

IBM Blockchain Platform Hands-On

Lab 4:

IBM Blockchain Platform Operations *Optional Extras*

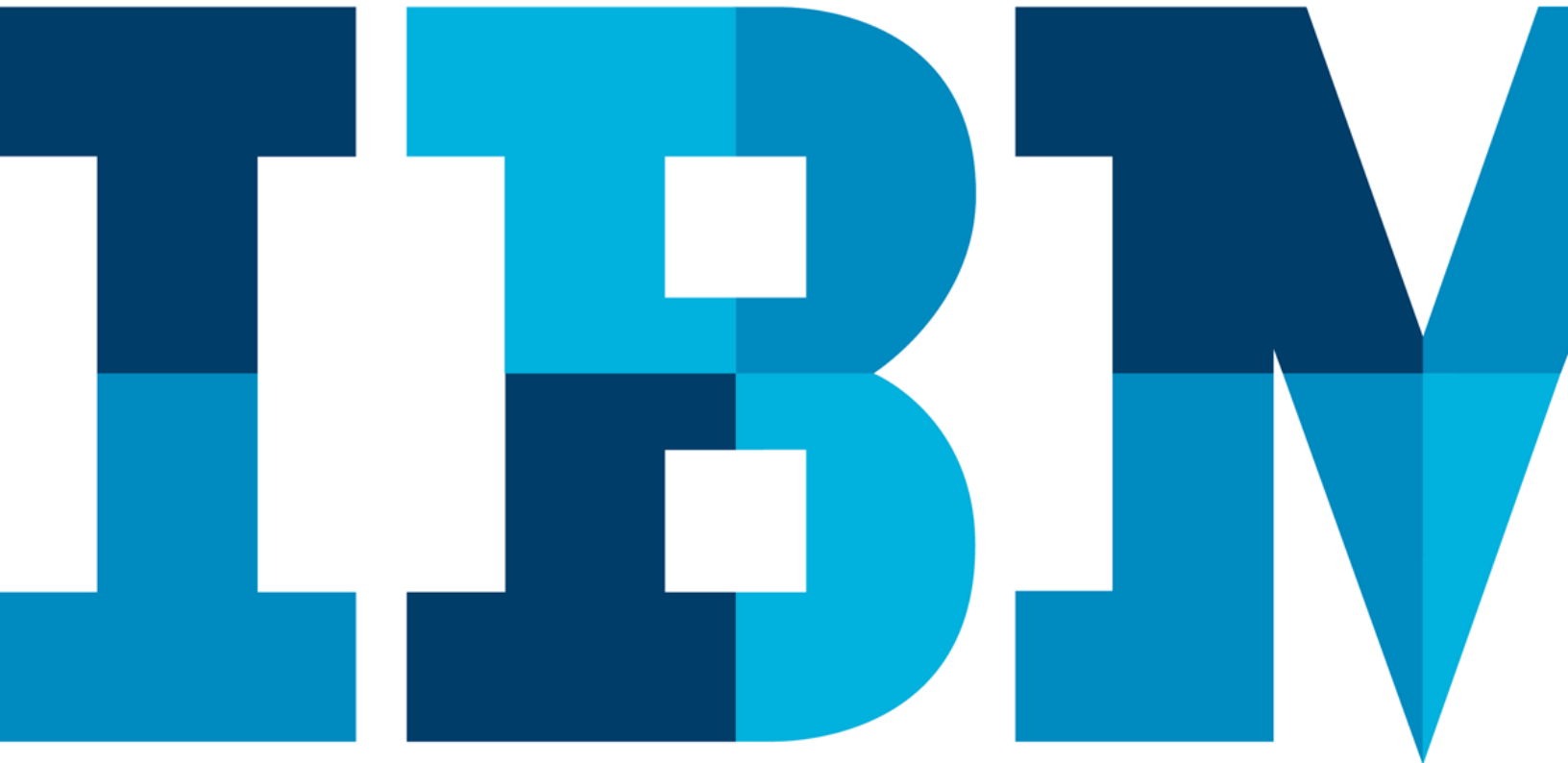


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1 Overview of the lab environment and scenario

