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WKB-CD-SPINNAKER-INSTALL-GCP-2019 v3 (DRAFT)

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Authors: Monjay Settro
Technical Advisor: William Campbell

Introduction

Use this workbook to bootstrap Capstan into a Google Cloud Platform (GCP) Account that you administer. Time needed is estimated to be approximately 40 mins.

What is Capstan?

Capstan, provides platform automation. At its heart, it is a Terraform application. It provisions all the necessary infrastructure and tools to provide a Spinnaker based continuous delivery environment in Kubernetes.

What is Capstan-Bootstrap?

Capstan-Bootstrap provides a containerized runtime environment for Capstan. It captures and automates as many setup steps as possible based on the Capstan ReadMes.

Contents

Conventions

This workbook uses the following conventions for...

Capstan Demo Account Name. Hopefully, the bootstrap process will work with any valid Gmail account name associated to a Google Cloud Platform Account. When you see your.capstan.demo.account@gmail.com, it is a placeholder to be replaced by the actual Gmail account name associated to your GCP account.

Capstan Demo Project Name. The bootstrap process generates a GCP project whose name is based on a random 4-digit number between 1000 and 9999. When you see capstandemoNNNN, it is a placeholder to be replaced by the actual name of your Capstan demo project.

Command Line Prompts. We love command line prompts because they indicate from which execution environment a command should run. So...

When you see...	It means...
$ <command>	Run the <command> from a terminal or shell session on your Workstation where the current working directory is the capstan-bootstrap directory which has been created after cloning the Github project.
bash-4.4# <command>	Run the <command> from inside the running capstan-bootstrap Docker container.
capstandemoNNNN@halyard-tunnel:~$ <command>	Run the <command> from a remote shell on the bastion instance created by Capstan Terraform named halyard-tunnel, aka the tools instance such as kubectl, helm, spin, etc are available.

Resources

This workbook uses the following publicly available Open Source repositories:

Tag	Repository
v0.0.4	https://github.com/kenzanlabs/capstan
2019.q3.beta.gcp.m1	https://github.com/kenzanlabs/capstan-bootstrap

What's Needed

A Google Cloud Account. Your account can be either an existing account or a new trial GCP account. Within it, the bootstrap process will create a new project named capstandemoNNNN and prompt you to take any other actions required by GCloud SDK. The project can be easily torn down from inside the capstan-bootstrap container or GCP Console.

> ***Recommendation****. Set up a new trial GCP account because you get to be admin while isolating the scope of this demo and minimizing permissions hiccups. Even though a GCP Trial account provides a $300 credit, a valid credit card is required in order to sign up. To sign up, goto APPENDIX A: Create GCP Trial Account.*

A Workstation. Although we're Macbook fans, the machine from which you run the bootstrap steps can be a Linux based virtual machine.

A Reliable Network from your Workstation. The bootstrap process is necessarily interactive and provision cloud resources with Terraform takes time. To avoid having to restart the bootstrap process, please start with a steady connection to the internet.

Docker, Git on your Workstation. The bootstrap process, after being cloned from our (Kenzan Labs) public Github repository, runs from a Docker container. Please make sure you have these tools installed and configured to your preference.

A GitHub Account. Please use your account to fork and clone Kenzan Labs repositories and to participate in the pipeline exercises.

A Standard Browser Window w/ Two Tabs. You'll need a browser dedicated to the GCP session to be used for this demo. The first tab will mostly be used to access the GCP Console. The second tab, will mostly be used to access the various direct links required for the bootstrap process.

> ***Recommendation****. Use a browser whose cache can be cleared to avoid account GCP account collisions*.

A Private Browsing Window. To access Spinnaker and avoid a sticky browser cache, please open a New Incognito Window in Chrome; a New Private Window in Safari or Firefox; an InPrivate Browsing Window in Internet Explorer.

Three Shell Sessions on your Workstation. The first session will be dedicated to the steps that occur outside the Docker container (i.e. cloning and ssh port forwarding tunnels), the second, dedicated to the steps that occur inside the container; and the third session for use with any pipeline exercises that require halyard-tunnel.

