

Spin Up A Blockchain Node with BlockApps STRATO in 3 minutes

GSP705



Google Cloud Self-Paced Labs

Overview

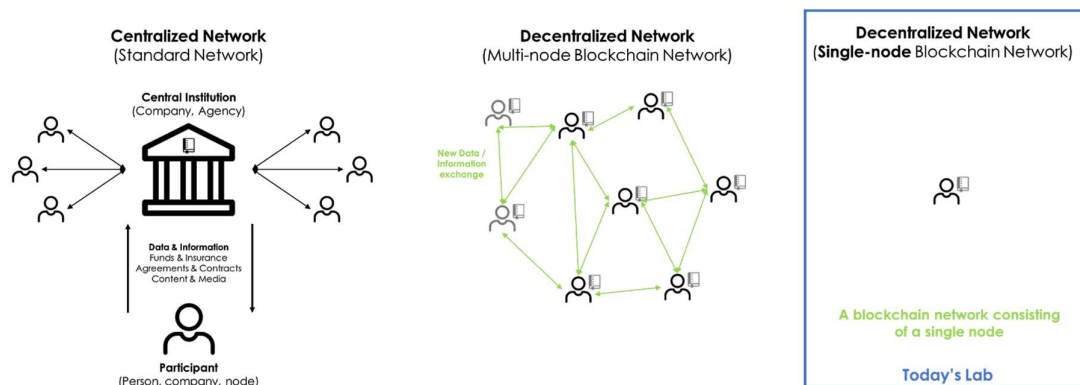
In this lab you will see just how easy it is to launch a blockchain network. This lab will show you how to spin up a simple private blockchain network consisting of one node.

What you'll learn

- How fast and easy it is to start up a private blockchain network with STRATO on Google Cloud
- The key components of a private blockchain network
- How to create users and log their creation on your blockchain network
- How to reset a STRATO network

By the end of this lab, you will see how launching a private blockchain network is "the easy part" and feel prepared to launch & reset STRATO networks as you add more complexity to them in the future.

Launching a blockchain is easy...



To do this you will be using BlockApps' flagship product called **STRATO**. For this lab, think of STRATO as software to launch and manage a blockchain network.

In this lab STRATO will be deployed on a Google Cloud virtual machine.



What is a Private Blockchain Network?

If you are already familiar with private blockchain networks, feel free to jump straight to the [hands-on portion of the lab](#).

Public vs. private blockchain networks

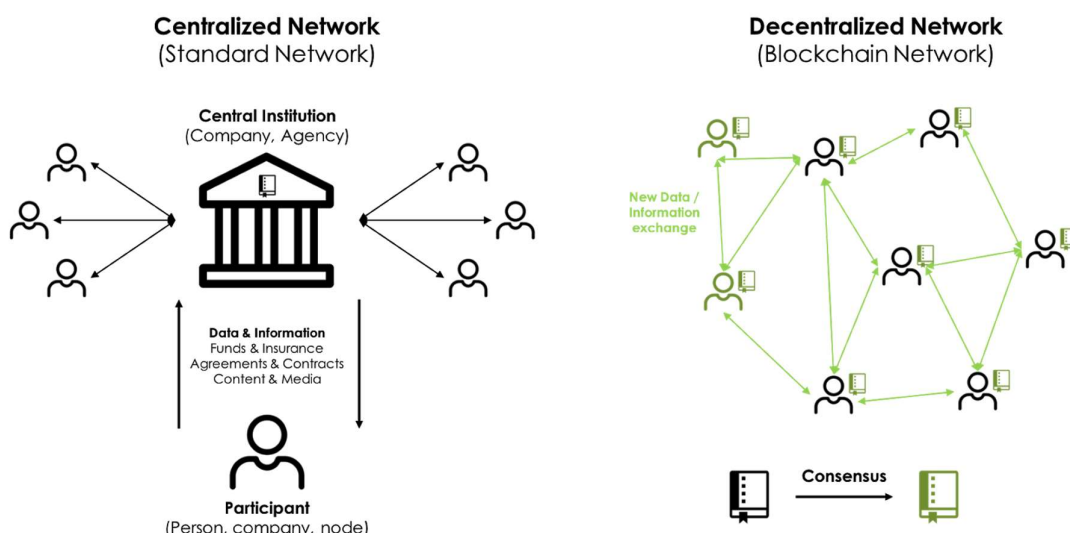
Blockchain is a technology that allows for the creation of scarce, transferable digital assets. It is a ledger that handles the "double spend" problem of accounting/economics for digital assets

There are two general types of blockchains - **public blockchains** and **private blockchains**.

Public Blockchains	Private Blockchains (AKA Permissioned Blockchains)
 • All activity visible to the public • Network members can self-identify, but are usually anonymous • Network latency does not scale well	 • Activity visible by network members only • Visible identity of network members • Lower network latency

Key Component of a Private Blockchain Network

Private blockchain networks consist of **network nodes** that maintain a **shared ledger of transactions**. As network users engage in transactions on the network, the transactions are added to the shared ledger based on the rules defined when a network is created.



Users

User accounts are used to create, send and accept transactions on the private network. On a private network users can be configured to be anonymous (like on the public blockchain networks) or identified with details like their email address.

In this lab you will create simple user accounts identified with a **username**. The username can be whatever you want.