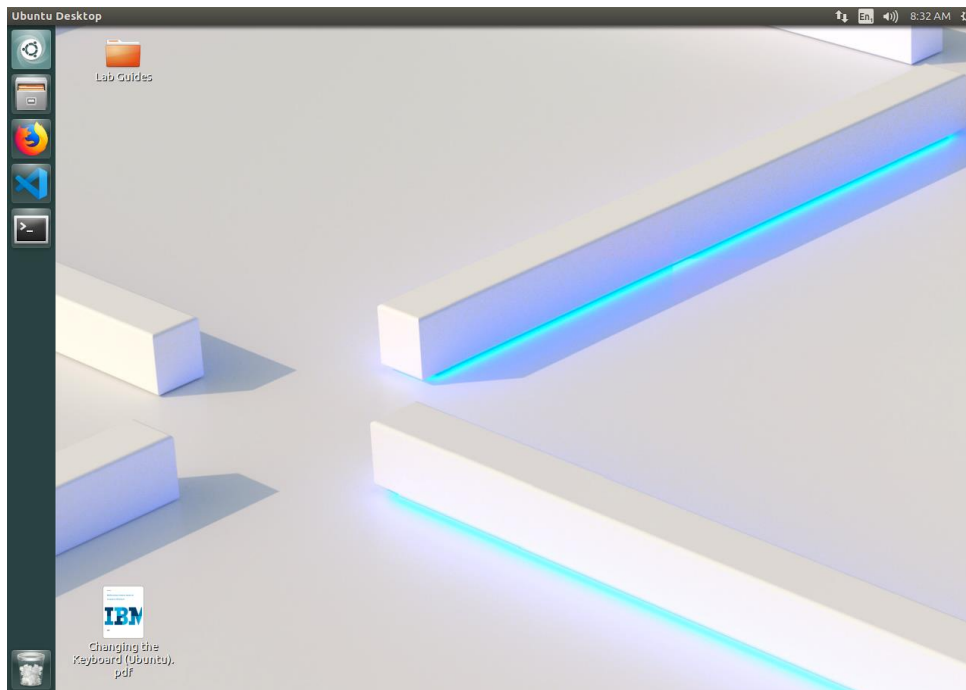
This lab is an extension to the previous lab -IBM Blockchain Platform Operations.

Note: The screenshots in this lab guide were taken using version **1.37.1** of **VS Code**, version **1.0.9** of the **IBM Blockchain Platform** plugin and version **0.3.50** of the **IBM Blockchain Platform** console. If you use different versions, you may see differences to those shown in this guide.

Start here. Instructions are always shown on numbered lines like this one:

- 1. If it is not already running, start the virtual machine for the lab. The instructor will tell you how to do this if you are unsure.
- 2. Wait for the image to boot and for the associated services to start. This happens automatically but might take several minutes. The image is ready to use when the desktop is visible as per the screenshot below.

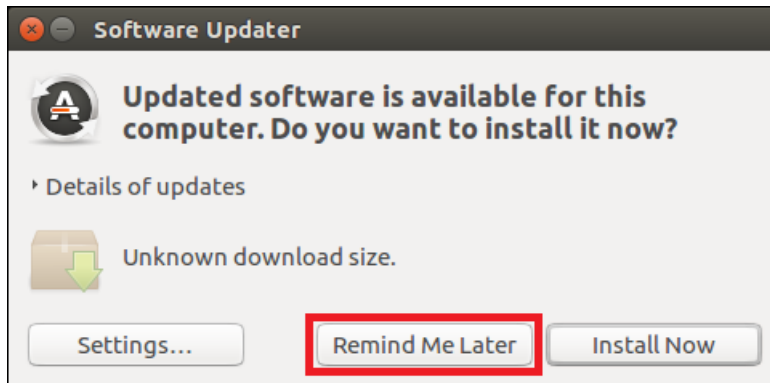
Note: If it asks you to login, the userid and password are both “**blockchain**”.



