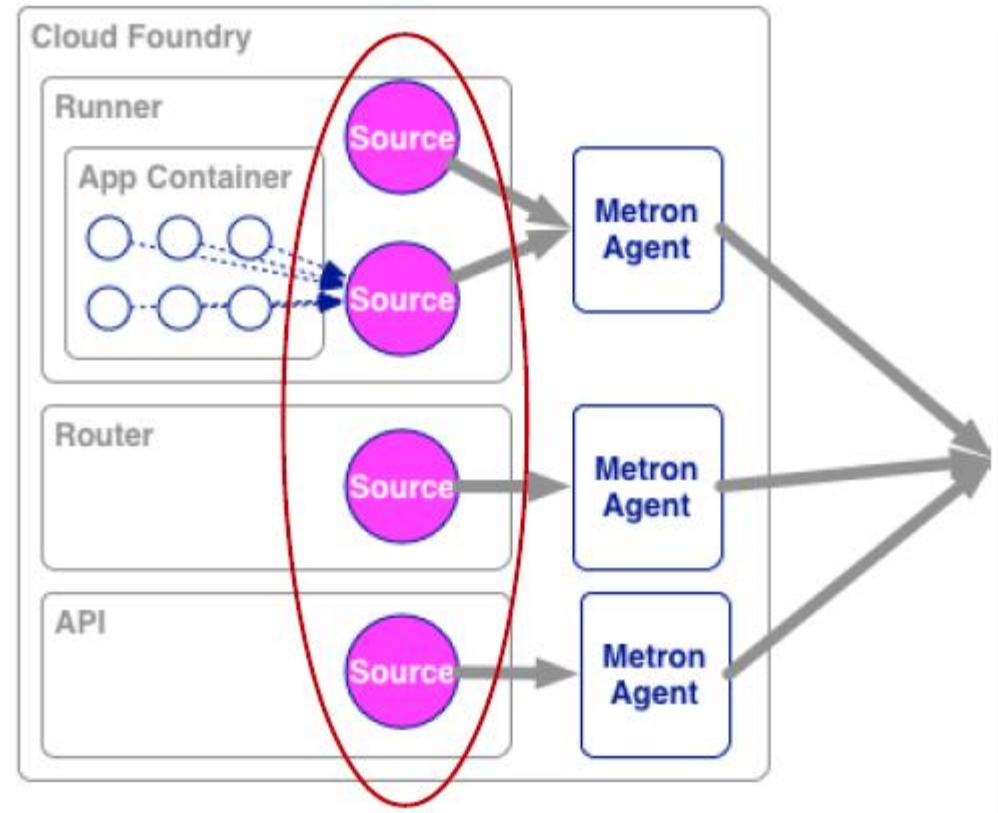
- Apps & CF Components logged to a Loggregator process
- It both accumulated and supplied logging information
- Loggregator referred to this process

## ■ CF 1.4 or later

- **Loggregator** : entire Log Aggregation Architecture
  - Metric agents + logging servers + traffic controllers
- Multiple components
  - **Metron Agents** : receive both log and metrics
  - **Doppler Server(s)** : accumulates data from agents
  - **Traffic Controller(s)** : allow access to metrics and logs

# Logging - Sources

- Application Instances
  - Logs collected from all application instances
    - From sysout or syserr
- Cloud Foundry Components
  - Router, Cloud Controller, DEA's ect
  - Useful to understand update/deployment issues