Governance

Governance is a catch-all term for the rules of the network. This includes the rules for:

- How users can be added and removed from the network
- How the shared ledger is updated, and how (or "who") approves (i.e. *validates*) those changes.
- How the rules can be *changed* as the network evolves, and how those rule changes get approved.

If you've heard of terms like **PoW (proof of work)** or **PBFT (partial byzantine fault tolerance)**, they are usually in reference to governance rules about this point - exactly *how* the shared ledger is updated, and how to be sure that the updates are accurate.

In this lab there will be **no governance rules** - you are the owner of the network and anyone with a user account can log in to create a ledger update that is automatically appended to the blockchain.

Transactions & Smart Contracts

Like on any kind of network, a transaction is an exchange of *something*. On private blockchain networks, transactions typically represent exchange of some asset or agreement between two parties.

A transaction could exchange something as simple as a message (e.g. "Hello there") or something more complex like the exchange of a rare piece of art.

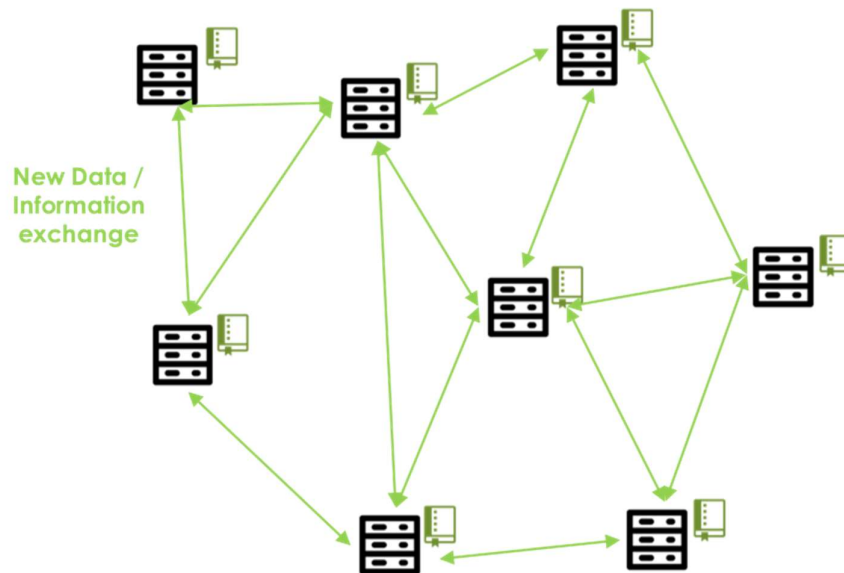
In this context, smart contracts are used as **templates** that help a network recognize exactly what is being exchanged in a transaction.

You won't be writing any smart contracts in this lab, so don't worry if this concept isn't clear yet.

Nodes

Nodes are the "Peers" in Peer-to-Peer. They are the actual computer machines that maintain a record of the blockchain ledger and execute the code as required by the network's governance rules.

8 Node Decentralized Network (Blockchain Network)



In this diagram, each server icon represents a node.

In this lab you'll create a network with just one single node running it. Simple!

Hands-on Lab Overview

At the conclusion of this hands-on lab, you will be able to say - maybe for the first time in your life - that **you** built a blockchain network!

The hands-on portion of this lab features 3 major steps:

1. Launch a network

2. Access the management dashboard of your network as an admin
3. Add a user account to your network

Setup and and requirements

Before you click the Start Lab button

Read these instructions. Labs are timed and you cannot pause them. The timer, which starts when you click **Start Lab**, shows how long Google Cloud resources will be made available to you.

This Qwiklabs hands-on lab lets you do the lab activities yourself in a real cloud environment, not in a simulation or demo environment. It does so by giving you new, temporary credentials that you use to sign in and access Google Cloud for the duration of the lab.

What you need

To complete this lab, you need:

- Access to a standard internet browser (Chrome browser recommended).
- Time to complete the lab.

Note: If you already have your own personal Google Cloud account or project, do not use it for this lab.


Note: If you are using a Pixelbook, open an Incognito window to run this lab.


How to start your lab and sign in to the Google Cloud Console


1. Click the **Start Lab** button. If you need to pay for the lab, a pop-up opens for you to select your payment method. On the left is a panel populated with the temporary credentials that you must use for this lab.

[Open Google Console](#)

Caution: When you are in the console, do not deviate from the lab instructions. Doing so may cause your account to be blocked. [Learn more.](#)


Username
google2727032_student@qwiklabs.n 

Password
k68CZxsxMZ 

GCP Project ID
qwiklabs-gcp-4fbfecac8667e457 

[New to labs? View our introductory video!](#)


- Copy the username, and then click **Open Google Console**. The lab spins up resources, and then opens another tab that shows the **Sign in** page.



Sign in
Use your Google Account


[Forgot email?](#)


Tip: Open the tabs in separate windows, side-by-side.

If you see the **Choose an account** page, click **Use Another**


Choose an account

 Your.Email@gmail.com

 google1381214_student@qwiklabs.net
Signed out

 **Use another account**

Account.

3. In the **Sign in** page, paste the username that you copied from the Connection Details panel. Then copy and paste the password.