1.1 Lab Scenario

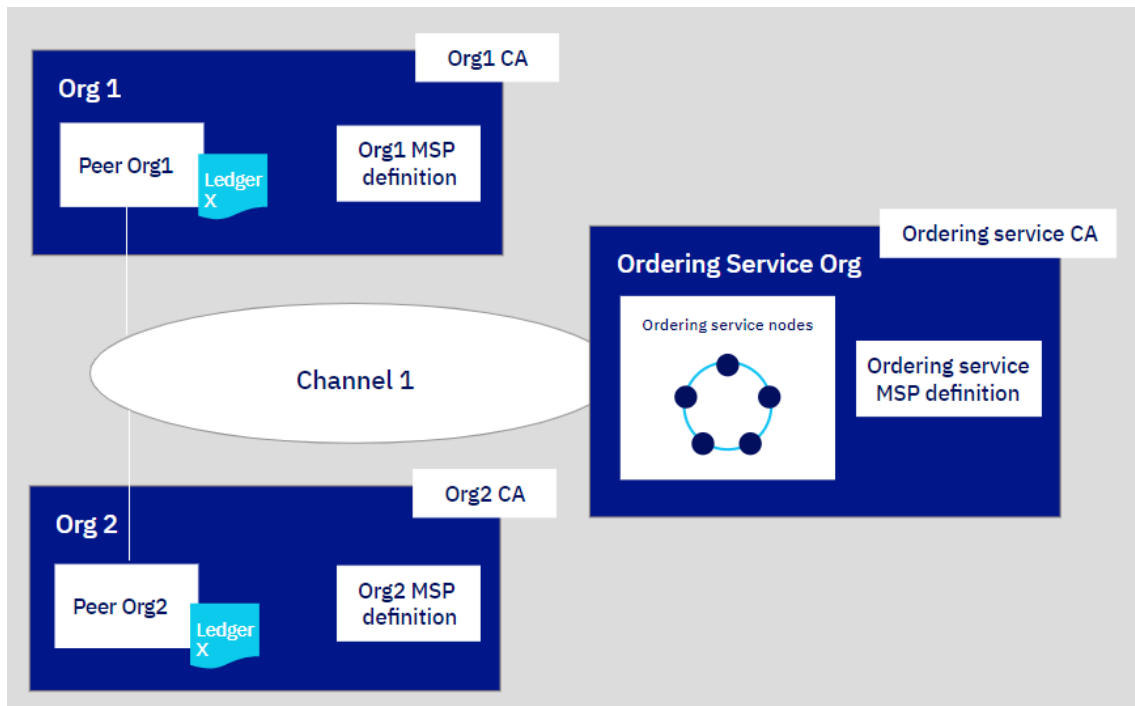
In this lab, we will be carrying on from where we finished in the previous lab. We will be exploring some extra content around logging etc.

Note that if you get an “Software Updater” pop-up at any point during the lab, please click “**Remind Me Later**”:



2 IBM Blockchain Platform Operations

As mentioned above, in this lab we will be carrying on from where we finished in the previous lab. This assumes that you managed to complete the previous lab. As a reminder, here is a diagram of the network we built in the previous lab:



In the previous lab we split into pairs, each doing a separate part. In this lab, we can go back to doing the steps individually if you wish or you can carry on sharing a screen in you prefer.

2.1 Looking at the logs in the IBM Blockchain Platform.

- __ 3. Open the Firefox web browser inside the VM and go to <https://cloud.ibm.com/resources>. Make sure you are logged in, then expand “Clusters” to see the “ibp-cluster” that the network you have created is hosted in.

Resource list

Create resource

Collapse all | Expand all

Name ▲	Group	Status
Filter by name or IP address...	Filter by group or org...	Filter...
> Devices (0)		
> VPC Infrastructure (0)		
▼ Clusters (1)		
ibp-cluster	workshop-rg	Normal
> Cloud Foundry Apps (0)		
> Cloud Foundry Services (0)		
> Services (1)		
> Storage (0)		
> Network (0)		
> Cloud Foundry Enterprise Environments (0)		
> Functions Namespaces (0)		

FEEDBACK

__ 4. You will see your cluster, which will have an expiry date if it is a free cluster.

The screenshot shows the IBM Cloud Kubernetes Dashboard for a cluster named 'mycluster'. The browser window is titled 'mycluster Cluster - IBM Cloud - Mozilla Firefox'. The URL is 'https://cloud.ibm.com/kubernetes'. The dashboard shows the cluster status as 'Normal' with a green dot. A warning banner indicates 'Expires in 24 days: Be sure to back up your data, your cluster will be deleted in 24 days. To access the full capabilities of the service, try out a [standard cluster](#).' The 'Summary' section lists the following details:

Summary	
Cluster ID	blto1dad0a1oj4dbdtag
Master status	Ready
Version	1.14.6_1531
Zones	hou02
Creator	Mgk@uk.ibm.com
Created	9/13/2019, 11:44 AM
Resource group	default

If you scroll down you should see that there is one Worker Node that should **be 100% Normal** which means it is running correctly.