Before You Begin

Setup Your Standard Browser Tabs (~3 mins)

1. In Browser Tab 1
    a. Log into https://console.google.com (w/ your demo GCP account)
    b. Open the **3 bar menu** and **pin** the following nav items
        i. Compute Engine
        ii. IAM & admin
        iii. Kubernetes Engine
        iv. Billing
2. In Browser Tab 2
    a. Please leave this tab empty

Setup Your Terminal Sessions (~2-15 mins)

1. In Terminal 1
    a. Install and run Docker (if not done so already)
    b. Install and configure Git (if not done so already)
    c. Clone the bootstrap source (~ 2 mins)

```
$ git clone https://github.com/kenzanlabs/capstan-bootstrap.git
$ cd capstan-bootstrap
$ git checkout v0.0.4a
```

    d. Edit the Makefile and Setup Your Environment

```
$ vi Makefile
```

    ***Editing the Makefile**. You must specify a valid value for GCP_ACCOUNT. Verify and/or update the values for GCP_ZONE, CAPSTAN_REPO and CAPSTAN_TAG. Optionally, specify a value for GIT_AUTHOR_NAME and GIT_AUTHOR_EMAIL if different than the value inherited from shell environment of Terminal 1.*

    e. Review Your Customization(s)

```
$ make debug
```

    f. Make the Bootstrap Container and Container Root Directory

```
$ make container
$ make container.root
```

    ***Notes**. Use `docker images` to see the resulting kenzan/capstan-bootstrap container.*

2. In Terminal 2 and Terminal 3
    a. Navigate to your capstan-bootstrap directory

```
$ cd /path/to/your/capstan-bootstrap
```

3. All done setting up, you're ready to begin

Let's Begin

Enter the Bootstrap Container (~30 secs)

1. In Terminal 2
    a. Enter the Capstan Bootstrap Docker Container

        $ make container.shell

        ***Note**: This step runs the bootstrap container and mounts the external .container.root directory as /root inside the container. Any changes to files in /root will persist when you exit and re-enter the container.*

    b. Review Your Command Line Prompt and Environment
    from Inside the Container (optional)

        bash-4.4# env | sort
        bash-4.4# make debug

        ***Note**: You should see your earlier customizations. If you don't please escalate to a workshop attendant.*

Start the Bootstrap Process (~25 mins)

1. In Terminal 2
    a. From **inside** the bootstrap container
        i. ...start the bootstrap process...

            bash-4.4# make cdenv

            ***Requirements**: This step requires a reliable network connection. In case of an interruption, at the bash-4.4 prompt, i.e. from inside the container, run `make clean `, then retry this step again.*

            ***Be Mindful**: This step takes time and is interactive. Please read the prompts carefully. Before you walk away, wait for and satisfy the prompts that require you to auth gcloud and specify a billing project. Make sure to cut and paste direct url links into Browser Tab 2 while your Google Console session is still active in the Browser. Make sure to paste GCP Console responses correctly into the active session in Terminal 2 which is running inside the bootstrap container.*

            ***What This Step Does**: Currently, this step does many things including (a) configures GIT in the container (b) clones the desired Capstan repo and switches to the tag (c) installs and configures gcloud and (d) configures and runs Capstan Terraform.*

            ***What Install and Configure GCloud Does**. Currently, this series of steps in the bootstrap process (a) create the project name (capstandemoNNNN) based on a random value between 1000 and 9999 (b) makes a GCP project called, capstandemoNNNN (b) asks you to authorize your gcloud account via OATH (c) creates the project (d) enables google.api services (e) create a Service Account (terraform-admin) (f) grants the service account the proper role(s) (g) generates and downloads a service account JSON key to be used with Capstan Terraform.*

            ***For more information**. See Capstan Bootstrap Template Root Makefile.*

Let's Finish Up...

This section enables secure access to Spinnaker which is enabled when (a) halyard-tunnel, the bastion server provisioned by Capstan Terraform, hosts **internal** port forwarding to Spinnaker in the GCP cluster and (b) your Workstation hosts **external** port forwarding via SSH to halyard-tunnel.

Finish the Bootstrap Process (~3 mins)

1. In Terminal 2
    a. From **inside** the bootstrap container...
        i. ...setup internal port forwarding...

            bash-4.4# make hal.deploy.connect

            ***Note**: Please follow the instructions. If running for the first time, you will likely need to hit CTRL^C manually to exit the foreground process in the bootstrap container. This action should not disturb the background process `hal deploy connect' running on remote halyard-tunnel bastion.*

        ii. ...verify internal port forwarding is ready...

            bash-4.4# make is.hal.connected

            ***Expected Results**: You should see table listing indicating kubectl is listening to ports 9000 and 8084 on localhost.*

        iii. ...setup Spinnaker application...