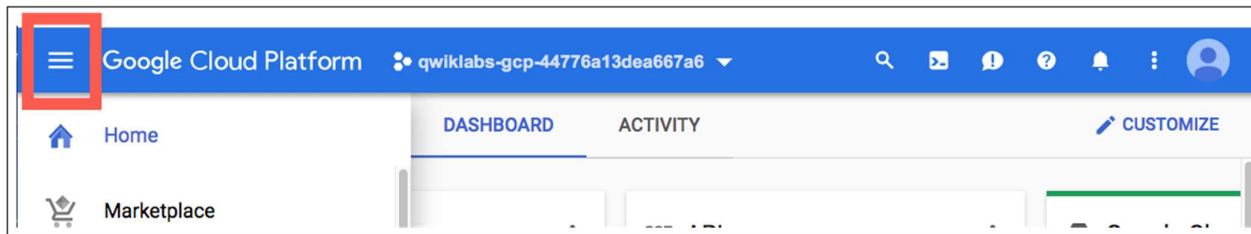
Important: You must use the credentials from the Connection Details panel. Do not use your Qwiklabs credentials. If you have your own Google Cloud account, do not use it for this lab (avoids incurring charges).

4. Click through the subsequent pages:

- Accept the terms and conditions.
- Do not add recovery options or two-factor authentication (because this is a temporary account).
- Do not sign up for free trials.

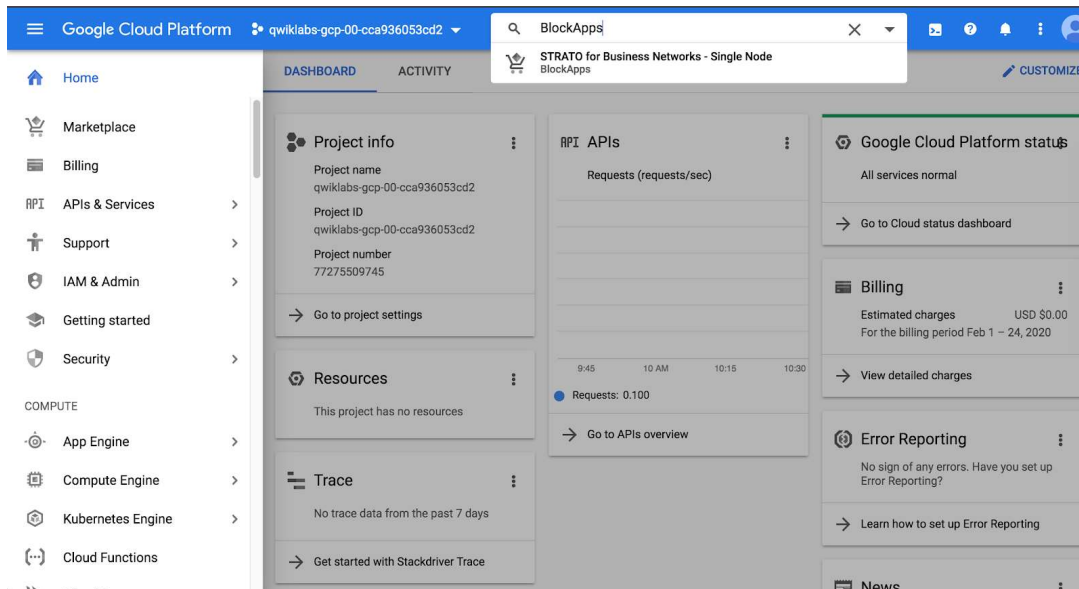
After a few moments, the Cloud Console opens in this tab.

Note: You can view the menu with a list of Google Cloud Products and Services by clicking the **Navigation menu** at the top-left.



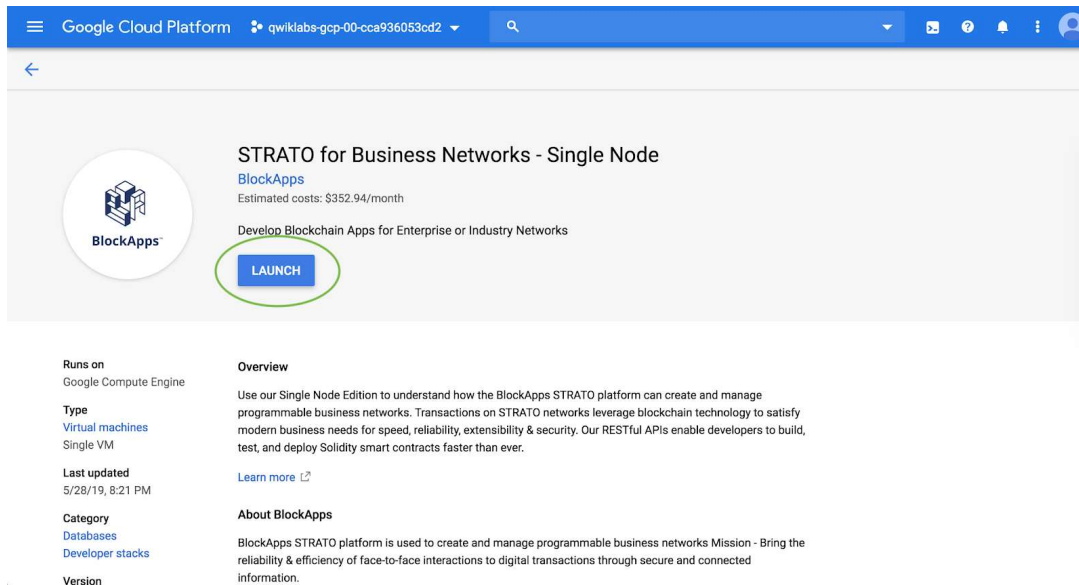
Launch STRATO

Now it's time to start STRATO... as promised, this is the easy part!