- __ 5. At the top of the page, click on the **Kubernetes dashboard** button to launch the dashboard. This may take a while to show.

Overview - Kubernetes Dashboard - Mozilla Firefox

Overview - Kubernetes X +

https://us-south.containers.cloud.ibm.com/kubeproxy/cl...

kubernetes Search + CREATE

Overview

Cluster

- Namespaces
- Nodes
- Persistent Volumes
- Roles
- Storage Classes

Namespace

default

Overview

Workloads

- Cron Jobs
- Daemon Sets
- Deployments
- Jobs
- Pods
- Replica Sets

Discovery and Load Balancing

Services

Name	Labels	Cluster IP	Internal endpoints	External endpoints	Age
✓ kubernet...	componen... provider: k...	172.21.0.1	kubernetes...	-	6 days

Config and Storage

Secrets

Name	Type	Age
default-jp-icr-io	kubernetes.io/dockerconfigj...	6 days
default-au-icr-io	kubernetes.io/dockerconfigj...	6 days
default-de-icr-io	kubernetes.io/dockerconfigj...	6 days
default-uk-icr-io	kubernetes.io/dockerconfigj...	6 days
default-us-icr-io	kubernetes.io/dockerconfigj...	6 days

- __ 6. On the left-hand side of the page, click on the “**Namespace**” drop down, and scroll to the end of the list to find a namespace beginning with the letter “**n**” and select it. This is the namespace that IBM Blockchain Platform creates when you deploy it:

The screenshot shows the Kubernetes Dashboard in Mozilla Firefox. The browser address bar shows the URL: <https://us-south.containers.cloud.ibm.com/kubeproxy/cli>. The dashboard has a blue header with the 'kubernetes' logo and a search bar. The left sidebar shows the 'Overview' page selected under the 'Namespace' dropdown, which is set to 'nd5c97a'. The main content area shows 'Workloads' with 'Workloads Statuses' and 'Deployments' sections.