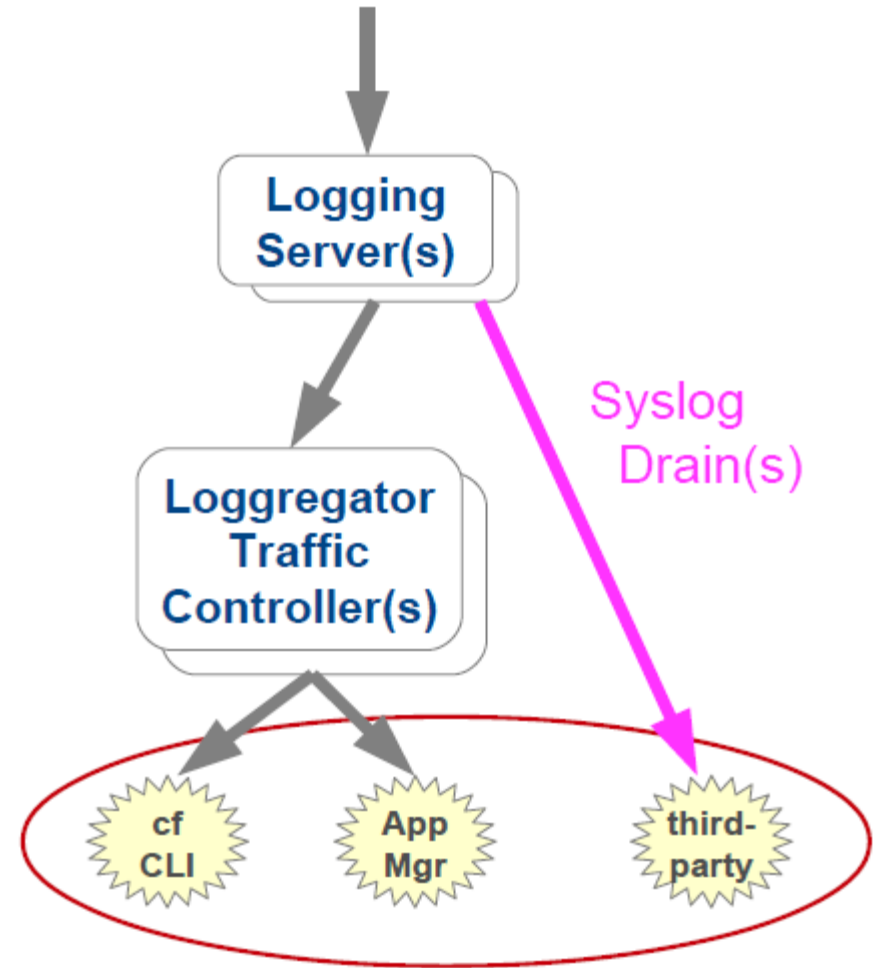
# Logging - Sinks

## ■ CLI - Tail

- Quick, direct way to obtain output
- cf logs <appname>

## ■ Third-party log managers

- Splunk, Logentries, logstash, Papertrail, ect





# A Tour of Log Output

Timestamp – Added by Loggregator

```
2014-04-11T14:58:41.66 [API] OUT Updated app with guid 018f9a20-f0c9-4b5a-970d-e84f05375859 ({\"instances\"=>2})
2014-04-11T14:58:53.32 [App/0] OUT 18:58:53,323 INFO WebApplicationC
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2014-04-11T14:58:57.44 [App/0] ERR INFO: Starting ProtocolHandler [\"http-bio-62773\"]
2014-04-11T14:58:57.45 [App/0] ERR Apr 11, 2014 6:58:57 PM org.apache.catalina.startup.Catalina start
2014-04-11T14:58:57.45 [App/0] ERR INFO: Server startup in 8713 ms
2014-04-11T15:01:09.44 [RTR] OUT spring-music-567.cfapps.io - [19:01:09 +0000] \"GET /info HTTP/1.1\" 200 48
2014-04-11T15:01:09.46 [RTR] OUT spring-music-567.cfapps.io - [19:01:09 +0000] \"GET /albums HTTP/1.1\" 200 4669
2014-04-11T15:03:35.16 [DEA] OUT Starting app instance (index 1) with guid 018.70d-e84f05375859
2014-04-11T15:03:40.43 [App/1] ERR INFO: Starting Servlet Engine: Apache Tomcat/7.0.52
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# A Tour of Log Output

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## Log Type / Origin

Where this message came from

- API – Cloud Controller
  - A change in application state
- App/# - Your Application / Instance number
- RTR – Router
- DEA – Droplet Execution Agent
- etc.

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2014-04-11T15:03:35.15 [API] OUT Updated app with guid 018f9a20-f0c9-4b5a-970d-e84f05375859 ({"instances"=>2})
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## Channel

- Whether this output came from "SYSOUT" or "SYSERR"



# A Tour of Log Output

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## Message

- From the application / component

# A Tour of Log Output

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2014-04-11T15:01:09.44 [RTR] OUT spring-music-567.cfapps.io - [19:01:09 +0000] "GET /info HTTP/1.1" 200 48
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2014-04-11T15:03:35.15 [API] OUT Updated app with guid 018f9a20-f0c9-4b5a-970d-e84f05375859 ({"instances"=>2})
```

