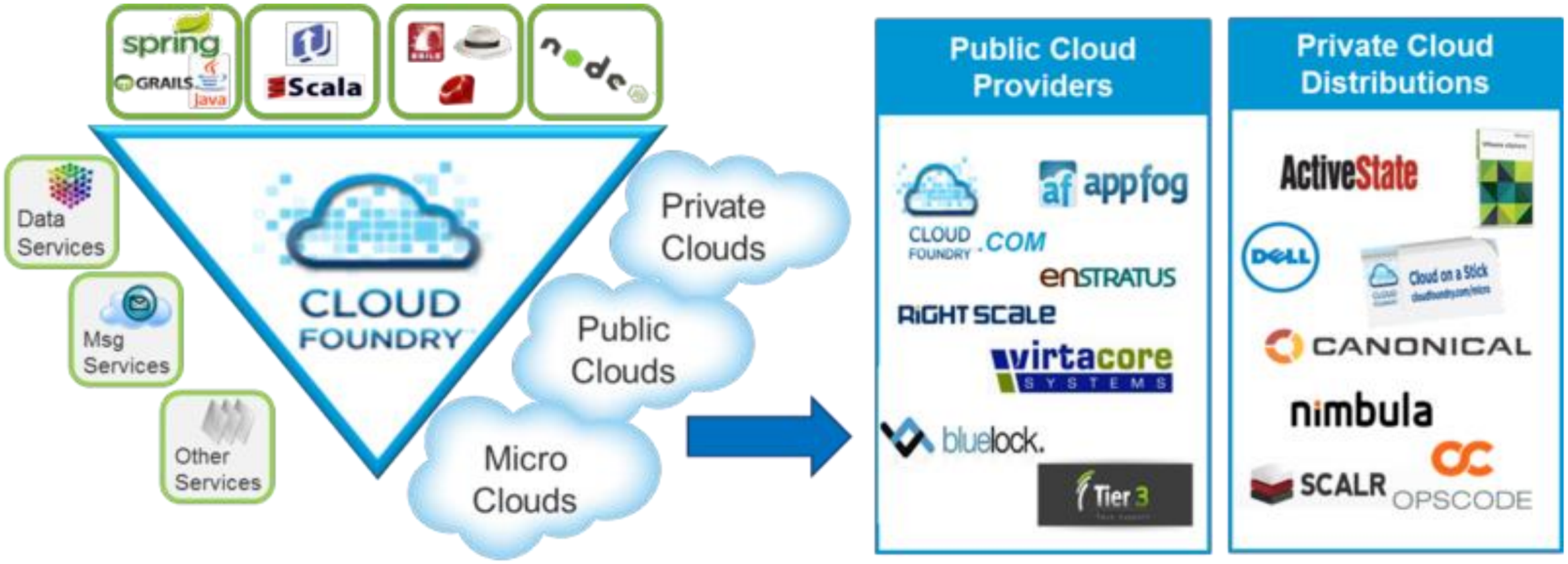
Module 7: How Cloud Foundry works

Cloud Foundry internals

Cloud Foundry

An open platform as a service (**PaaS**). The system supports **multiple** frameworks, **multiple** application infrastructure services, and deployment to **multiple** clouds.



Making Multi-Cloud a Reality

Lots of languages, frameworks, and services

Multiple languages

- Ruby, Java, Scala, Node.js, Erlang, Python, PHP, etc.

