Spin Up A Blockchain Node with BlockApps STRATO in 3 minutes

GSP705

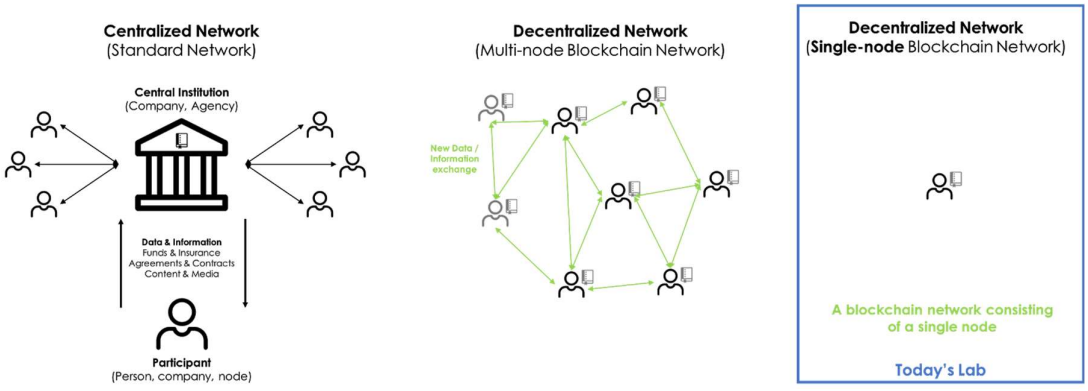
Overview

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.

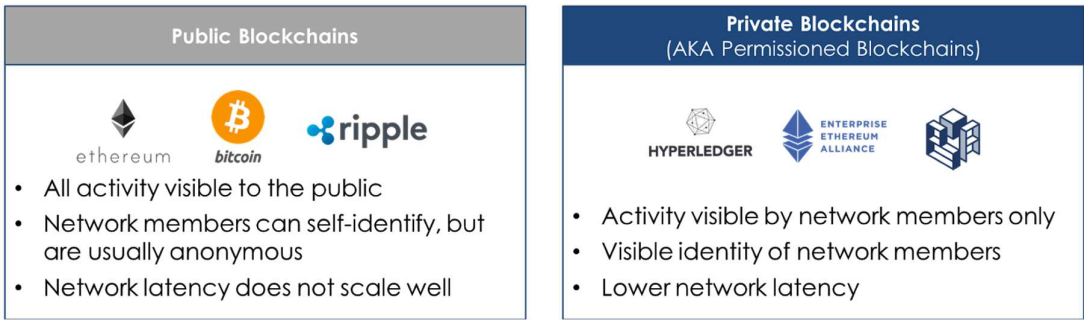
What is a Private Blockchain Network?

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

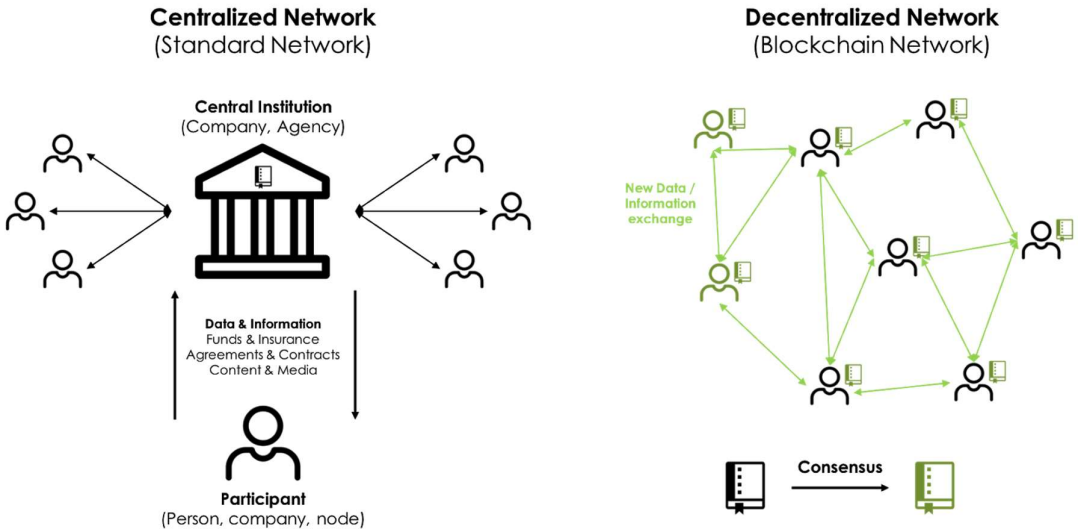
Blockchain is a technology that allows for the creation of scarce, transferable digital assets. It is a ledger that handles the "double spend" problem of accounting/economics for digital assets

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



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 anoynmous (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 governence 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.