Instance 0 startup activity  
(condensed)

# A Tour of Log Output

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User requests for a  
web page on instance 0



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Request to scale application

- `cf scale <appname> -i 2`

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2014-04-11T14:58:57.44 [App/0] ERR INFO: Starting ProtocolHandler ["http-bio-62773"]
2014-04-11T14:58:57.45 [App/0] ERR Apr 11, 2014 6:58:57 PM org.apache.catalina.startup.Catalina start
2014-04-11T14:58:57.45 [App/0] ERR INFO: Server startup in 8713 ms
2014-04-11T15:01:09.44 [RTR] OUT spring-music-567.cfapps.io - [19:01:09 +0000] "GET /info HTTP/1.1" 200 48
2014-04-11T15:01:09.46 [RTR] OUT spring-music-567.cfapps.io - [19:01:09 +0000] "GET /albums HTTP/1.1" 200 4669
2014-04-11T15:03:35.16 [DEA] OUT Starting app instance (index 1) with guid 018.70d-e84f05375859
2014-04-11T15:03:40.43 [App/1] ERR INFO: Starting Servlet Engine: Apache Tomcat/7.0.52
2014-04-11T14:58:54.47 [App/1] OUT ...]
2014-04-11T14:58:56.26 [App/1] OUT Hibernate: insert into Album (albumId, artist, trackCount, id) values (?, ?, ?, ?, ?, ?, ?)
2014-04-11T14:58:56.26 [App/1] OUT Hibernate: insert into Album (albumId, artist, trackCount, id) values (?, ?, ?, ?, ?, ?, ?)
2014-04-11T14:58:56.38 [App/1] ERR INFO: Initializing Spring Environment for Cloud Foundry
2014-04-11T14:58:57.44 [App/1] ERR Apr 11, 2014 6:58:57 PM org.apache.coyote.AbstractProtocol start
2014-04-11T14:58:57.44 [App/1] ERR INFO: Starting ProtocolHandler ["http-bio-62773"]
2014-04-11T14:58:57.45 [App/1] ERR Apr 11, 2014 6:58:57 PM org.apache.catalina.startup.Catalina start
2014-04-11T14:58:57.45 [App/1] ERR INFO: Server startup in 8713 ms
2014-04-11T15:03:35.15 [API] OUT Updated app with guid 018f9a20-f0c9-4b5a-970d-e84f05375859 ({"instances"=>2})
```

Instance #1 startup activity



# Accessing Logs

- Tailing - provides real time tail of output from loggregator
  - `cf logs <<app_name>>`
  - Live feed
  - Use `<ctrl> c` to exit
- Recent activity
  - `cf logs <<app_name>> --recent`

# Direct Access to Files/Logs

- Log files can be accessed directly via CLI
  - `cf files <app_name> <path_to_directory_to_view>`

```
> cf files spring-music /
app/                                -
logs/                               -
run.pid                             3B
staging_info.yml                    426B
tmp/                                -
```

Second  
instance

- View contents of a specific file

