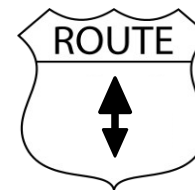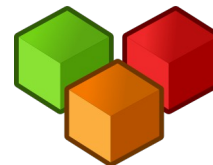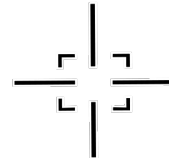# Cloud Foundry Concepts

Terms We Use

Organization, Space, Role, Route, Application

Overview

- After completing this lesson, you should understand:
  - Applications
  - Buildpacks
  - Manifests
  - Organizations
  - Spaces
  - Users and Roles
  - Quotas
  - Domains
  - Routes
  - Services

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Roadmap

- **Applications, Buildpacks, Manifests**
- Organizations, Spaces, Users, and Roles
- Domains and Routes
- Services

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Applications

- PaaS exists to deploy *applications*
  - In Cloud Foundry, <u>the application is the unit of deployment</u>
  - Developers focus on apps, not runtimes or services

- Cloud Foundry is development *agnostic*
  - Not limited to specific language
  - Doesn't mandate the runtime environment you get
  - Some are "out-of-the-box"
  - You can add more

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Buildpacks and Manifests

- Buildpacks
  - Allow CF to support multiple languages and deployment environments
    - Buildpacks for Java, Ruby, JavaScript …
    - Buildpacks for Tomcat, Rails, Node.JS …

- Manifests
  - A deployment "blueprint" for an application
  - *Repeatable:* redeploy using same manifest

```
---
applications:
- name: nodetestdh01
  memory: 64M
  instances: 2
  host: crn    # unique
  domain: cfapps.io
  path: .
```
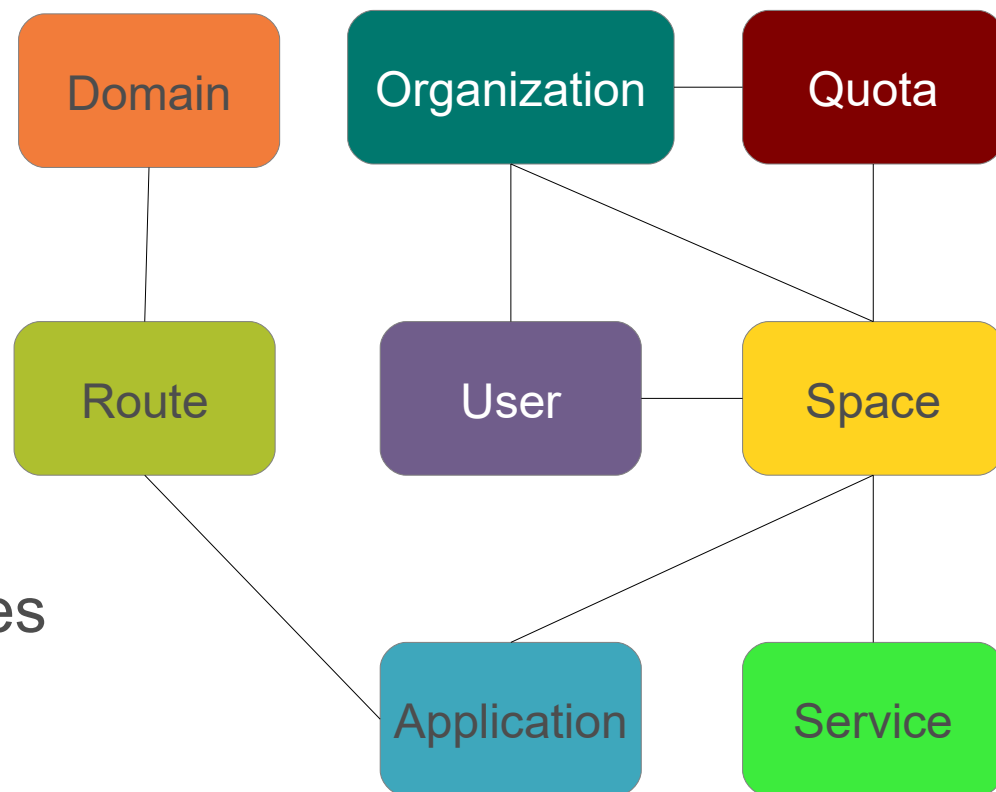
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Roadmap

- Applications, Buildpacks, Manifests
- **Organizations, Spaces, Users, and Roles**
- Domains and Routes
- Services