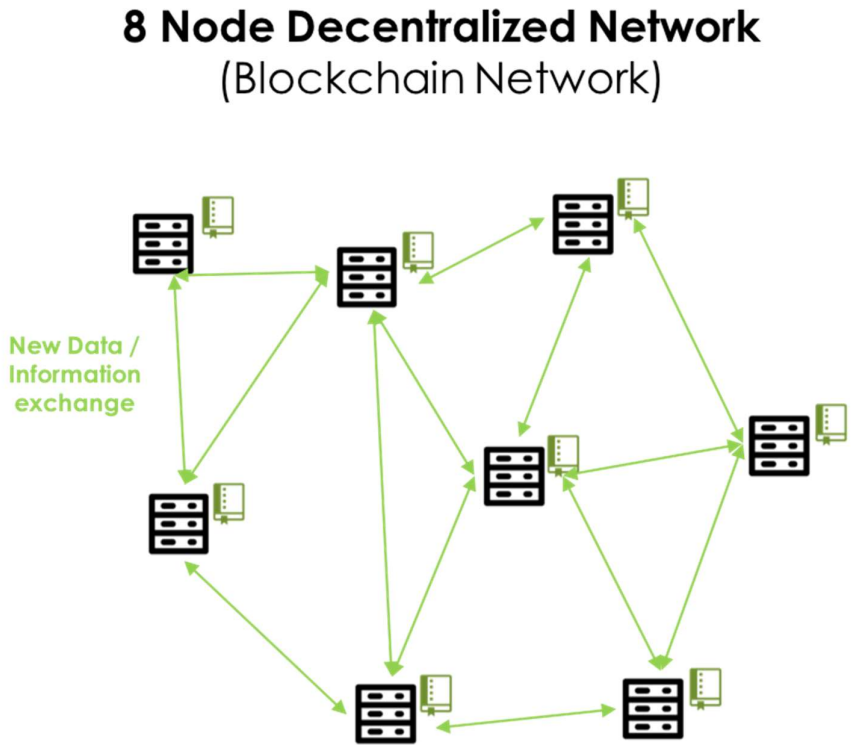
A transaction could exchange something as simple as a message (e.g. "Hello there") or something more complex like the exchange of a rare piece of art.

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.



In this digram, 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

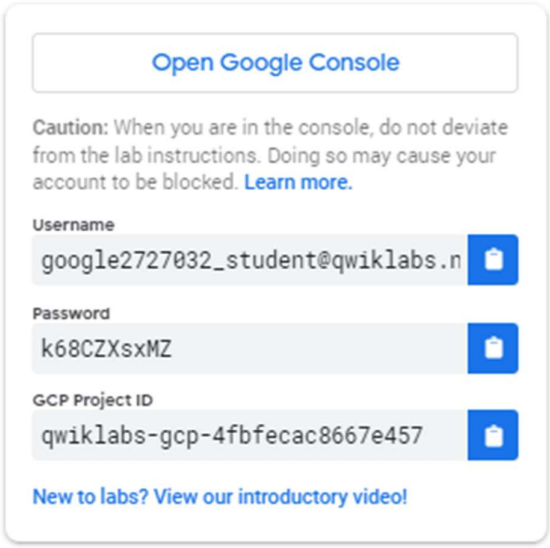
To complete this lab, you need:

- 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.

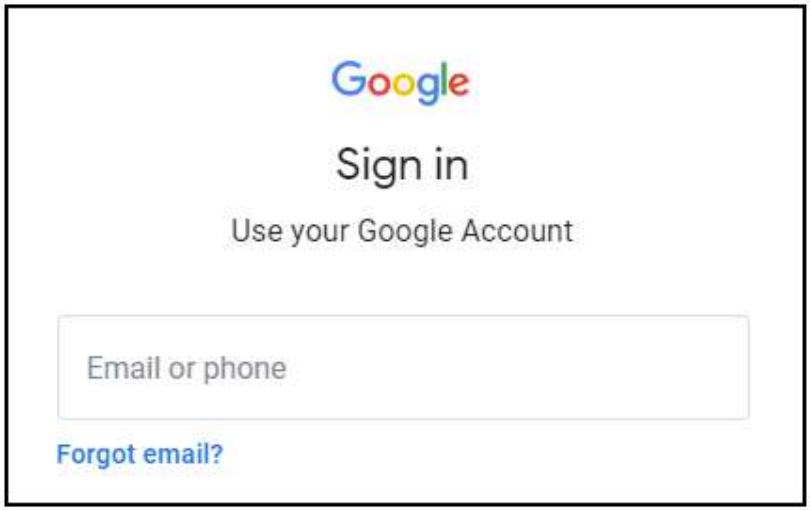
Note: If you are using a Pixelbook, open an Incognito window to run this lab.

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.

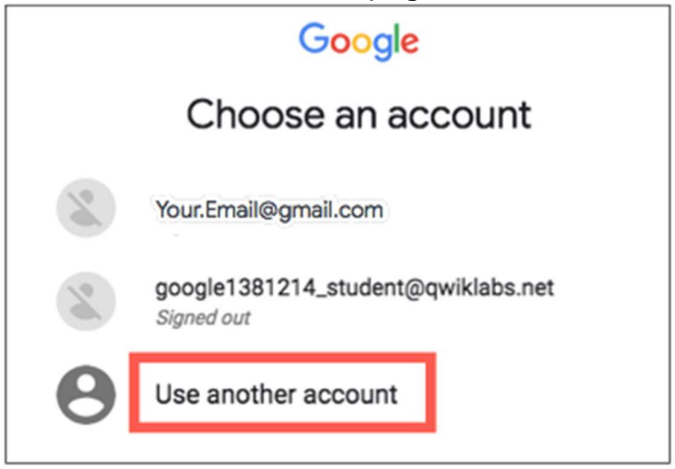


2. Copy the username, and then click **Open Google Console**. The lab spins up resources, and then opens another tab that shows the **Sign in** page.



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

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



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

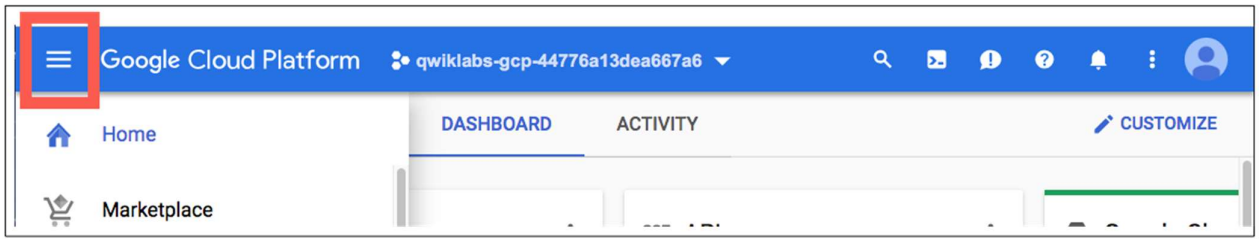
   Important: You must use the credentials from the Connection Details panel. Do not use your Qwiklabs credentials. If you have your own Google Cloud account, do not use it for this lab (avoids incurring charges).