```
> cf files spring-music /logs/stdout.log -i 1
20:55:27,179 INFO ContextLoader:272 - Root started
20:55:27,878 INFO :67 - Found serviceInfos:
20:55:27,879 INFO :513 - Refreshing Root
...
```

# Eclipse Remote System View

## Applications

Select a currently deployed application to see details.

- cf-profile-test
- cf-service-broker

### General

Name: cf-profile-test [Started]

Mapped URLs: [cf-profile-test-dev.cfapps.io](http://cf-profile-test-dev.cfapps.io)

Memory limit: 512M Change is not updated until application restarts

Instances: 1

Stop Restart

### Application Services

Name	Vendor	Plan	Version
------	--------	------	---------

### Instances

ID	Host	CPU	Memory	Disk	Uptime
0	10.10.17.11	0.0% (0)	0M (512M)	102M (1024M)	0h:0m:0s

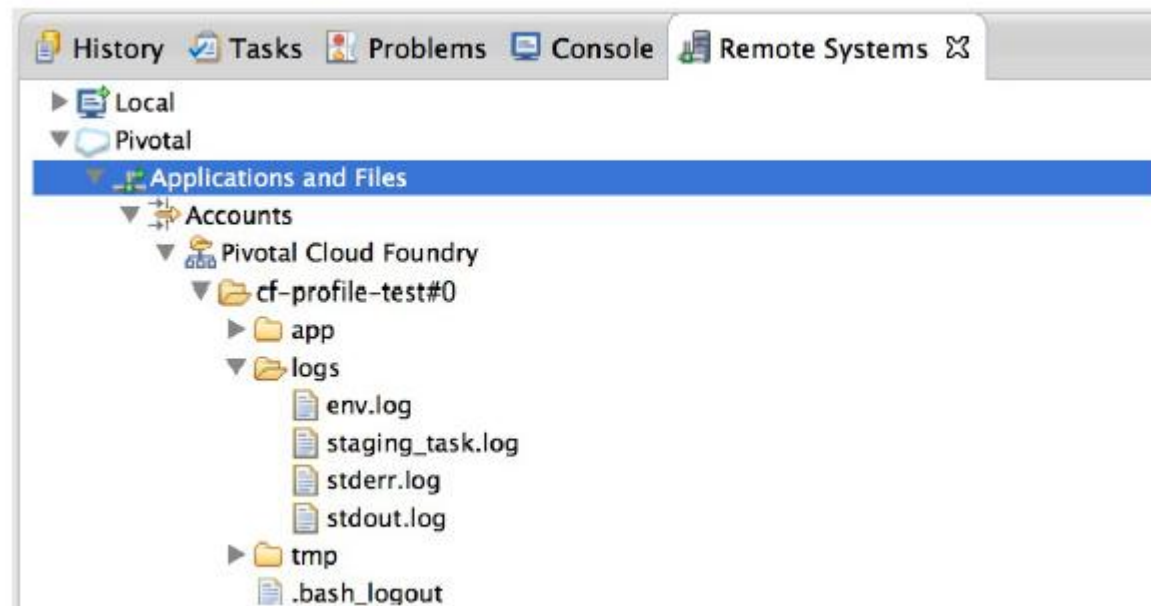
Show deployed files in [Remote Systems View](#).

## Services

# Eclipse Remote Systems View - cont

## Eclipse plug-in for Cloud Foundry

- Remote Systems View
- Access logs



# TROUBLESHOOTING

# Troubleshooting applications in Cloud Foundry

- Troubleshooting Applications in Cloud Foundry can be hard
  - Deployment / push issues
  - Runtime issues
- Important to be familiar with the tools at your disposal

# cf apps command

- **cf apps** - Lists all applications within a space
  - ... and their status
- **cf apps <app-name>** - Lists all instances of an application within a space
  - ... and their status

```
> cf app spring-music
```

```
...
```

	state	since	cpu	memory	disk
#0	running	2014-04-14 03:27:02 PM	0.1%	407.1M of 512M	134.8M of 1G
#1	starting	2014-04-14 09:12:37 PM	0.0%	0 of 0	0 of 0
#2	running	2014-04-14 09:12:55 PM	0.0%	415.9M of 512M	134.8M of 1G
#3	running	2014-04-14 09:12:54 PM	0.0%	415.7M of 512M	134.8M of 1G

# Events

- `cf events <app-name>`
  - Event log related to your application