Click the link to go to [Single Node version of BlockApps STRATO](#) in the Google Cloud Marketplace.

Search for "BlockApps" in the search bar and find the Single Node listing. Click the **Launch** button.



No customization is needed so just **accept the terms** and click **Deploy**.

Google Cloud Platform

qwiklabs-gcp-00-cca936053cd2

←

New STRATO for Business Networks - Single Node dep

Boot disk size in GB

30

Networking

Network

default

Subnetwork

default (10.128.0.0/20)

External IP

Ephemeral

Firewall

Add tags and firewall rules to allow specific network traffic from the Internet

⚠

Creating certain firewall rules may expose your instance to the Internet. Please check if the rules you are creating are aligned with your security preferences. [Learn more](#)

✓

Allow HTTP traffic

Source IP ranges for HTTP traffic

0.0.0.0/0, 192.169.0.2/24

⌵

More

✓

I accept the [GCP Marketplace Terms of Service](#).

Deploy

Just sit back and relax as STRATO builds the single node network. This should take about two minutes.

Google Cloud Platform

qwiklabs-gcp-00-cca936053cd2

Deployment Manager

← strato-node-1

■ STOP

🗑 DELETE

Overview - strato-node-1

Deployments

Type registry

strato-node-1 is being deployed

Overview - strato-node-1

Deployment properties

ID

7567347355372900542

Created On

2020-02-24 (10:40:01)

Manifest Name

manifest-1582558801735

Config

[View](#)

Imports

[c2d_deployment_configuration.json](#)
[common.py](#)
[default.py](#)
[password.py](#)
[path_utils.jinja](#)
[resources/en-us/strato-node_small.jpg](#)
[resources/en-us/strato-node_store.jpg](#)
[software_status.py](#)
[software_status.py.schema](#)
[software_status.sh.tpl](#)
[software_status_script.py](#)
[software_status_script.py.schema](#)
[strato-node.jinja](#)
[strato-node.jinja.display](#)
[strato-node.jinja.schema](#)
[test_config.yaml](#)
[vm_instance.py](#)

You'll know it's ready when you see confirmation `strato-node-1` has been deployed.

The screenshot shows the Google Cloud Platform interface. The top navigation bar includes the Google Cloud Platform logo, the project name 'qwiklabs-gcp-00-cca936053cd2', and a search icon. The left sidebar shows the 'Deployment Manager' section with 'Deployments' and 'Type registry' options. The main content area is titled 'strato-node-1' and features a green checkmark icon with the text 'strato-node-1 has been deployed'. Below this, an 'Overview - strato-node-1' section lists the deployment components: 'strato-node' (strato-node.jinja), 'strato-node-vm-tmpl' (vm_instance.py), 'strato-node-1-vm' (vm instance), 'generated-password-0' (password.py), and 'strato-node-1-tcp-80-0' (firewall). The right sidebar displays the 'STRATO for Business Networks - Single Node' solution provided by BlockApps. It lists configuration details: Site address (http://35.232.144.73:80/), Admin user (admin), Admin password (Temporary) (qufFIH6Mzx), Instance (strato-node-1-vm), Instance zone (us-central1-f), and Instance machine type (n1-standard-2). Below this, there is a 'Get started with STRATO for Business Networks - Single Node' section with a 'VISIT THE SITE' button and an 'SSH' button. A 'Suggested next steps' section follows, with a bullet point 'Save your temporary credentials' and a note about changing the admin password.

Just like that, you created a blockchain network!

Click *Check my progress* to verify the objective.

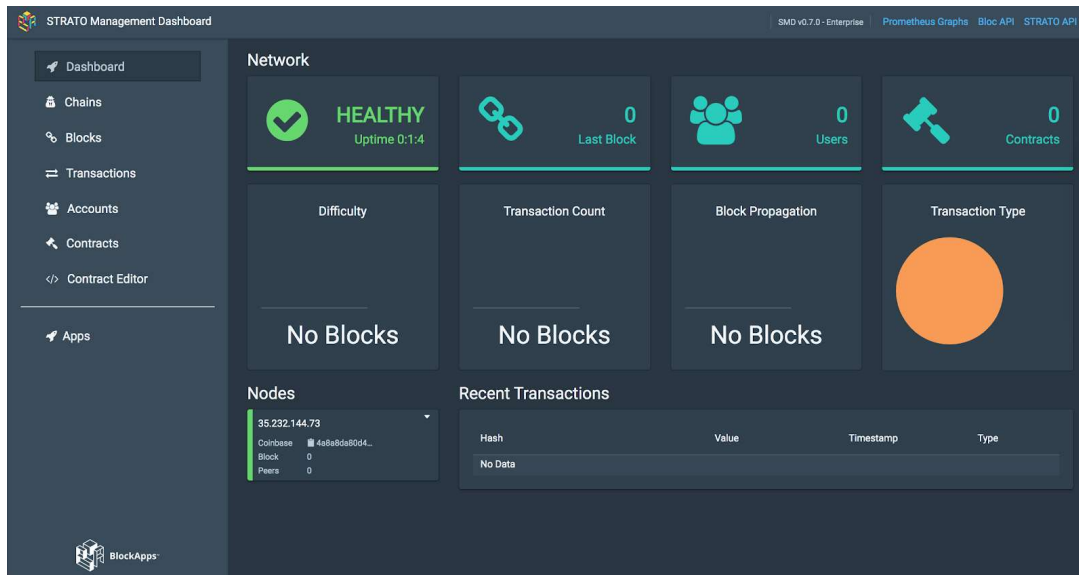
Launch STRATO

Check my progress

Access the Management Dashboard

So far you've created a private blockchain network consisting of one node. It comes with one admin account, and that's about it.