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.

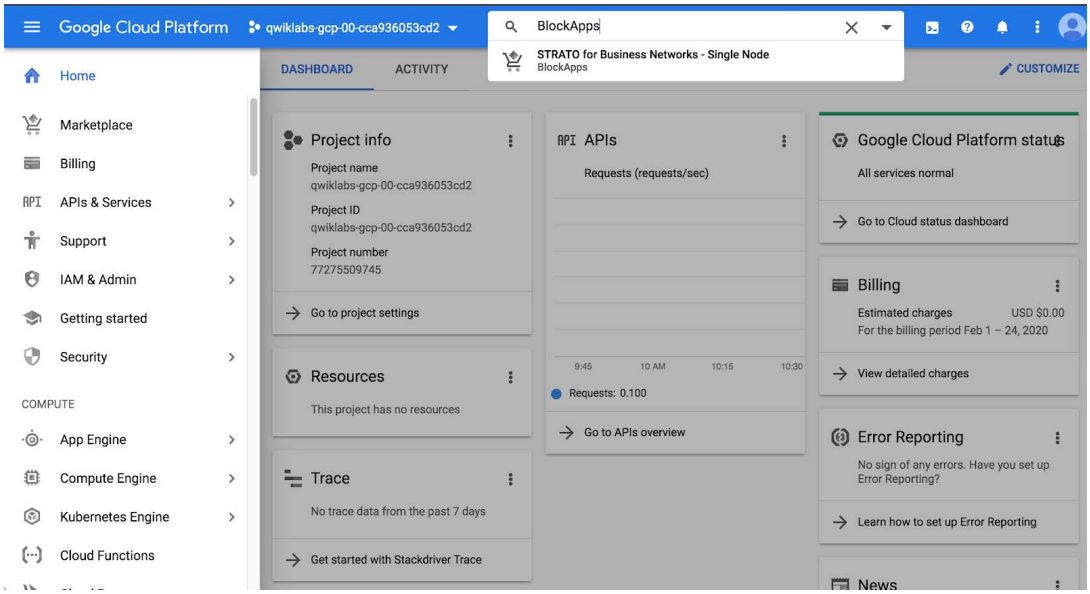
After a few moments, the Cloud Console opens in this tab.