Multiple frameworks

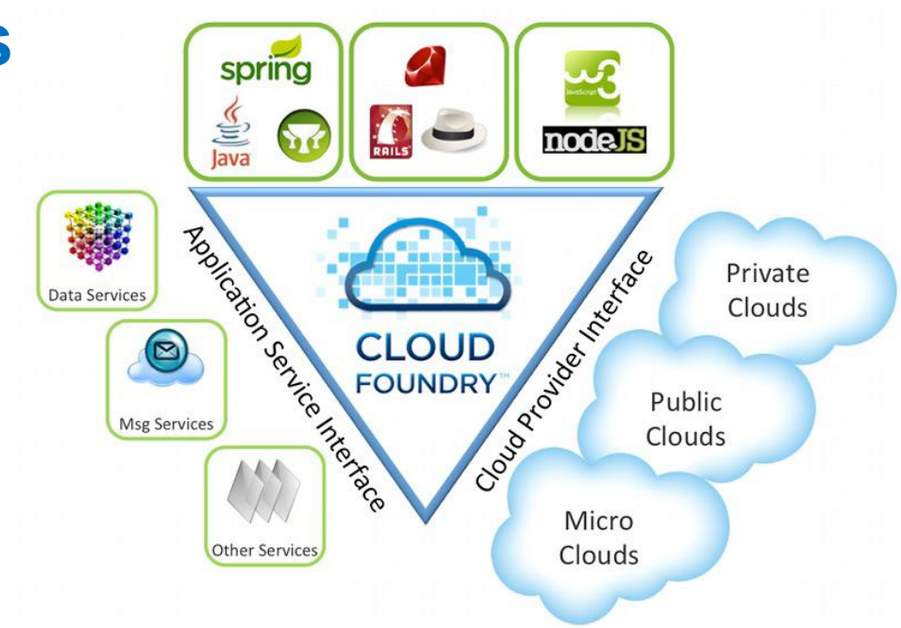
- Rails, Sinatra, Spring, Grails, Express, Lift, etc.

Multiple services

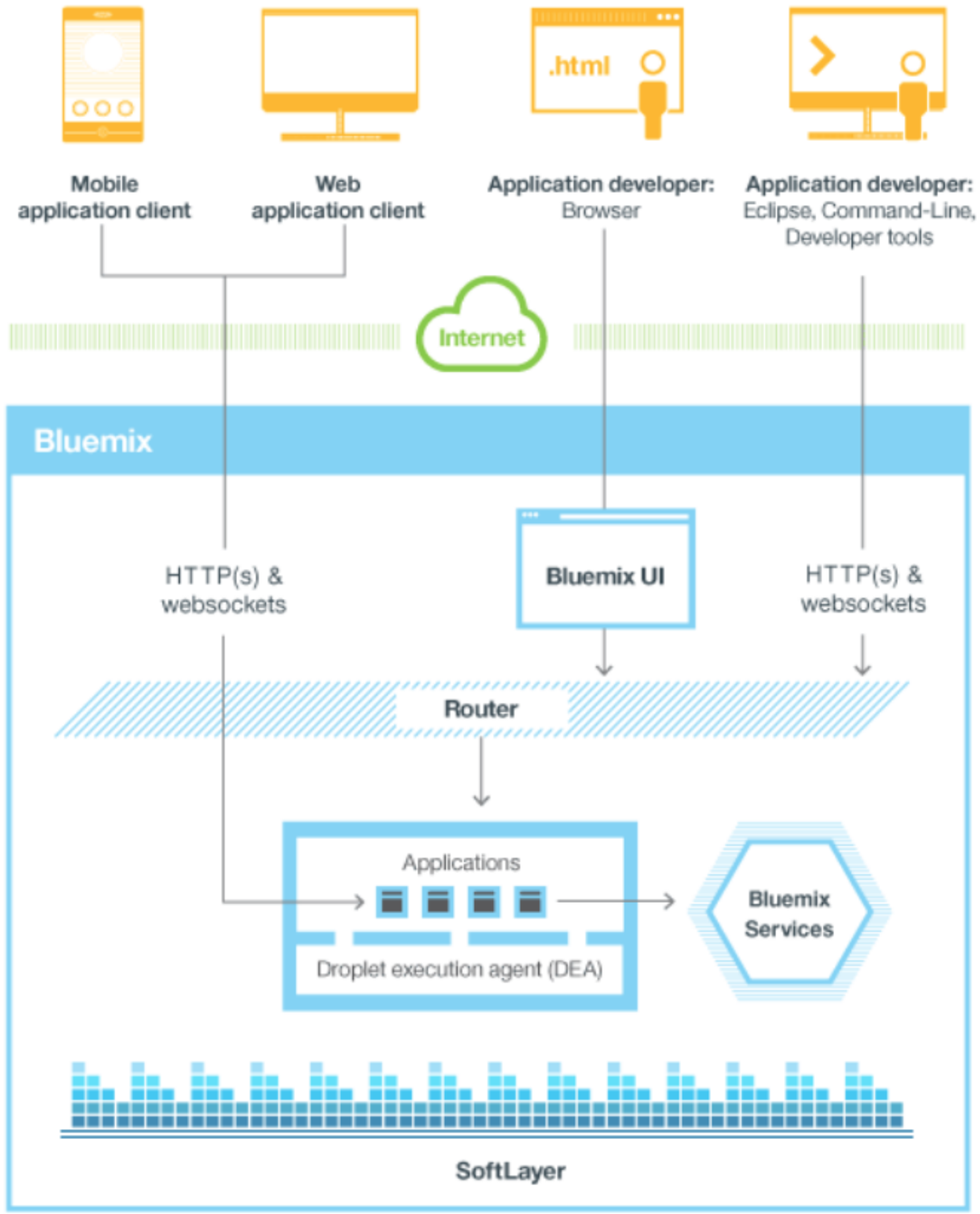
- MySQL, Postgres, MongoDB, Redis, RabbitMQ, etc.