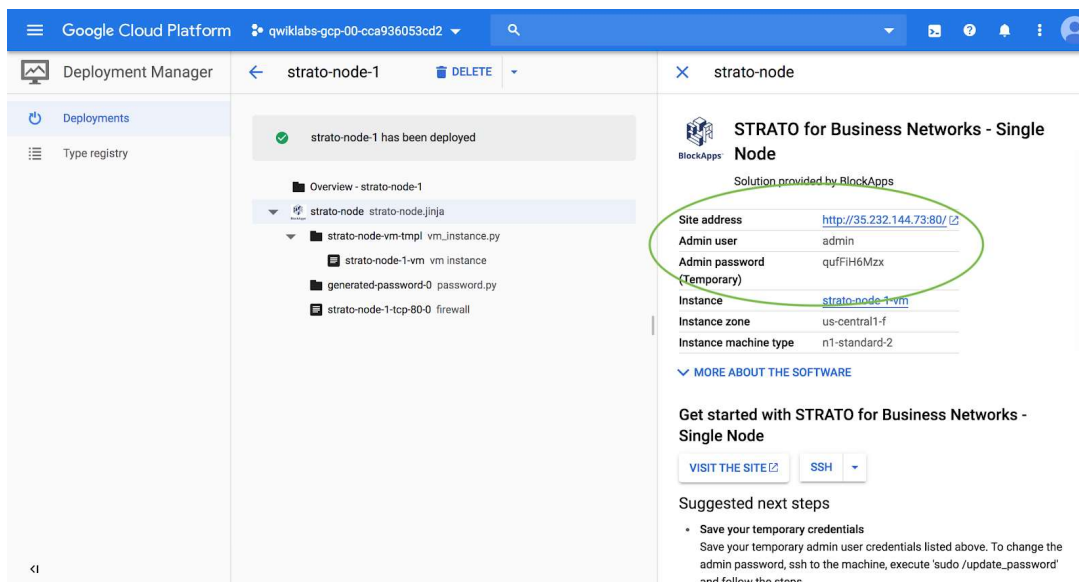
You can see what's on this blockchain you just made by looking at the the management dashboard.



The management dashboard is your control center for monitoring and managing your blockchain network.

1. Navigate to the dashboard

To access your management dashboard, navigate to the address provided in the deployment console:



2. Login to the dashboard

Log in to the dashboard with the admin credentials provided in the for STRATO:

Username: `admin`

Password: *collect from "Admin password (Temporary)"*

If you are receiving a "this site can't be reached" error or are missing a prompt to log in, close the window and try again.

Sign in

http://35.232.144.73

Your connection to this site is not private

Username

Password

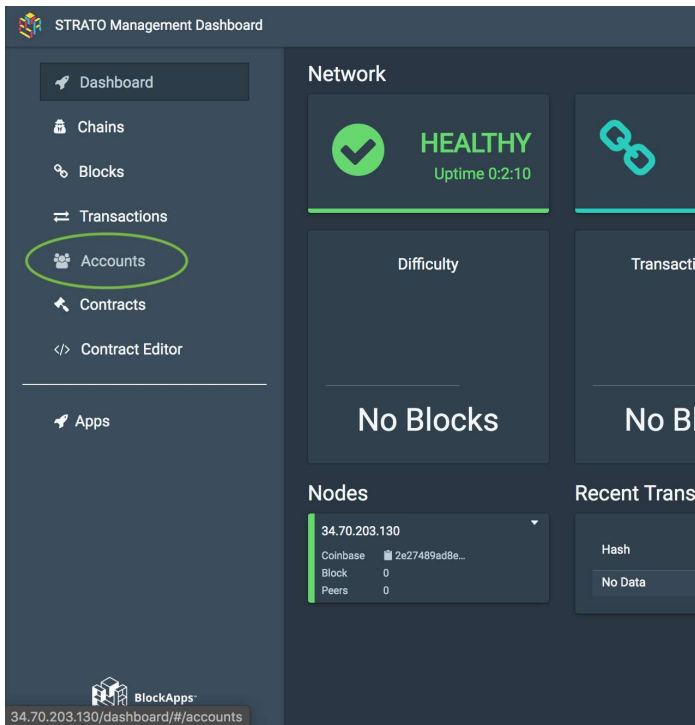
In this lab you'll only be exploring the **Accounts** section. Feel free to take a 3-5 minutes to click around and explore what is available on the dashboard.

FYI - If you feel like something has stopped working (or just want to revert to the original set up) [reset your STRATO node](#) at any time to revert it back to it's original state.