            bash-4.4# make spin.setup

        iv. ...generate the ssh tunnel command for **external** port forwarding...

            bash-4.4# make external.tunnel.command

            ***Note**: From inside the container, the above command generates Bash scripts containing the SSH command. The Bash scripts, ie. the SSH commands, which should be run from outside the bootstrap container should look something like this:*

                $ cat .container.root/external.tunnel.command
                ssh -i .container.root/.ssh/google_compute_engine -o 'StrictHostKeyChecking no' -o 'UserKnownHostsFile /dev/null' -L 9000:localhost:9000 -L 8084:localhost:8084 capstandemoNNNN@<halyard-tunnel-ip-number>

            ***Note**: To confirm the value of your <halyard-tunnel-ip-number>, In Browser Tab 1, goto the GCP Console to URL for your capstandemon project:*

            - *https://console.cloud.google.com/compute/instancesDetail/zones/us-central1-f/instances/halyard-tunnel*

        v. ... finally... review the generated files...

            bash-4.4# ls -la

Connect To Spinnaker…

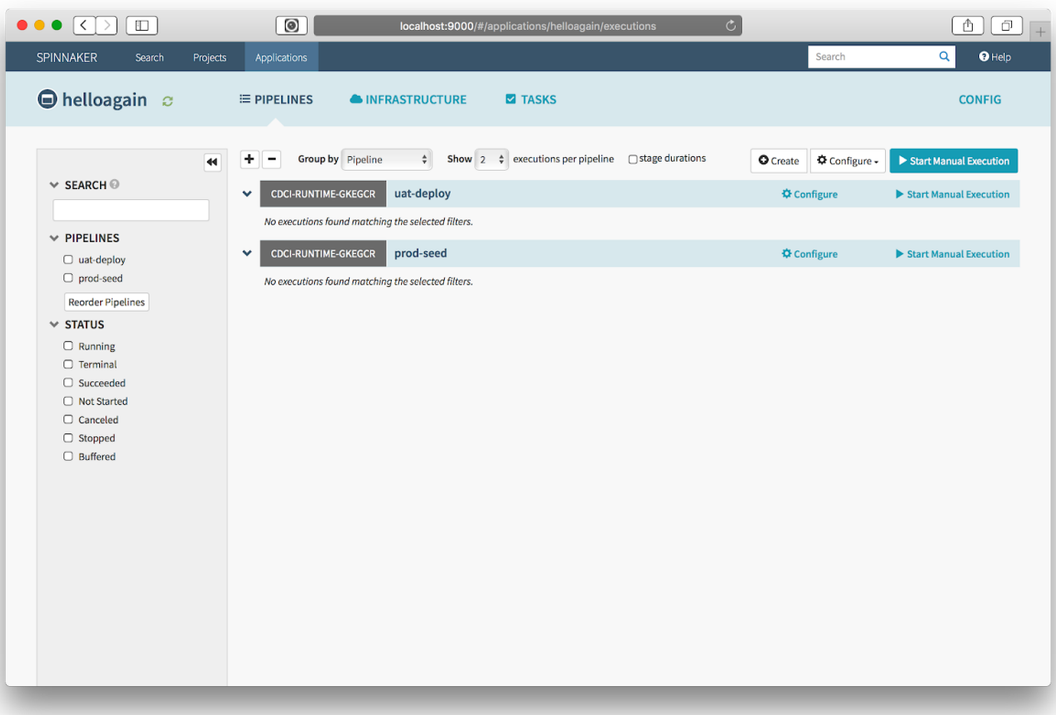
Access Spinnaker (~1 min)

1. In Terminal 1
    a. From **outside** the bootstrap container…
        i. …run the command generated for you…

        $ make external.tunnel

        ***Note**: This step runs SSH with -L to port forward traffic on port 9000 and 8084 from your Workstation to halyard-tunnel which in turn forwards it's internal traffic to the Spinnaker in the cluster.*

2. Using a Private Browsing Window…
    a. Open a New Incognito Window in Chrome; a New Private Window in Safari or Firefox; or an InPrivate Browsing Window in Internet Explorer
    b. Goto http://localhost:9000/#/applications/helloagain/executions for Spinnaker…