Multiple clouds, Multiple IaaS environments

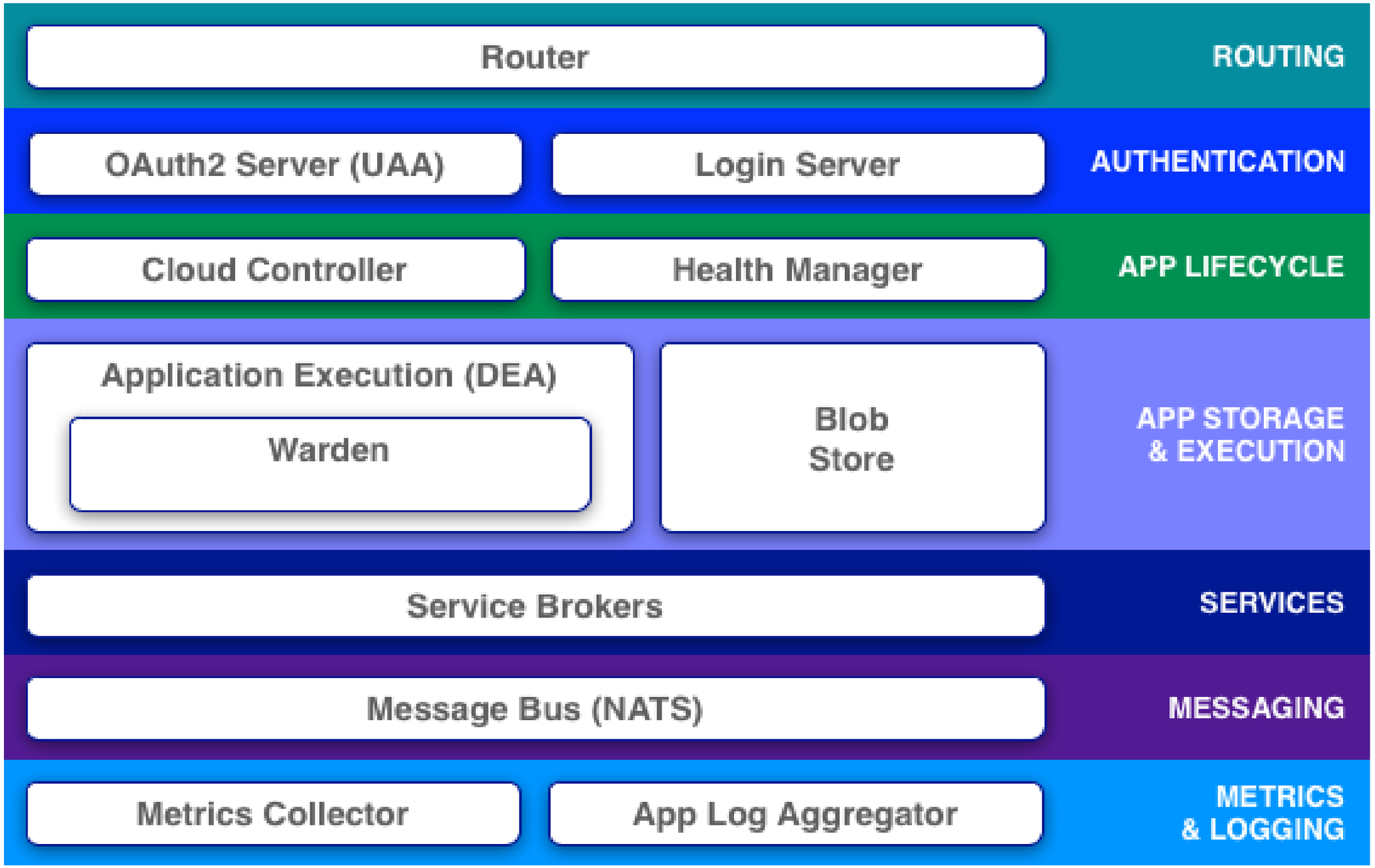
- Public cloud, microcloud, private cloud