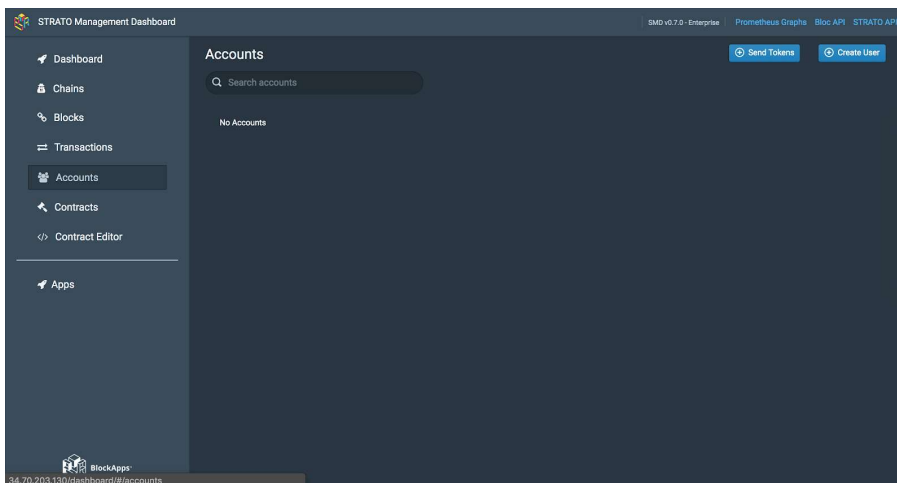
Create and Activate A User

As the network administrator, you have a lot of control over this private blockchain - including control over who has access to it.

Click on the **Accounts** tab of the management dashboard to see what user accounts have access to this network.

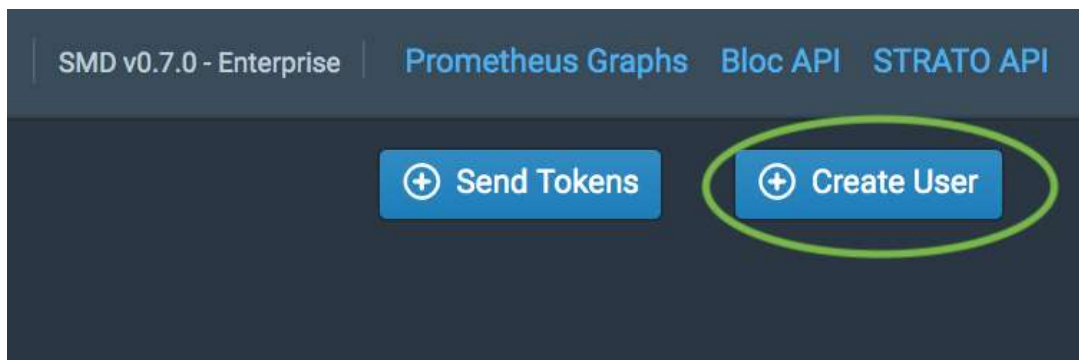


There are currently **no users** in this network. Without users, nothing of interest can happen on this network, so create one.