```
> cf events spring-music
```

time	event	description
2014-04-01T16:33:37.00-0400	audit.app.create	instances: 1, state: STOPPED
2014-04-01T16:33:38.00-0400	audit.app.update	
2014-04-01T16:34:17.00-0400	audit.app.update	state: STARTED
2014-04-01T17:03:45.00-0400	audit.app.update	
2014-04-01T19:30:09.00-0400	audit.app.update	instances: 1, state: STOPPED
2014-04-10T17:56:07.00-0400	audit.app.update	
2014-04-10T17:56:11.00-0400	audit.app.update	state: STARTED
2014-04-10T17:58:48.00-0400	audit.app.update	state: STOPPED
2014-04-11T14:58:41.00-0400	audit.app.update	state: STARTED
2014-04-11T15:03:35.00-0400	audit.app.update	instances: 2
2014-04-11T15:16:28.00-0400	audit.app.update	state: STOPPED
2014-04-11T16:55:17.00-0400	audit.app.update	state: STARTED
2014-04-14T21:12:40.00-0400	audit.app.update	instances: 4



# Recent Logs

- Obtain most recent subset of logs
  - very useful when diagnosing a crash
  - **cf logs <app-name> --recent**

# CF\_TRACE

- Set this environment variable
  - On our own machine (not a Cloud Foundry variable)
  - Detected by the cf utility causing it to generate extra debugging output
  - Displays REST messages between cf and Cloud Foundry
- Usage

```
export CF_TRACE=true  
cf push ...
```

MacOS  
/ Linux

```
export CF_TRACE=/path/to/log/file  
cf push ...
```

MacOS/Linux

```
set CF_TRACE=true
```


MS Windows

```
set CF_TRACE=\path\to\log\file
```

MS Windows

# Common CF Deployment Issue - Java

- Memory set too low
  - Warden container fails due to memory, discarded, new container created, fails again, restarted, fails ...
- JAR / WAR too large, upload fails
  - Resolve by:
    - push the JAR / WAR only
    - Decompose application
- Slow start, health check fails
  - Specify Tomcat `BindOnInit = false`
  - Alter timeout settings (explained later...)



Known as  
FLAPPING

# Best Practices - Ruby

- Precompile assets
  - Recommended to reduce staging time
- Use `rails_serve_static_assets` gem (Rails 4)
  - Sets `config.serve_static_assets = true`
  - Allows populating of CDN, or serving files directly from application
- Don't push unnecessary files
  - List them in `.cfignore`
  - `cf` should ignore `.cfignore`!

```
.cfignore  
.gitignore  
_darcs  
.DS_Store  
.git  
.hg  
.svn  
/manifest.yml  
/tmp  
/logs
```

# Best Practices – Node.js

- `package.json` *mandatory*
  - For configuration
- Again. don't push unnecessary files
  - Use `.cfigure`
- Specify application's web start command
  - Using a Procfile
  - Or `cf push -command "node myapp.js"`
  - Or Cloud Foundry deployment manifest
    - (covered later)