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Organizations

- Top-most administrative unit
- Contains spaces and users
  - Which own routes, applications and services
- Quotas restrict resources
  - For orgs and spaces
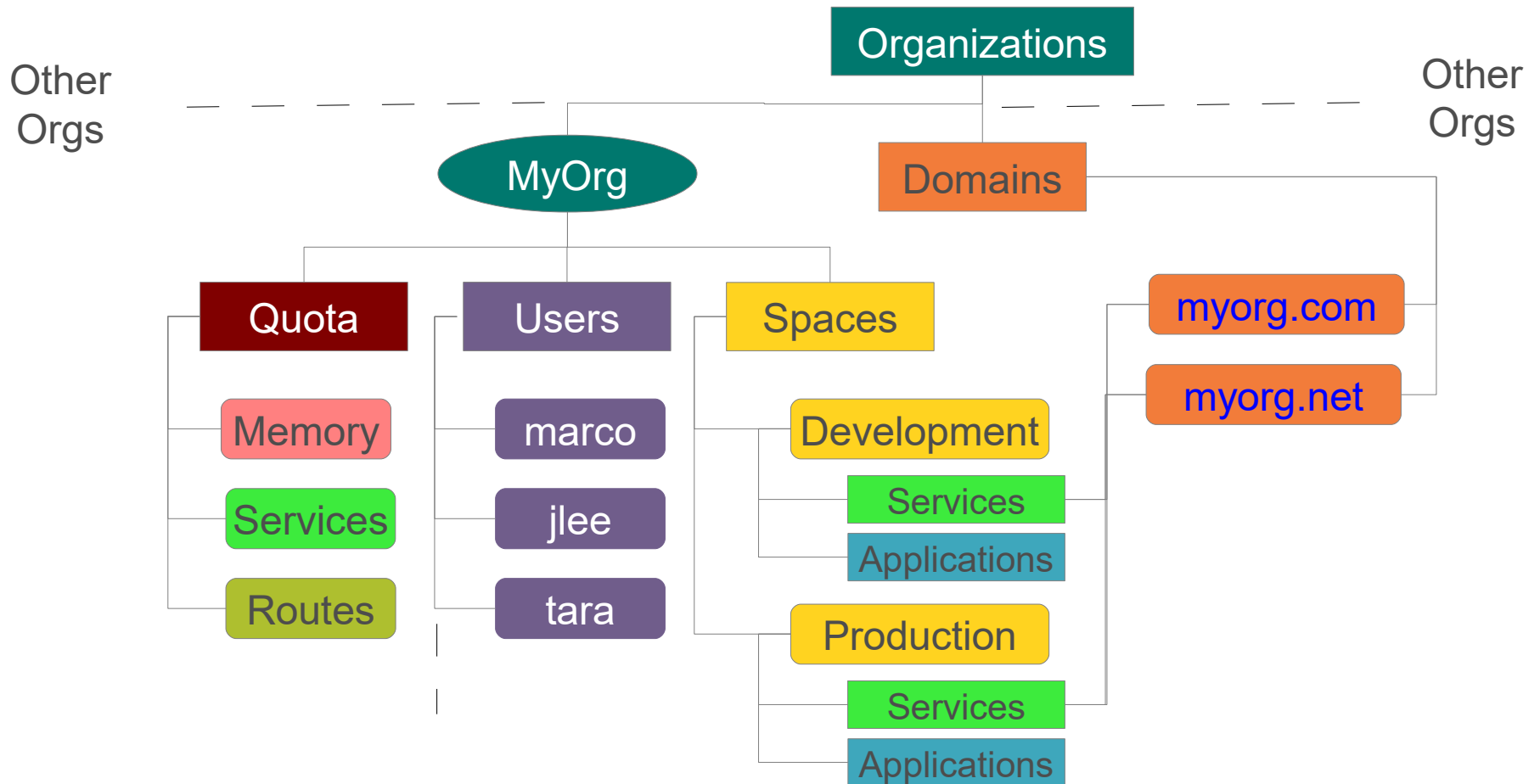- Domain(s)
  - Define routes to apps
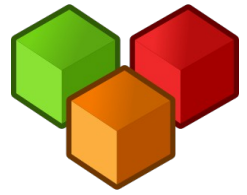
Organizations

- CF is designed for use by Organizations
  - Typically a company, department, application suite or large project
- Designed to support collaboration
  - Potentially many users
- Defines one or more domains
  - Cloud Foundry instance defines default domain for all organizations
    - For PWS: cfapps.io
  - You may add additional domains
- Defines Security, Quotas

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Example Organization

Organizations

Other Orgs

Other Orgs

MyOrg

Domains

Quota
- Memory
- Services
- Routes

Users
- marco
- jlee
- tara

Spaces
- Development
  - Services
  - Applications
- Production
  - Services
  - Applications

myorg.com

myorg.net

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Spaces

- Organization contains multiple spaces
  - Default PWS space: *development*
  - Users can create additional spaces
- Provides set of users access to shared location
  - Application development
  - Functionality and/or Performance Testing
  - Quality Assurance
  - Deployment to production
  - Maintenance
- Applications and services scoped to a space
  - Many applications can run/scale within a space