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

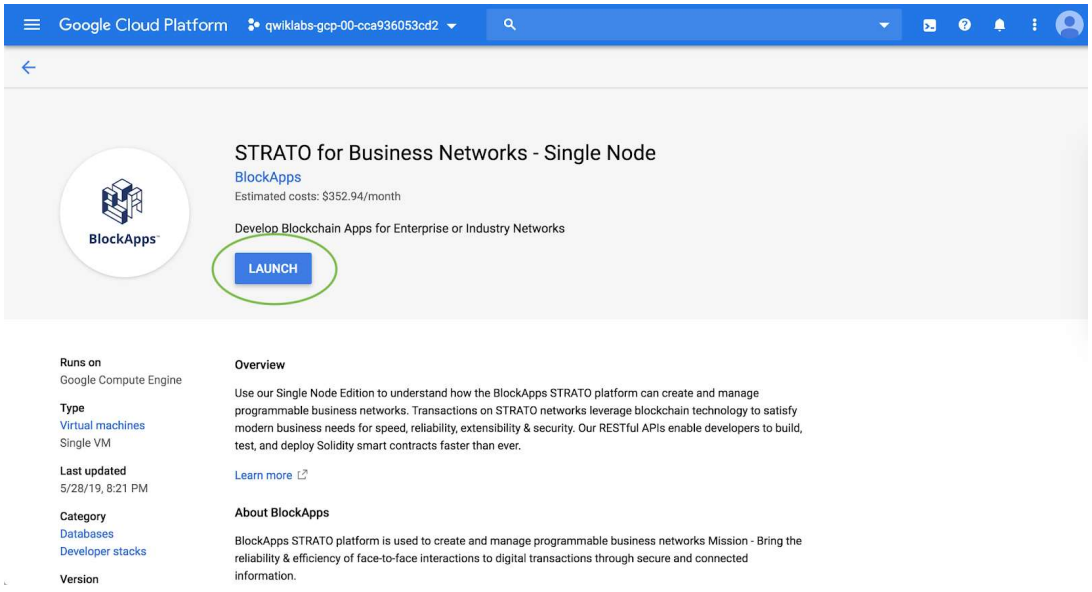


Launch STRATO

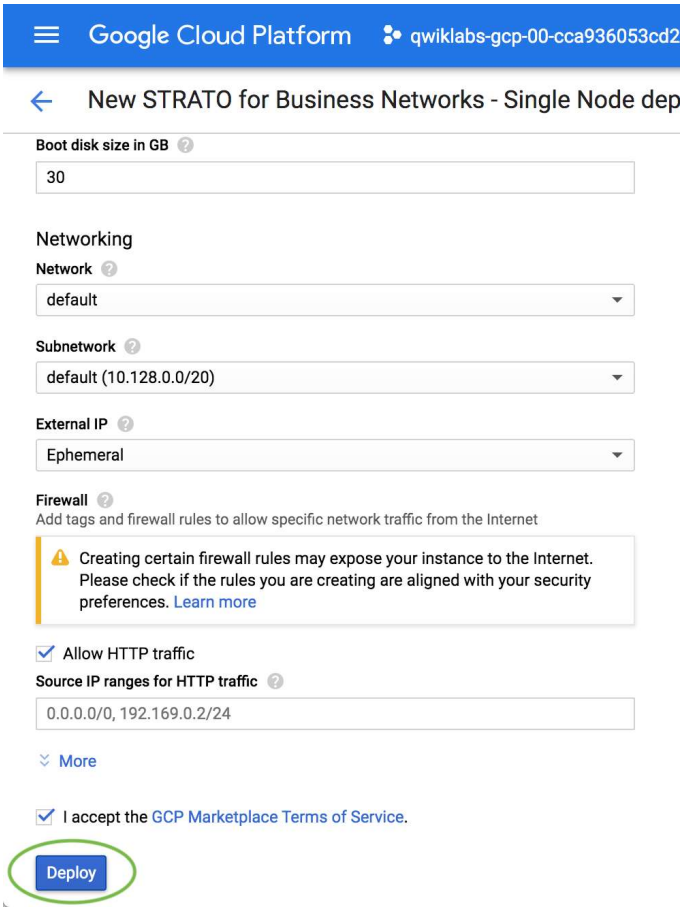
Now it's time to start STRATO... as promised, this is the easy part!



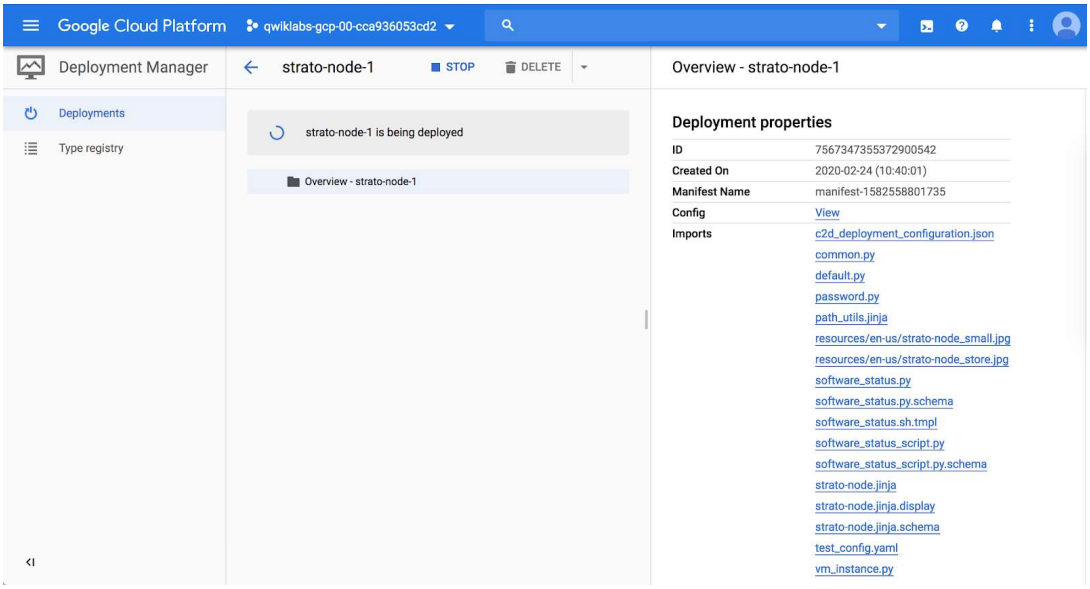
Click the link to go to [Single Node version of BlockApps STRATO] in the Google Cloud Marketplace.
Search for "`BlockApps`" in the search bar and find the Single Node listing. Click the **Launch** button.



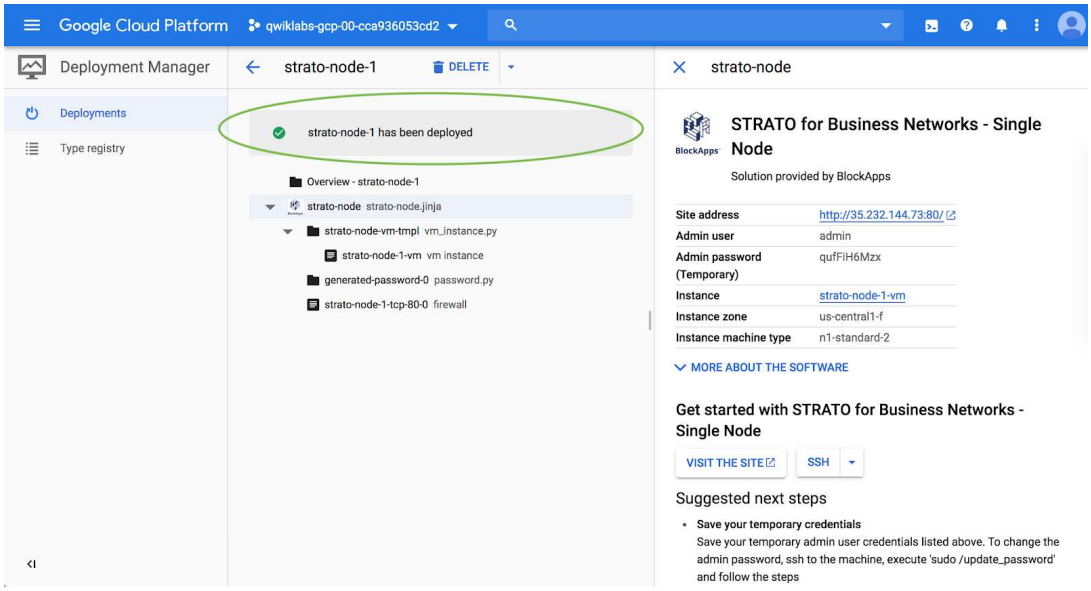
No customization is needed so just **accept the terms** and click **Deploy**.