```
{
  "name": "myapp",
  "version": "0.0.1",
  "author": "Your Name",
  "dependencies": {
    "express": "3.4.8",
    "consolidate": "0.10.0",
    "express": "3.4.8",
    "swig": "1.3.2"
  },
  "engines": {
    "node": "0.12.2",
    "npm": "2.7.4"
  }
}
```

# Controlling Timeouts



- When a new application is pushed, timeouts may occur
  - `cf push` after 60 secs
  - Application staging after 15 mins
  - Application start-up after 5 minutes
- Can specify push timeout in *seconds* using `-t` option
  - `cf push -t 120`
  - maximum timeout is 180s
- Use environment variables to control staging or startup
  - `CF_STAGING_TIMEOUT` and `CF_STARTUP_TIMEOUT`
  - specify time in *minutes*

# What about IDE Debugging?

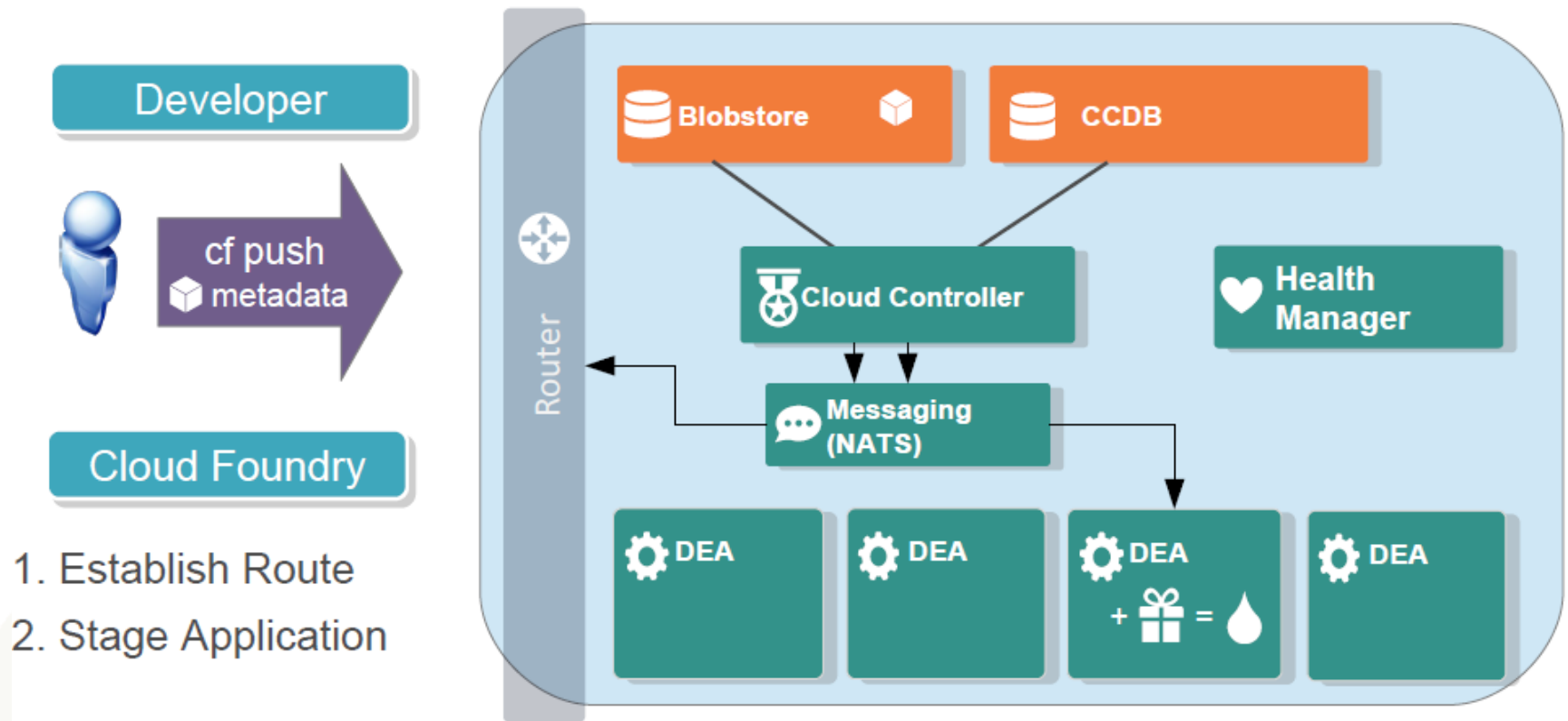
- Connecting an IDE to an application running on Cloud Foundry is basically not possible
- Cloud Foundry restricts incoming traffic
  - Only HTTP on port 80 & 443
- Work-arounds are possible
  - Described in later module
- Recommendations: debug applications locally, rely on techniques just described for troubleshooting.