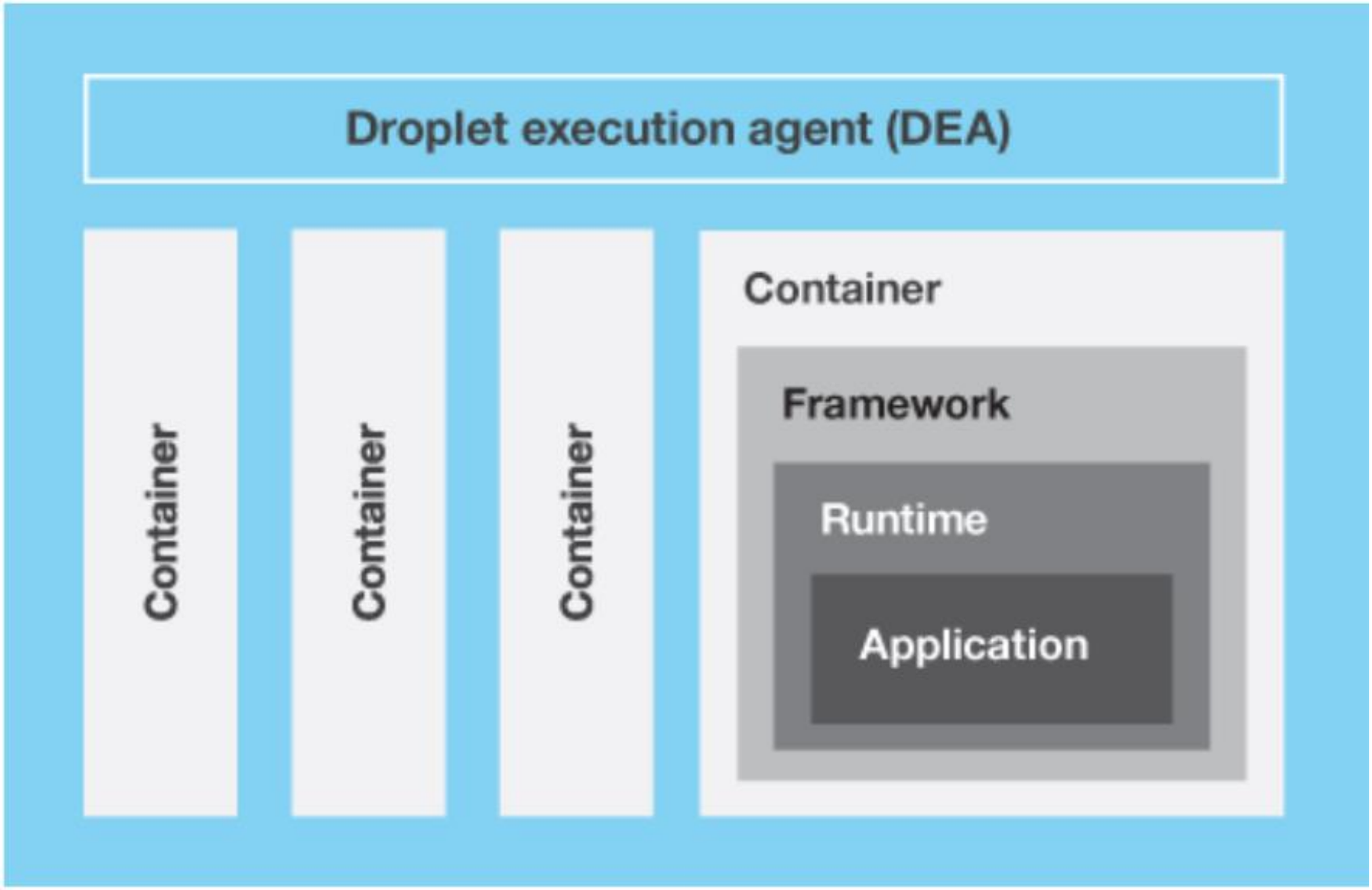
Bluemix architecture



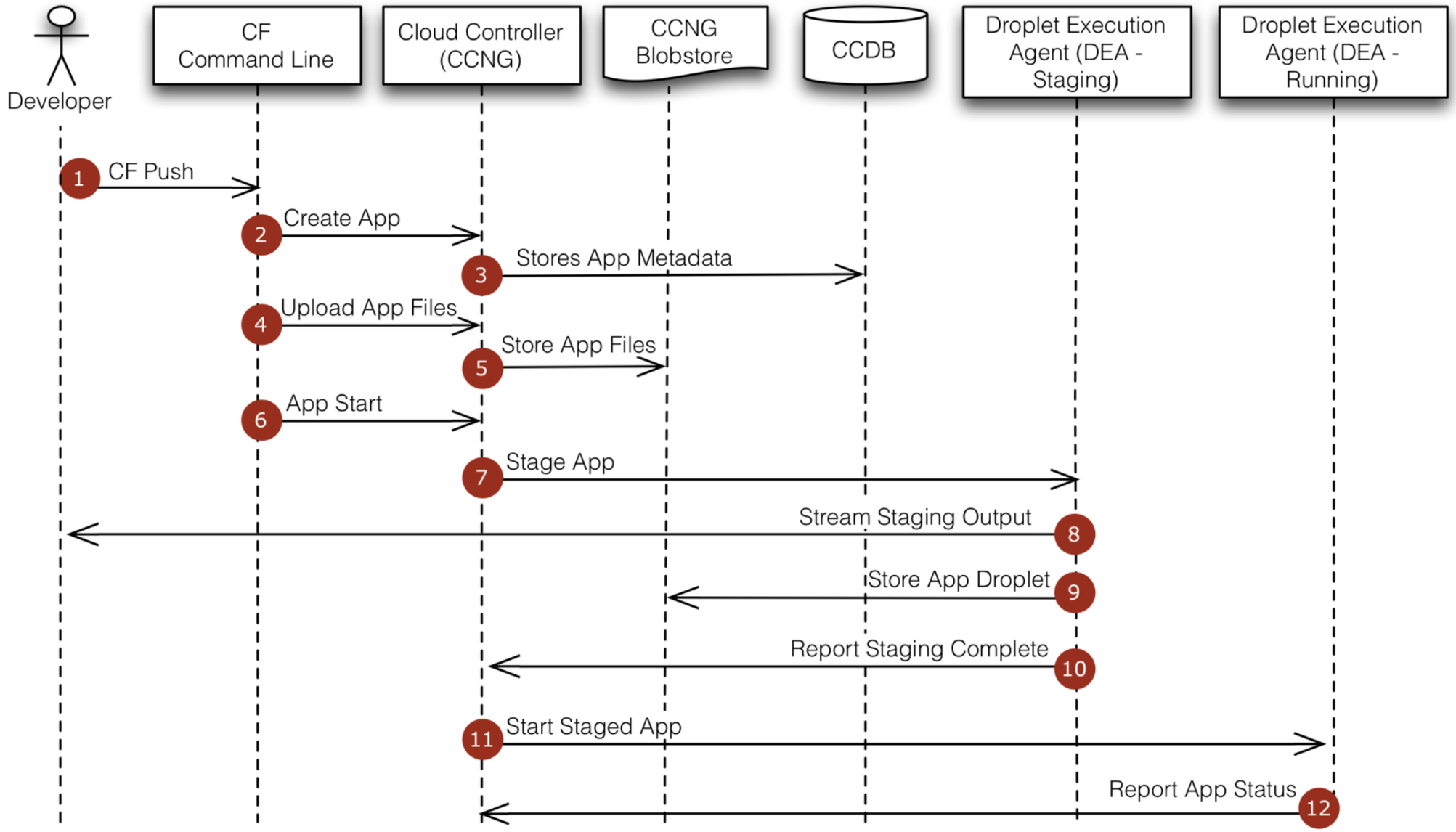
Cloud Foundry kernel internals



Design of a virtual machine (VM)



Cloud Foundry: application staging



Choosing the runtime for an application

- If you don’t specify a runtime when you deploy an application, Bluemix will try to find a suitable runtime as follows:
  1. Each predefined runtime has a position set and runtimes are tried in ascending position order.
  2. Bluemix asks each runtime, starting with runtime at position 1, if it can run the application.
  3. The first runtime that responds that it can run the application is used.
  4. If no runtime can run the application, an error is returned.
- At deploy time, you can also specify the runtime to use.

Buildpacks

- Buildpacks provide the framework and runtime support for your application.
- The buildpack determines whether they can run your application as part of the auto detect mechanism that Bluemix uses when you push an application.