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



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



Just like that, you created a blockchain network!

Click *Check my progress* to verify the objective.

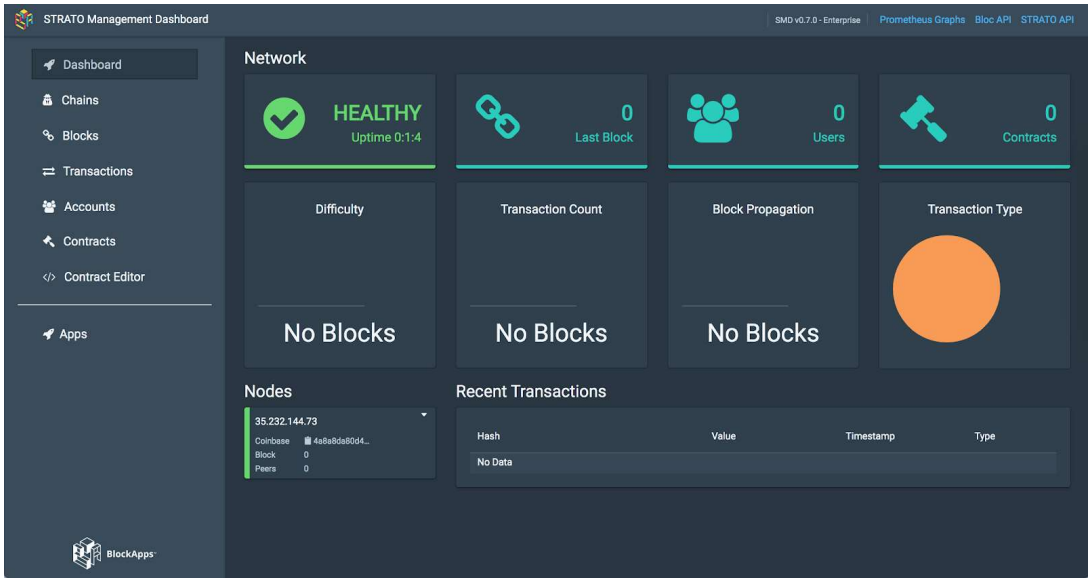
Launch STRATO

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.

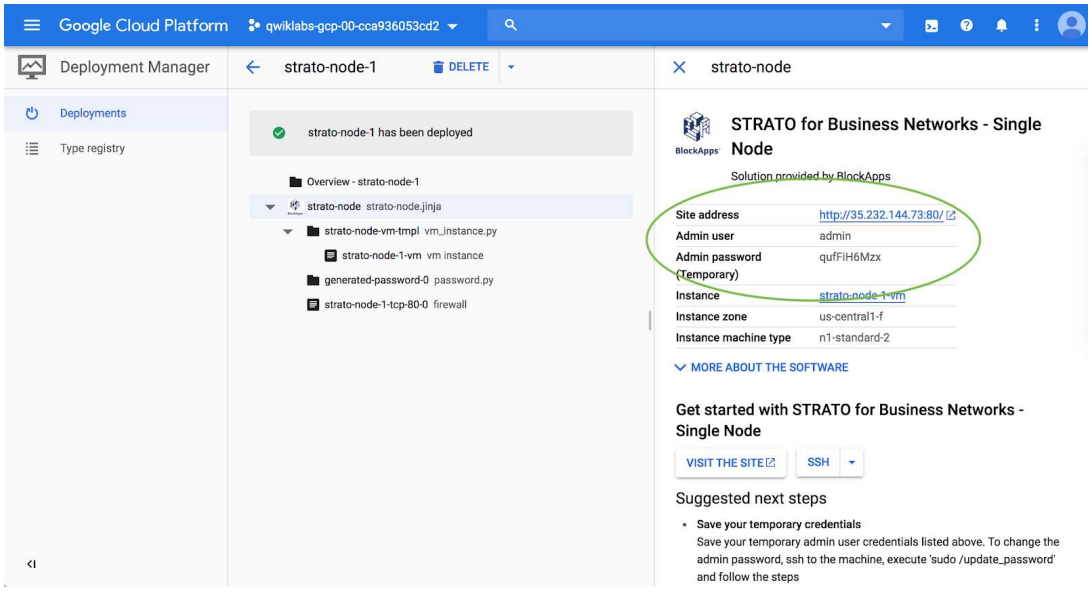
You can see what's on this blockchain you just made by looking at the the management dashboard.



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:



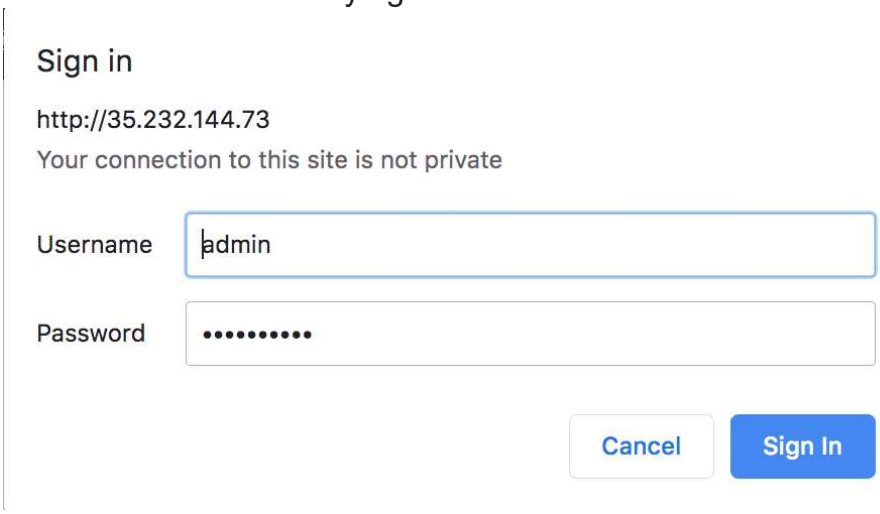
2. **Login to the dashboard**

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



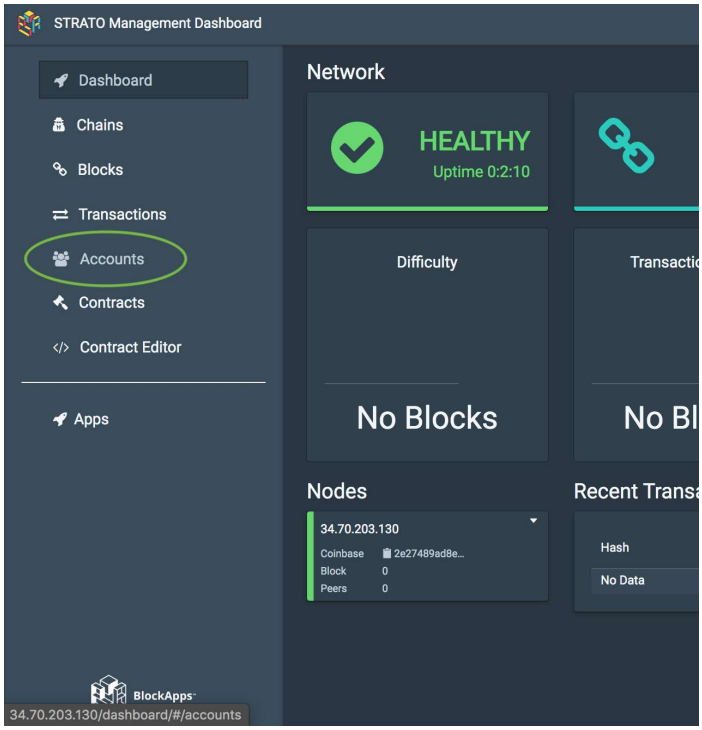
In this lab you'll only be exploring the **Accounts** section. Feel free to take a 3-5 minutes to click around and explore what is available on the dashboard.

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.

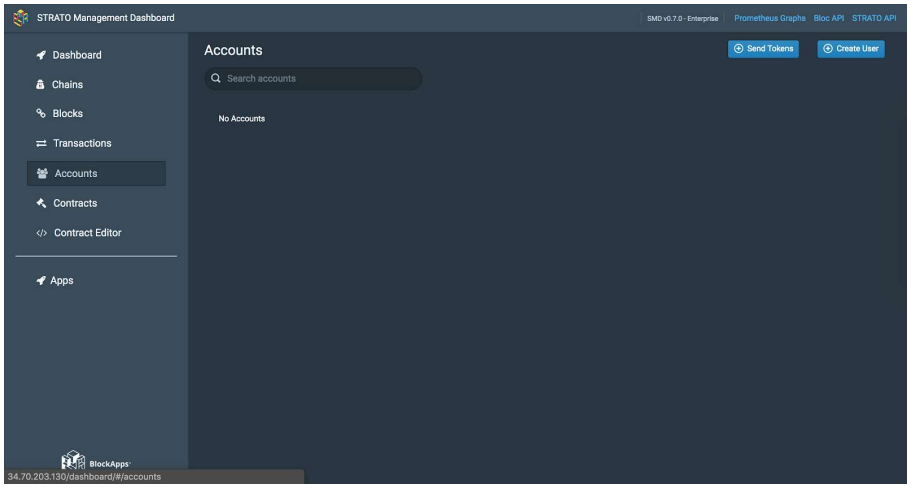
Create and Activate A User

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.

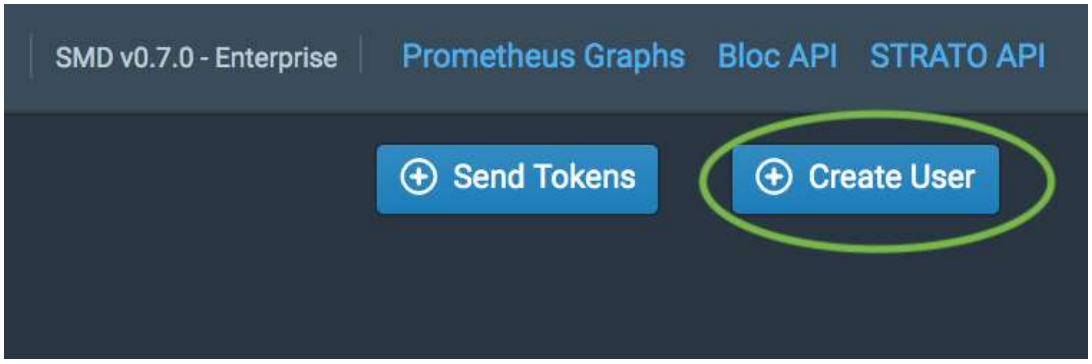


There are currently **no users** in this network. Without users, nothing of interest can happen on this network, so create one.