Workloads Statuses

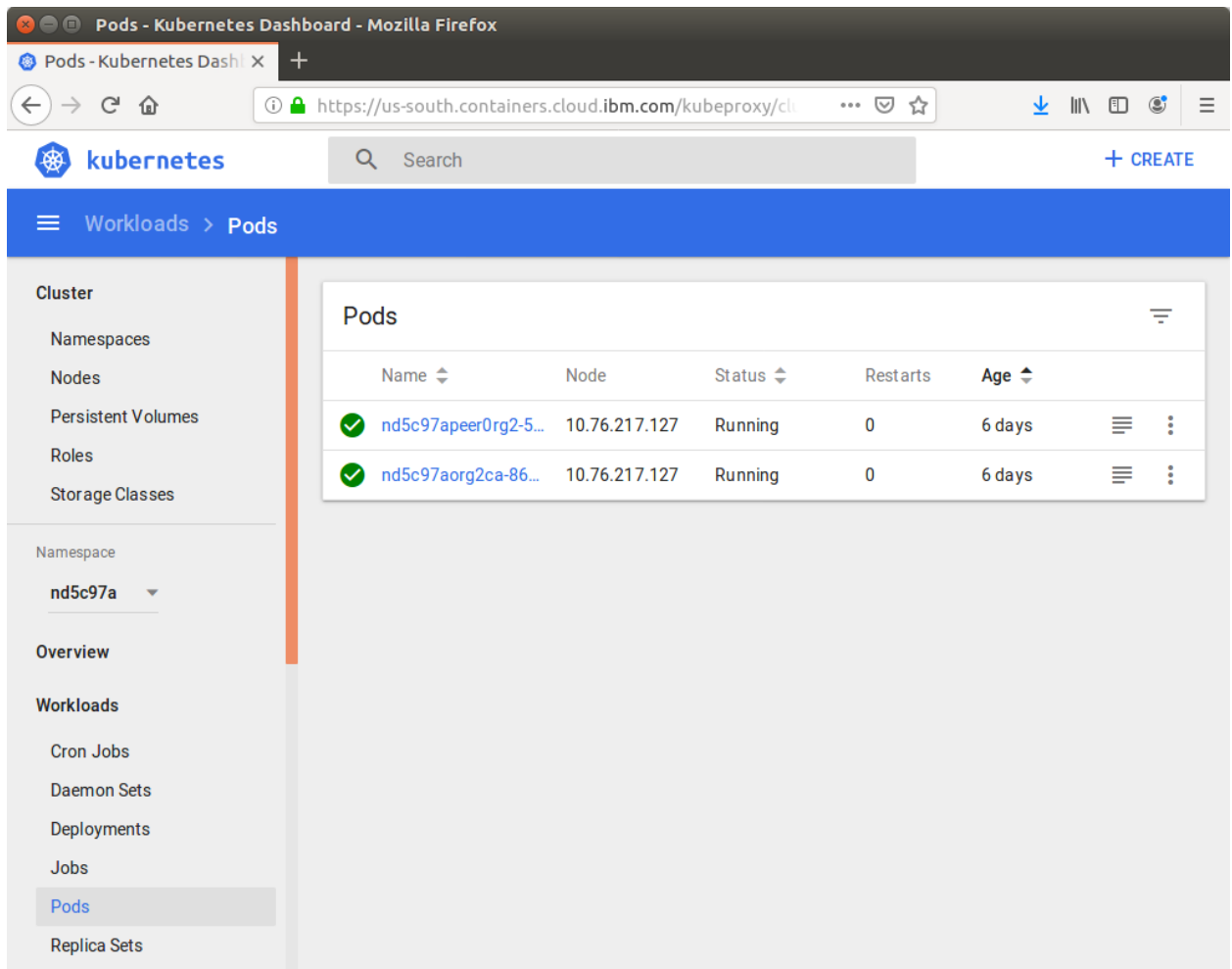
Workload Type	Status
Deployments	100.00%
Pods	100.00%
Replica Sets	100.00%

Deployments

Name	Labels	Pods	Age	Images
nd5c97apeer0...	<ul style="list-style-type: none">app: ibm-ibpchart: peercomponent: pe.heritage: Tillername: peer0rg2	1 / 1	6 days	<ul style="list-style-type: none">us.icr.io/ibp2/...us.icr.io/ibp2/...us.icr.io/ibp2/...us.icr.io/ibp2/...fluentd:v1.4-2us.icr.io/ibp2/...

Scroll down the page and you will now be able to see the status of the **Deployments**, **Pods**, **Replica Sets** and **Services** created at part of your IBM Blockchain Platform deployment.

- __ 7. From the left-hand side of the page, click on the “**Pods**” link under “**Workloads**” and you will see a list of the running **Pods**. If you look closely at the names for each pod, you will see that they start with the namespace (**nd5c97a** in this case – yours will be different). After the namespace you will see the name you used earlier such as **peerOrg2** or **org2ca**. Note that this screenshot only shows two pods as it was taken from **Org2** who ran the **Join** tutorial. If you ran the **Build** tutorial, you will see more pods.



The screenshot shows the Kubernetes Dashboard in a Mozilla Firefox browser. The URL is <https://us-south.containers.cloud.ibm.com/kubeproxy/cluster/nd5c97a>. The dashboard displays the 'Pods' page for the 'nd5c97a' namespace. The left sidebar shows the navigation menu with 'Pods' selected under 'Workloads'. The main area shows a table of running pods.