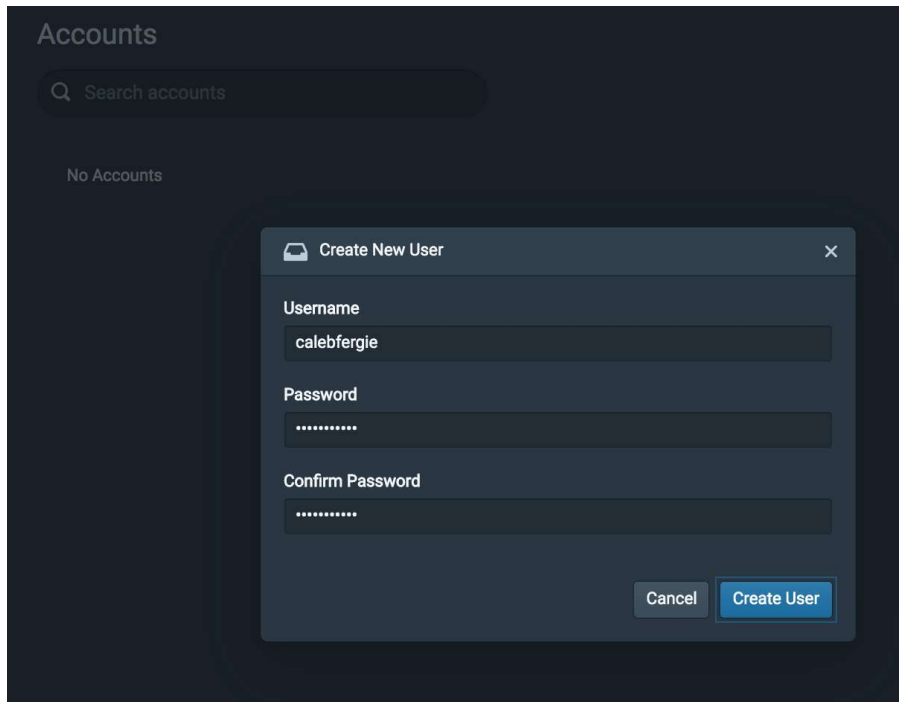


Create user account

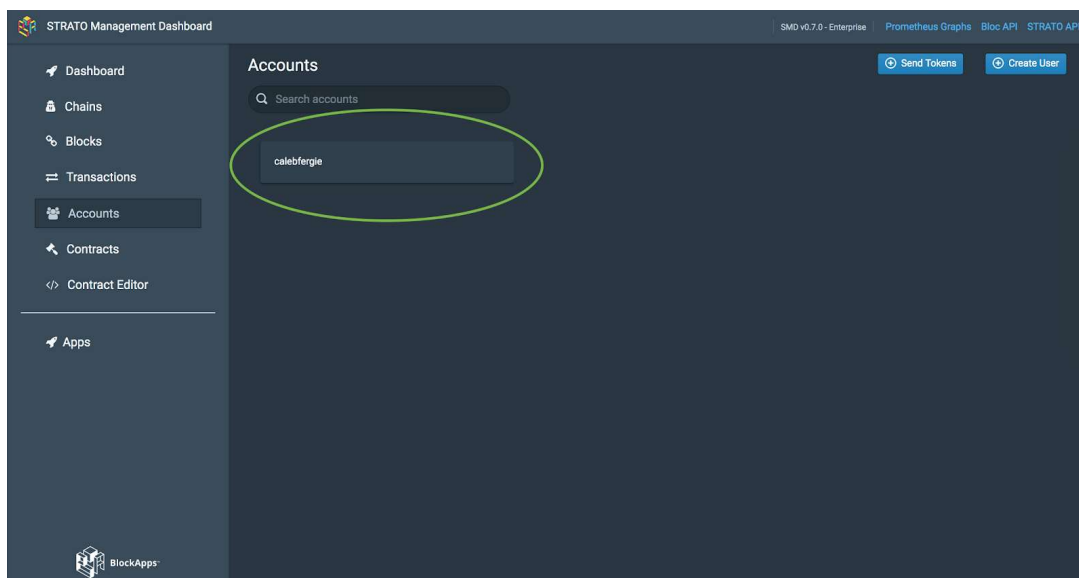
1. Click the **Create User** button in the upper-right corner.



2. Choose a username and password (can be anything - calebfergie in this example) and click the **Create User** button.

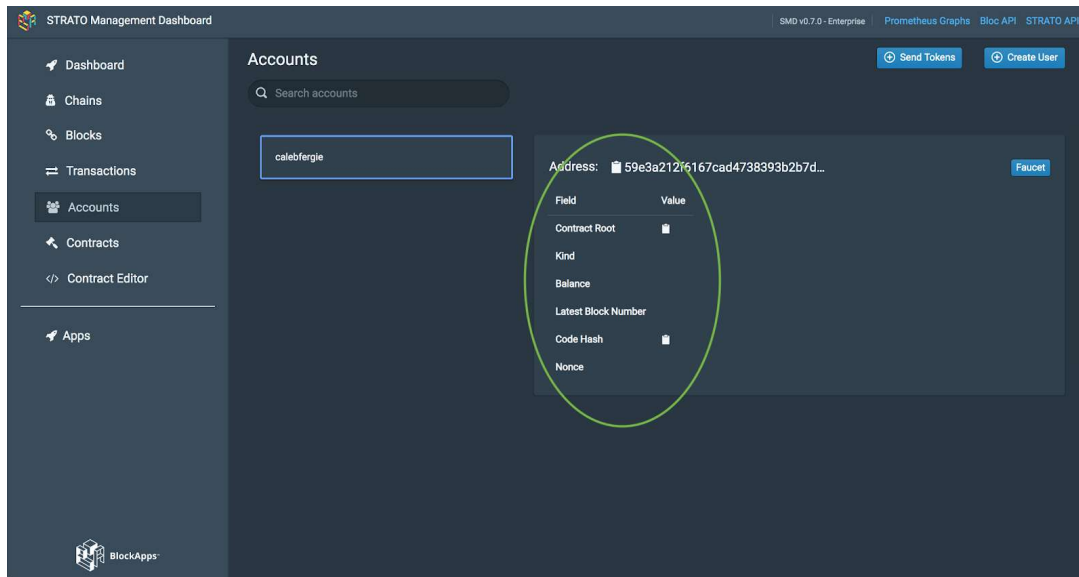


You should now see the user in the Accounts list!



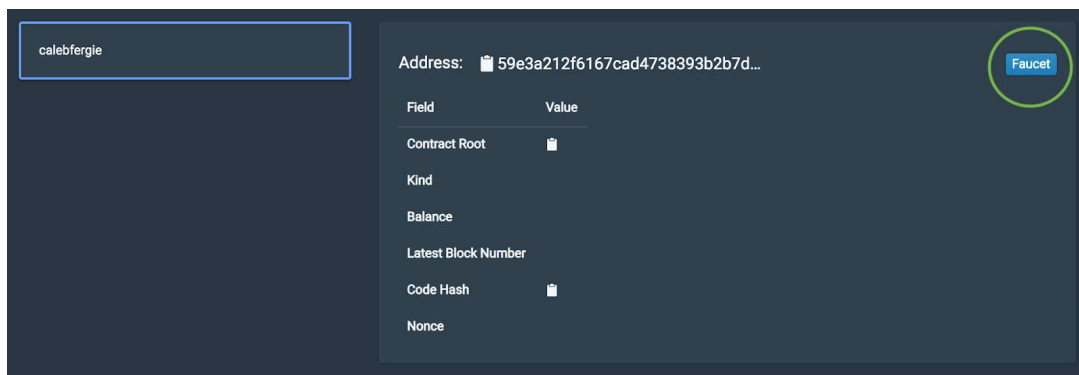
Activate the account

While this user account has been created, it hasn't truly been "activated" yet.



Notice how most of the account fields are empty. You need to activate this account by *fauceting* it. Fauceting:

- Provides the user with what they need to perform transactions on your network
 - Adds the user accounts "creation event" to the blockchain ledger
- Click the **Faucet** button to activate the account.



After fauceting, you will see the user's account fields are now populated with information.

calebfergie

Address: 59e3a212f6167cad4738393b2b7d...