- You can control which platform-provided buildpack your application should use or specify an external buildpack to be used to run your application: “Bring your own Buildpack.”

Specifying a buildpack

- Use the cf CLI to specify which buildpack to use when deploying your application.
  - Use the **`-b`** option with the command **`cf push`**
- You can specify the name of an internal buildpack or provide the URL for an external buildpack.
- **`cf buildpacks`** shows the installed internal buildpacks that are available:

```
buildpack                          position  enabled  locked  filename
liberty-for-java                   1         true     false   buildpack_liberty-for-java_v1.12-20150130-1016-yp.zip
sdk-for-nodejs                     2         true     false   buildpack_sdk-for-nodejs_v1.12-20150130-1059-yp.zip
noop-buildpack                     3         true     false   noop-buildpack-20140311-1519.zip
java_buildpack                     4         true     false   java-buildpack-v2.6.zip
ruby_buildpack                     5         true     false   ruby_buildpack-offline-v1.2.0.zip
nodejs_buildpack                   6         true     false   nodejs_buildpack-offline-v1.1.1.zip
go_buildpack                       7         true     false   go_buildpack-offline-v1.1.1.zip
python_buildpack                   8         true     false   python_buildpack-offline-v1.1.1.zip
php_buildpack                      9         true     false   php_buildpack-offline-v1.0.2.zip
liberty-for-java_v1-11-20150119-1511 10      true     false   buildpack_liberty-for-java_v1.11-20150119-1511-yp.zip
sdk-for-nodejs_v1-11-20150115-2258 11        true     false   buildpack_sdk-for-nodejs_v1.11-20150115-2258-yp.zip
```

- **`cf push myApp -b nodejs_buildpack`**
- **`cf push myApp -b https://github.com/dmikusa-pivotal/cf-php-build-pack.git`**

Cloud Foundry: services