Spaces

Development

Services

Applications

Production

Services

Applications

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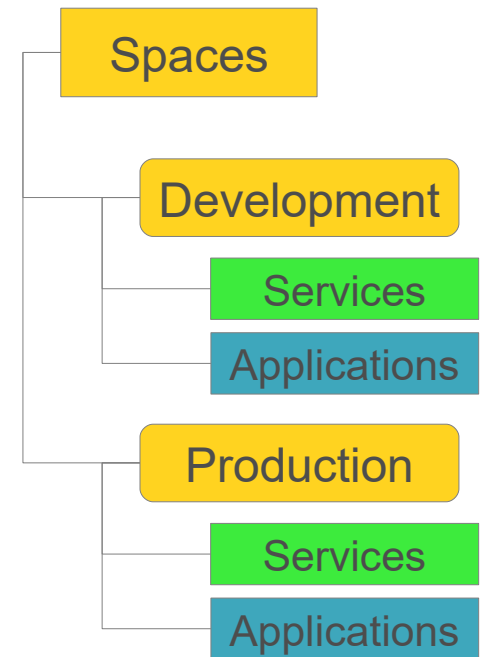
Users and Roles

- Members of an organization
  - You can invite users to share your "cloud"
- Have specific roles
  - Roles control access to domains and spaces
  - Roles therefore control who has permission
    - To manage routes (see later slides)
    - To deploy applications
    - To add/bind/remove services
- ***Don't*** need to be CF User to access deployed apps
  - Each application does its ***own*** user-management

Organization Roles

- **Organization Manager**
  - Can invite/manage users, select/change the plan, establish spending limits

- **Organization Auditor**
  - View only access to all org and space info, settings, reports

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Application Space Roles

- **Space Manager**
  - Can invite/manage users, enable features for a given space

- **Space Developer**
  - Can create, delete, manage applications and services, full access to all usage reports and logs

- **Space Auditor**
  - View only access to all space information, settings, reports, logs

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Administrator User / Roles

- Special Administrator user / role defined
  - Defined for the Cloud Foundry installation
  - Separate from users defined at Organization / Space
- Several `cf` commands restricted to Administrator only
  - Setting organization and space quotas
  - Defining security groups
  - Administering services
  - Adding, modifying and removing user accounts
- Use without the right role, CLI returns:

```
Server error, status code: 403, error code: 10003, message: You are not
authorized to perform the requested action
```
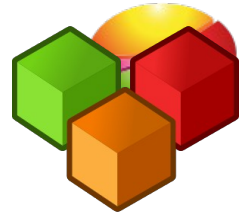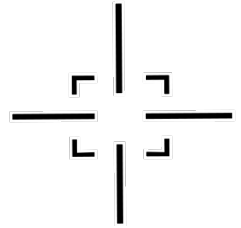
Quotas

- Restrictions on available resources
  - Total memory available to all applications
  - Total number of routes
  - Max application instance size
  - Total number of services
- Can view
  - Using the CLI
  - Using App Manager (on org homepage)

Roadmap

- Applications, Buildpacks, Manifests
- Organizations, Spaces, Users, and Roles
- **Domains and Routes**
- Services

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Domains

- Deployed applications are associated with a URL
  - All requests to that URL redirect to the application
- Each Cloud Foundry instance has a default app domain
  - PWS has cfapps.io
- Custom Domains
  - Register your own domain
  - Give it to Cloud Foundry to use and manage
- Subdomains
  - Each application has a *unique* sub-domain
    - It's URL is therefore *sub-domain.domain*
    - *Example:* deploy an app to http://myapp.cfapps.io

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Routes

- Define how to get to an application
  - A unique *route* exists to each *application* in every *space*
  - Behind the scenes CF uses a router
    - maps incoming requests to the right application

- Domain can be mapped to *multiple* spaces
  - Route can *only* be mapped to *one* space
  - Same application *can* be deployed in *multiple* spaces
    - Each must have a *different*, *unique* URL
    - Development space route: http://myapp-test.cfapps.io
    - Production space route: http://myapp.cfapps.io

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Roadmap

- Applications, Buildpacks, Manifests
- Organizations, Spaces, Users, and Roles
- Domains and Routes
- **Services**

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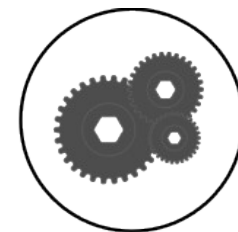
Services

- Any type of add-on that can be provisioned along side your apps.
  - database, messaging, mail, third-party SaaS provider
- Services are usually "bound" to 1 or more applications
  - Connection info and credentials are put in an environment variable: `VCAP_SERVICES`
  - **Note:**
    - All configuration data to CF applications should be passed via environment variables
    - Can't use configuration files: *no file system*

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Summary

- After completing this lesson, you should have learned about:
    - Applications, Buildpacks, Manifests
    - Organizations, Users, Roles ,Quotas
    - Domains, Spaces, Routes
    - Services

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