Faucet

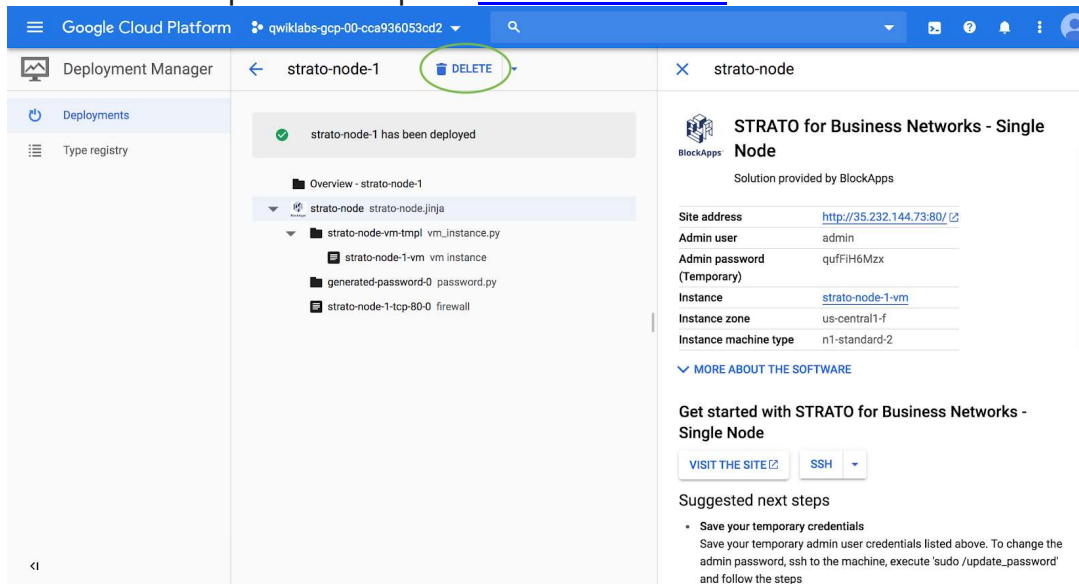
Field	Value
Contract Root	56e81f171bcc55a6ff8345e692c0f86e...
Kind	AddressStateRef
Balance	2000000000000000000 wei
Latest Block Number	1
Code Hash	c5d2460186f7233c927e7db2dcc703c...
Nonce	0

Take a look at elements of the user you created. What do these fields mean?

- The **Address** field is the unique identifying key (hash) that allows other users on the network to interact with this one user
- The **Contract Root** is a hash of the *proof* that this user was created at this point in time on the blockchain
- The **Kind** field describes what *type* of information the Contract Root value represents
- The **Balance** field contains an allocation of credits (as a result of the faucet) assigned to the account upon creation. The balance is only useful in more advanced networks but provided here regardless
- The **Latest Block Number** is the most recent block this account has been active for
- The **Code Hash** is a hashed representation of the above information
- The **Nonce** field is not relevant here

Reset STRATO

To reset STRATO, delete the instance running on your machine from the Deployment Console and repeat the steps to [Launch STRATO](#).



The screenshot shows the Google Cloud Platform Deployment Manager interface. The top navigation bar includes the Google Cloud Platform logo, the project name 'wikilabs-gcp-00-cca936053cd2', and a search bar. The main content area is divided into two panels. The left panel, titled 'Deployment Manager', shows a list of deployments under 'Deployments' and 'Type registry'. The right panel, titled 'strato-node', displays the details of the 'strato-node-1' deployment. A green circle highlights the 'DELETE' button in the top right corner of the deployment details panel. The deployment details include a status message 'strato-node-1 has been deployed', an overview section with a tree view of resources, and a 'STRATO for Business Networks - Single Node' section with various configuration details.

Google Cloud Platform wikilabs-gcp-00-cca936053cd2

Deployment Manager

Deployments

Type registry

strato-node-1

DELETE

strato-node

STRATO for Business Networks - Single Node

Solution provided by BlockApps

Site address <http://35.232.144.73:80/>

Admin user admin

Admin password quFFIH6Mzx (Temporary)

Instance [strato-node-1-vm](#)

Instance zone us-central1-f

Instance machine type n1-standard-2

[MORE ABOUT THE SOFTWARE](#)

Get started with STRATO for Business Networks - Single Node

[VISIT THE SITE](#) [SSH](#)

Suggested next steps

- Save your temporary credentials

Save your temporary admin user credentials listed above. To change the admin password, ssh to the machine, execute 'sudo /update_password' and follow the steps

Congratulations!

In just a few minutes, you have launched a private blockchain network with STRATO and added a user account to the network. Launching a blockchain is not so hard. The next steps in your blockchain journey will teach you how to build and run blockchain networks that do what you want them to.

If you still have time left in your session, you can:

- Continue to explore and play with the [management dashboard](#)
- Try creating another user and facilitating a transaction between them
- Submit a question or some feedback in the lab review

Want more from BlockApps?

- [Overview of STRATO](#)
- [About BlockApps](#)
- [STRATO for Business Networks - Single Node](#)
- [Developer Documentation](#)

Google Cloud Training & Certification

...helps you make the most of Google Cloud technologies. [Our classes](#) include technical skills and best practices to help you get up to speed quickly and continue your learning journey. We offer fundamental to advanced level training, with on-demand, live, and virtual options to suit your busy schedule. [Certifications](#) help you validate and prove your skill and expertise in Google Cloud technologies.

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