# HOW DEPLOYMENT HAPPENS



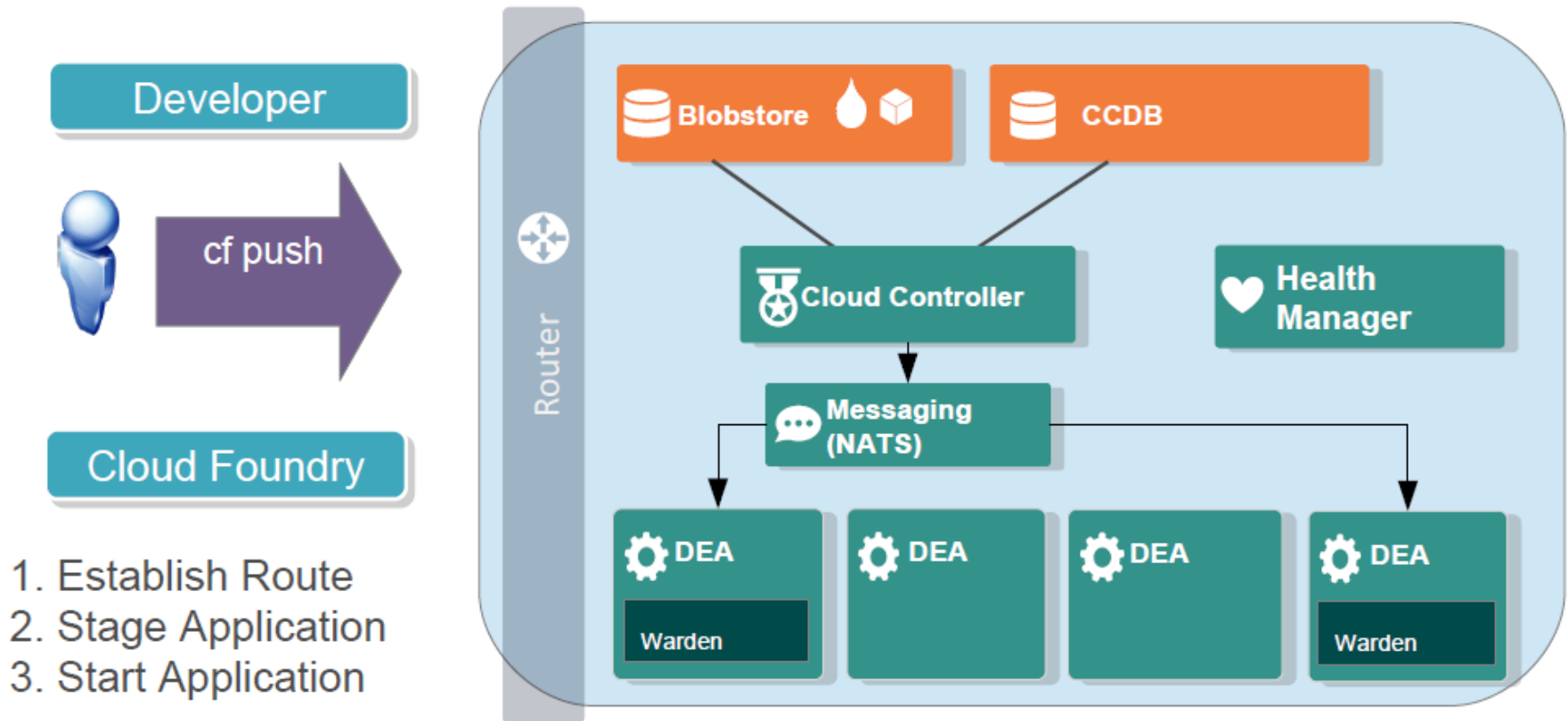
# Deploying App to Cloud Foundry

## Push & Staging



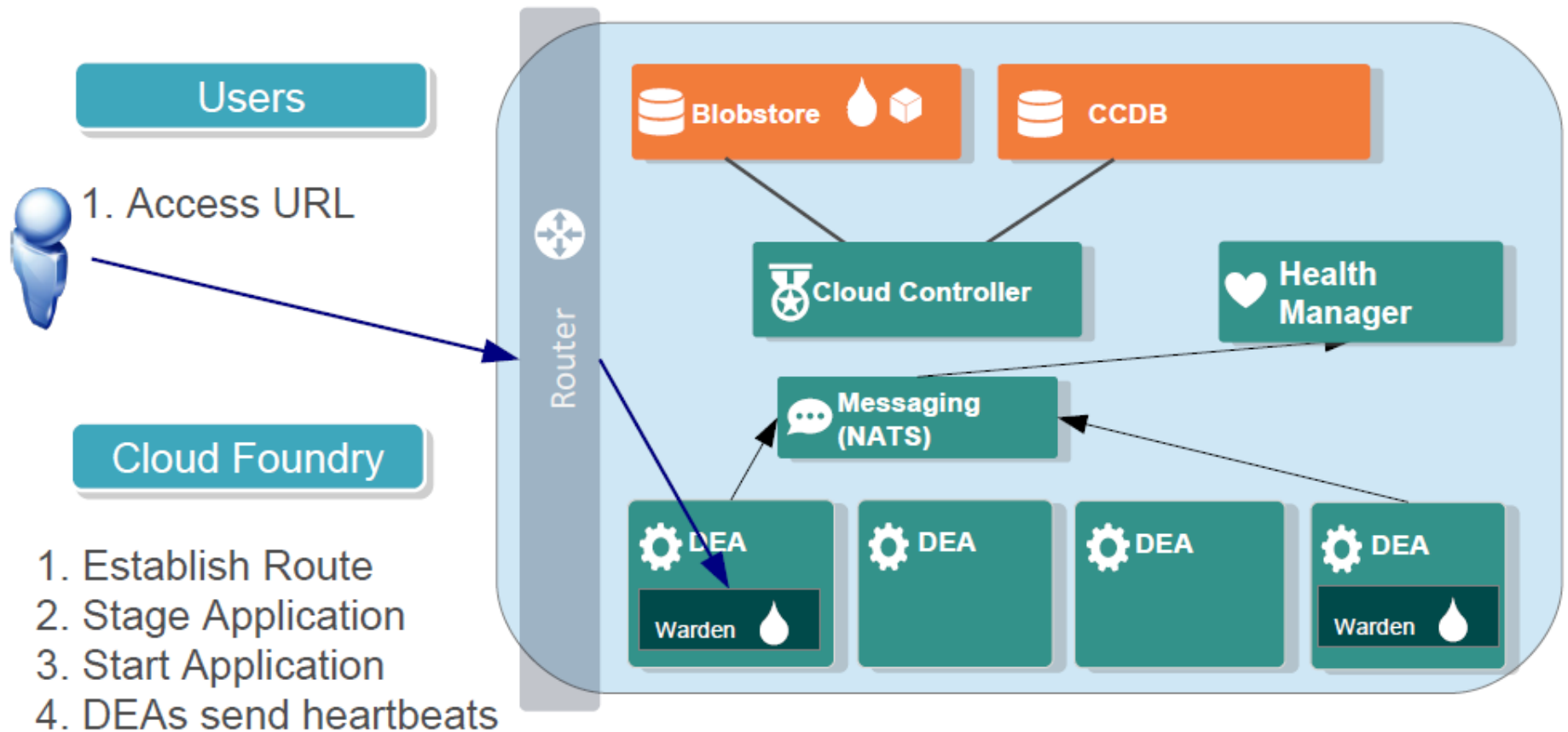
# Deploying App to Cloud Foundry

## Starting



# Deploying App to Cloud Foundry

## Health Management & Running



# Summary

---

- How to log and troubleshooting application
- How deployment Happens

# Recap

---

CF\_TRACE

Log

troubleshooting

deployment

cf logs

cf events

People matter, results count.



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