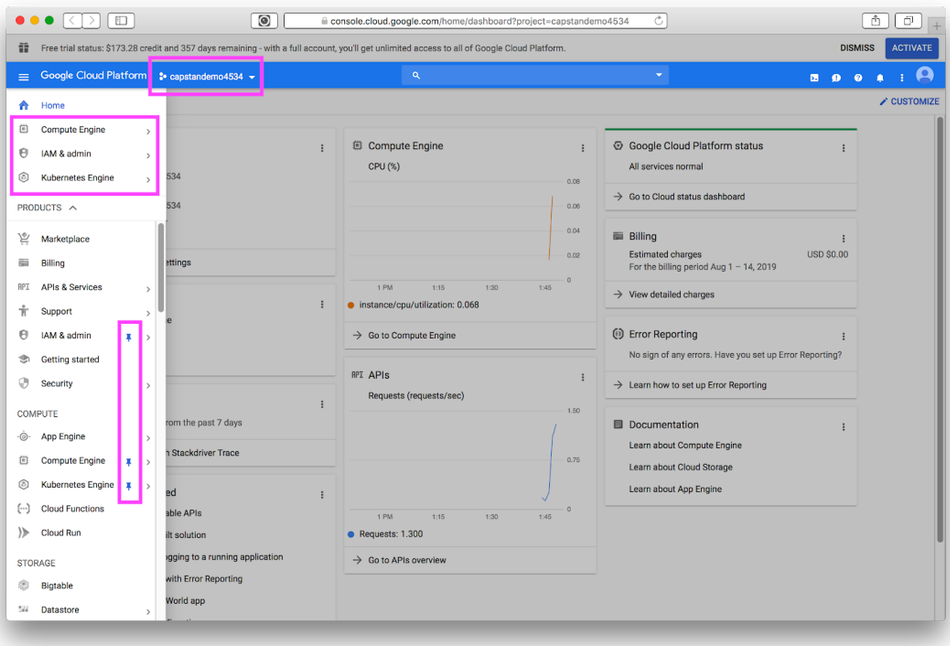
***Note**: Spinnaker isn't perfect (yet). A private browsing window helps avoid a sticky browser cache and stale pages.*

Review Your GCP Account

This section helps calls out the impact of the bootstrap steps on your GCP account using Browser Tab 1

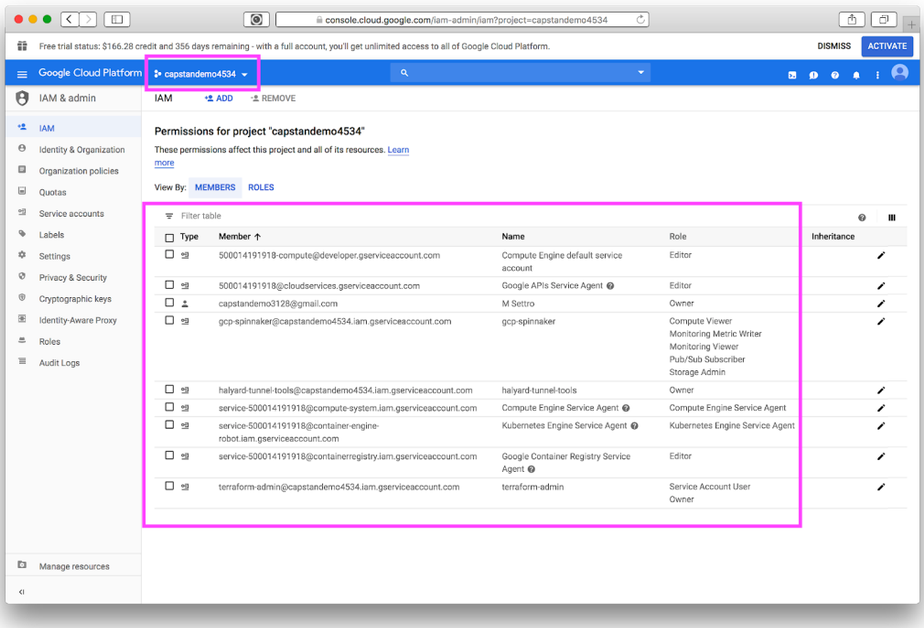
Configure Your GCP Navigation for Ease of Use

1. Goto https://console.cloud.google.com/home/dashboard
2. Select your Capstan Demo project from the top Navigation
3. Open the **3 bar menu** and **pin** Compute Engine, IAM & admin and the Kubernetes Engine, Billing options