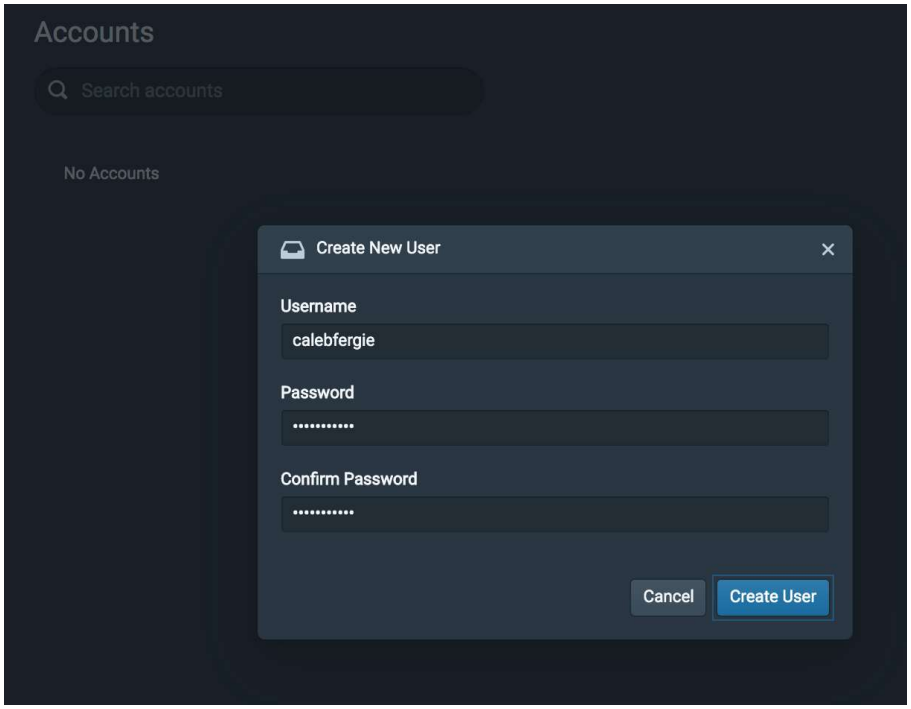


Create user account

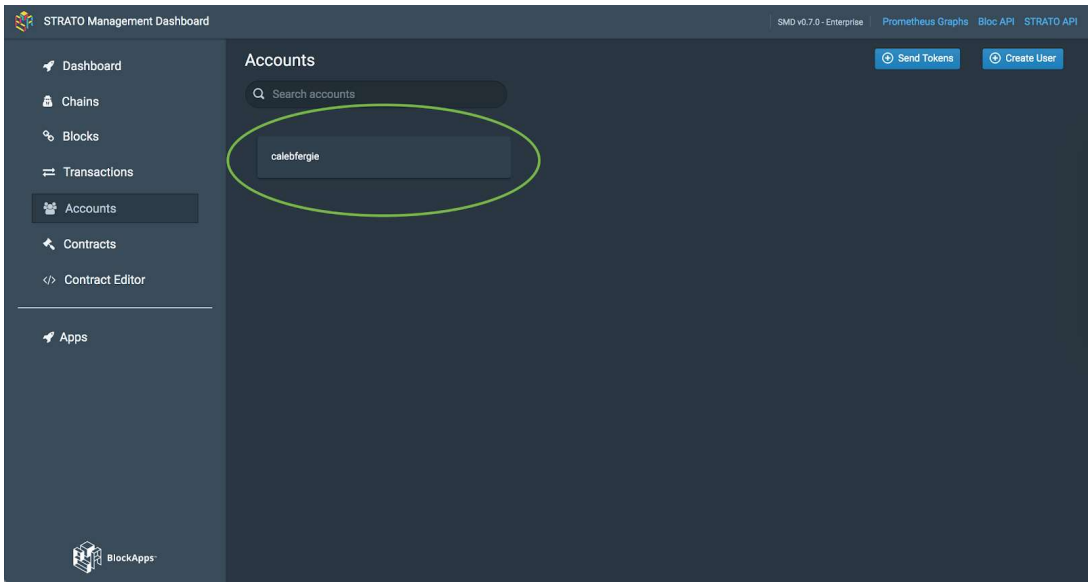
1. Click the **Create User** button in the upper-right corner.



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

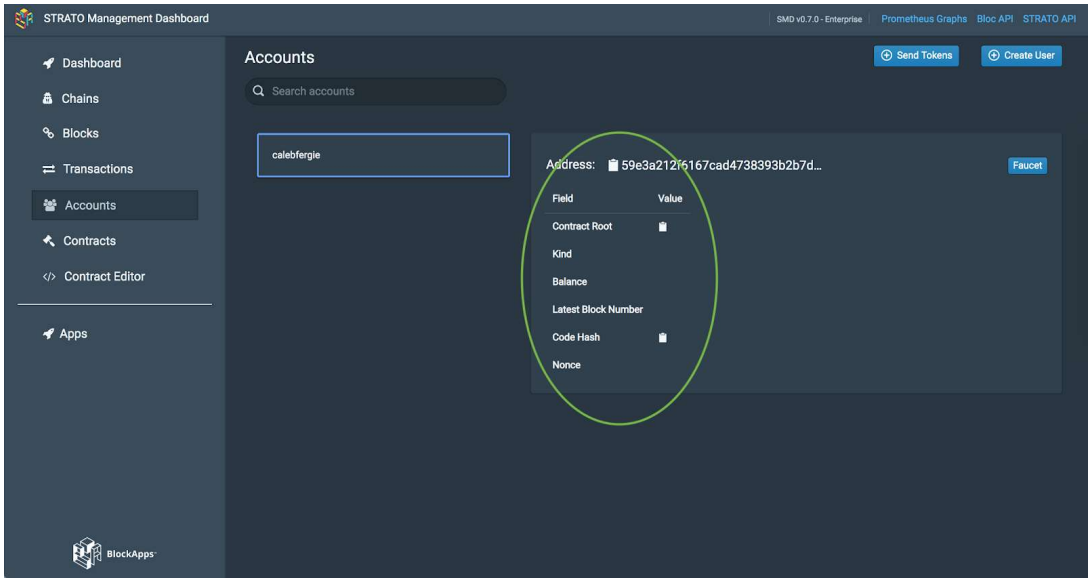


You should now see the user in the Accounts list!