Review IAM & Roles

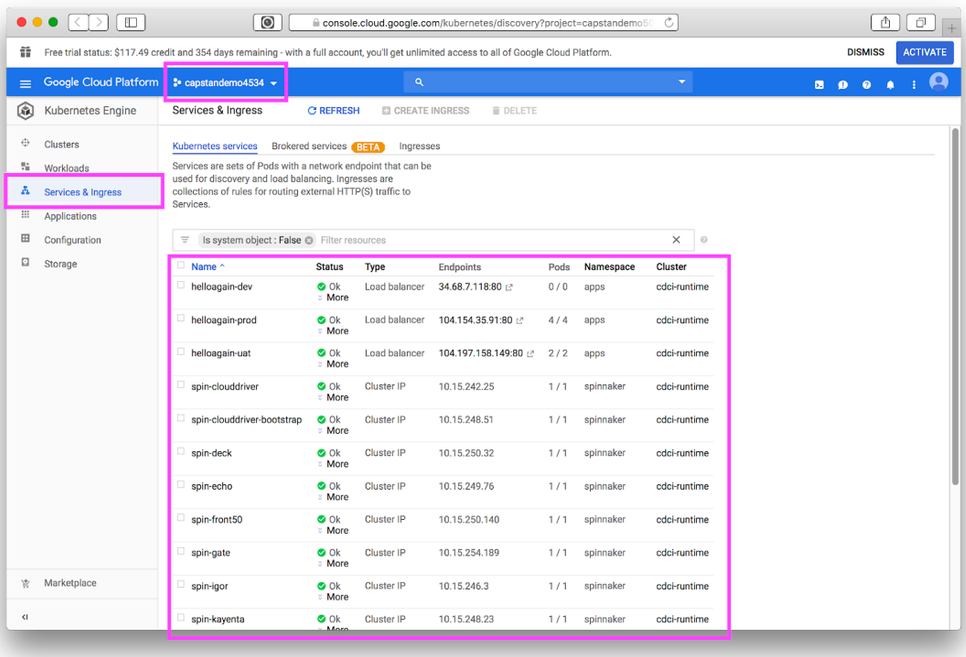
1. Goto https://console.cloud.google.com/iam-admin/iam
2. Make sure to Capstan Demo project is selected in the top Navigation
3. Review the Members and Roles provisioned by Capstan



Review Your GCP Account (cont'd)

Review Google Cloud Kubernetes Engine

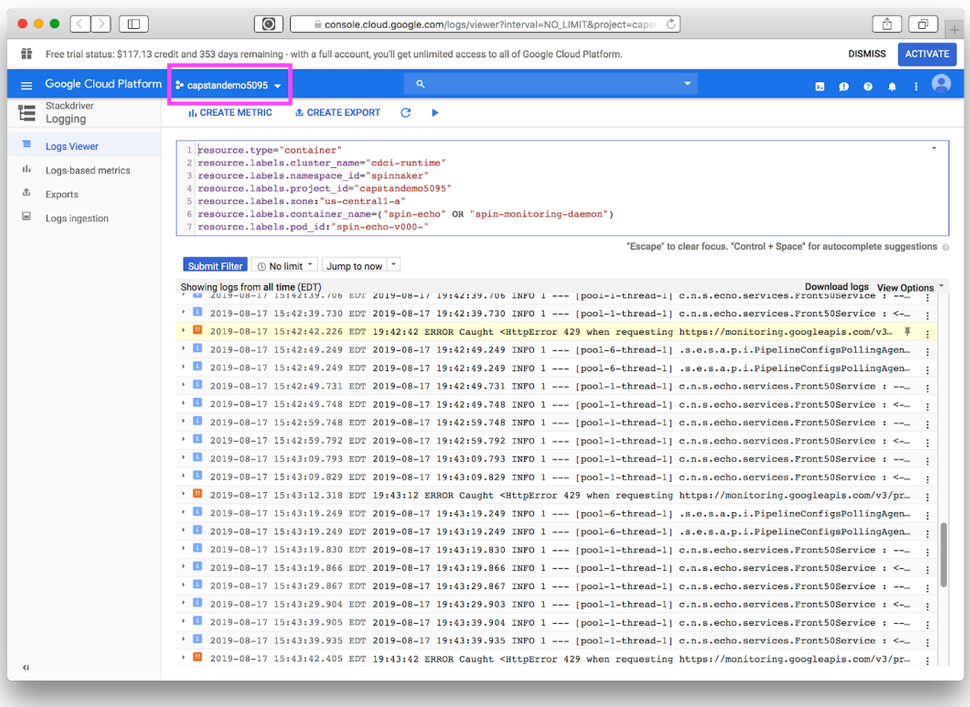
1. Goto https://console.cloud.google.com/kubernetes/discovery
2. Make sure to Capstan Demo project is selected in the top Navigation
3. Review the Services and Ingress to see the new **cicd-runtime** services associated to Spinnaker and the initial pipeline exercise, and more…



***Note**: You can use **kubectl** in the Console or from the halyard-tunnel instance.*

Review Logs

1. Goto https://console.cloud.google.com/kubernetes/workload
2. Make sure to Capstan Demo project is selected in the top Navigation
3. Click the Workload > Stackdriver logs > Container logs or Audit logs



Ready for Pipeline Exercises?

Setup for Pipeline Exercises (~1 min)

In Terminal 3

$ make external.shell

***Note**: This step runs a plain ssh command so you can safely exit and re-enter a remote shell on the on halyard-tunnel instance without disrupting your private browser experience with Spinnaker which requires ssh with port forwarding running which should be running in Terminal 1.*

Ready to Burn it All Down?

There are two ways to stop spending money on your demo project...

Clean with Consistency (~10 mins)

1. In Terminal 2
    a. From **inside** the bootstrap container...

        bash-4.4# make clean

        ***Note**: This step cleans the artifacts of each constitute action and remove the GCP project leaving you with a pristine container.root and working state ready for Let's Begin (again).*

Shut Down Your GCP Project

1. In a Browser Tab 1
    a. Goto https://console.cloud.google.com/iam-admin/settings/project
    b. Click the Shut Down button
2. In Terminal 2
    a. From **inside** the bootstrap container...
    ... exit the container ...

        bash-4.4# exit

    b. From **outside** the bootstrap container...
    ... remove the .container.root

        $ make superclean

We're Done Here!

Hey,

Thanks for your patience! I hope this workbook worked for you!

However, in the case it didn't or you'd like more information on how to extend Capstan and Capstan Bootstrap please visit us at Github / Kenzan Labs and engage with us!

Kenzan Labs

APPENDIX A: Create GCP Trial Account

A Google Cloud Platform Trial provides upto 11 projects that can use a $300 credit of services for up to 365 days. Multiple accounts can be used to balance the use of resource limits. Best part, you get to be admin and get things done with fewer blockers.

Assuming you have a browser cache cleared of previous Google Account data...

1. Goto https://cloud.google.com
2. Click the **Get Started for Free** Button
3. On the **Try Google Cloud Platform for free** page
    a. Select your Country
    b. Click the Continue button
4. On the **Google Sign In** dialog
    a. Click the **Create account** link (**for myself**)
5. On the **Create your Google Account** (to continue to Google Cloud Platform) dialog
    a. Click the **Create a Gmail account instead** link
    b. Specify the following details
        i. First name: ...
        ii. Last name: ...
        iii. Username: your.capstan.demo.account@gmail.com
    c. Click Next
6. On the **Verify your phone number** dialog (optional)
    a. Specify the following details...
        i. Password: ...
    b. Click the **Next** button
        i. ... receive and specify the Google code
7. On the **Welcome to Google** (your.capstan.demo.account@gmail.com) dialog
    a. Specify the following details
        i. Phone: ... (use your phone number)
        ii. Recovery email: leave blank (suggested value)
        iii. Birthday: January 1, 1960 (suggested value)
        iv. Gender: Rather not say (suggested value)
    b. Click the **Next** button
8. On the **Get more fro your number** dialog
    a. Choose to Skip
9. On the **Privacy and Terms** dialog
    a. Scroll down, save the Terms
    b. Click the **I Agree** button
10. On the **Try Cloud Platform for Free** dialog (page 1)
    a. On the **Step 1 of 3** dialog
        i. Agree to the **Terms of Service**
        ii. Click the Agree and Continue button
    b. On the **Step 2 of 3** dialog (Customer info)
        i. Specify the following...
            1. Account Type: Individual
            2. Name: ...
            3. Address Line 1: ...
            4. City: <may be prepopulated based on address line 1>
            5. State: <may be prepopulated based on address line 1>
            6. Zip Code: <may be prepopulated based on address line 1>
            7. Phone Number: ...
            8. How you Pay: Automatic Payments
            9. Payment Method (required)
                a. Card number / Month, Year, CVC: ...
        ii. Click the **Start my free trial** button