Activate the account

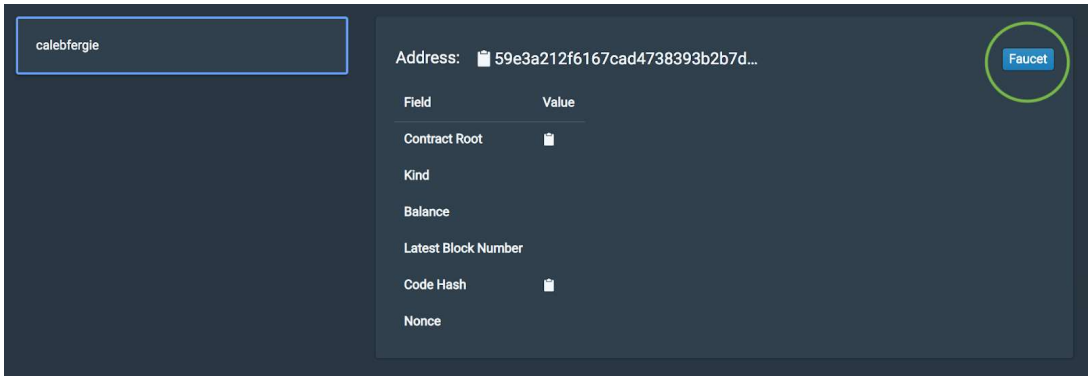
While this user account has been created, it hasn't truly been "activated" yet.



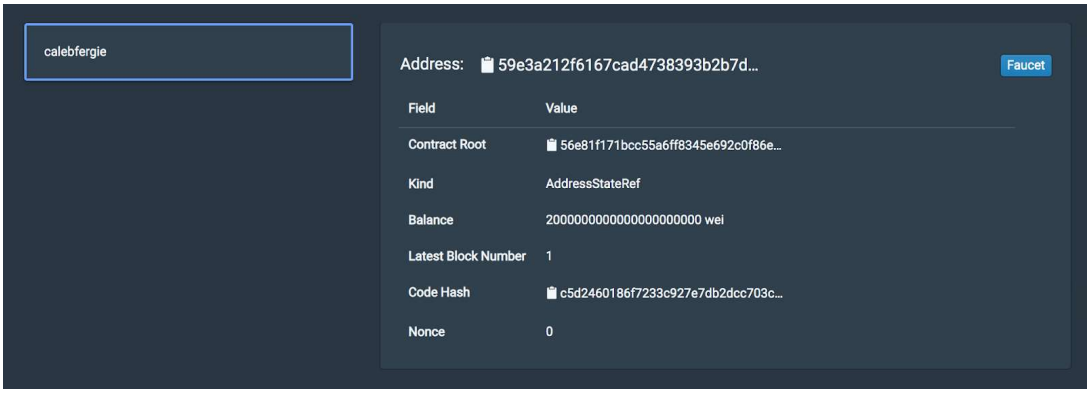
Notice how most of the account fields are empty. You need to activate this account by *fauceting* it. Fauceting:

- 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.

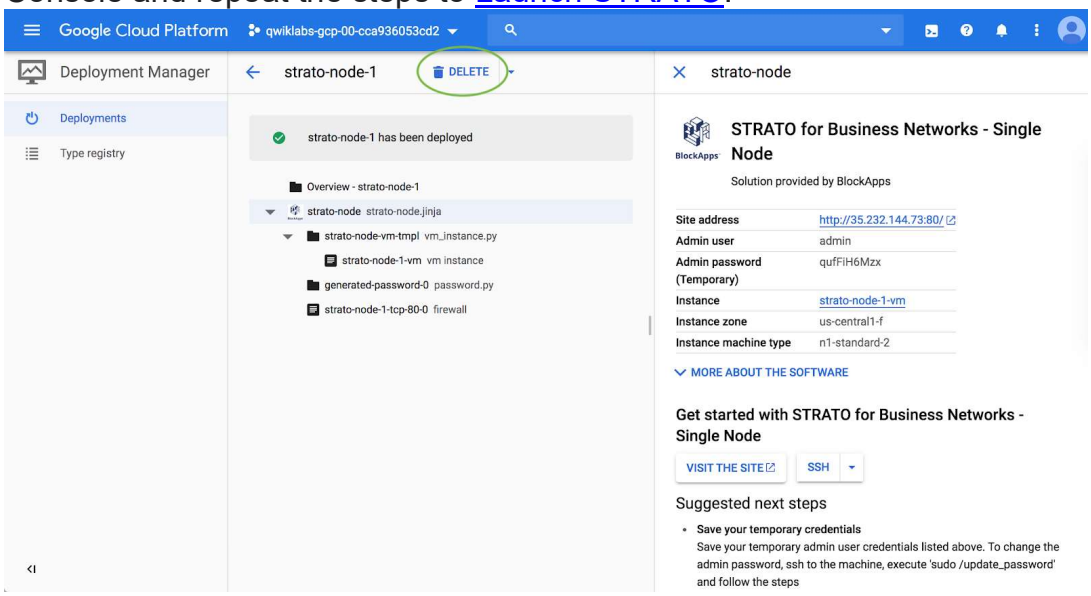


Take a look at elements of the user you created. What do these fields mean?

- 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.



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

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- Overview of STRATO
- About BlockApps
- STRATO for Business Networks - Single Node
- Developer Documentation

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Lab Last Tested March 23, 2020