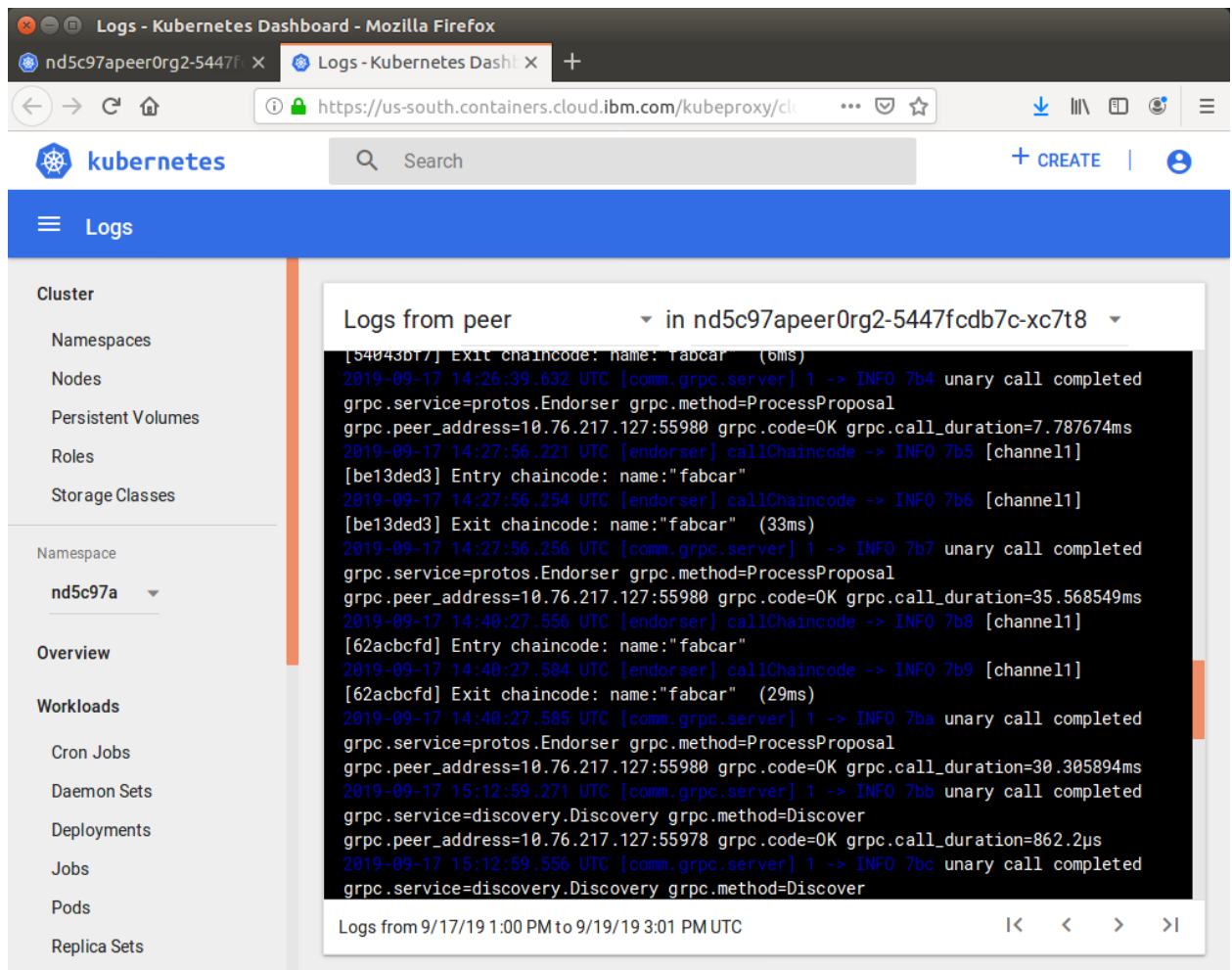
Name	Node	Status	Restarts	Age
nd5c97apeerOrg2-5...	10.76.217.127	Running	0	6 days
nd5c97aorg2ca-86...	10.76.217.127	Running	0	6 days

- __ 8. Find the Pod that contains your peer which should be the one containing the name **peerOrg2** or **peerOrg1** depending on which tutorial you ran and click on it:

The screenshot shows the Kubernetes Dashboard in a Mozilla Firefox browser. The address bar displays the URL `https://us-south.containers.cloud.ibm.com/kubeproxy/cl...`. The dashboard header includes the Kubernetes logo, a search bar, and a '+ CREATE' button. The breadcrumb navigation shows 'Workloads > Pods > nd5c97apeerOrg2-5447fcd7c-xc7t8'. The left sidebar contains a 'Cluster' menu with options like Namespaces, Nodes, Persistent Volumes, Roles, and Storage Classes. Below this is a 'Namespace' dropdown set to 'nd5c97a', followed by an 'Overview' section and a 'Workloads' section with options like Cron Jobs, Daemon Sets, Deployments, Jobs, Pods (highlighted), and Replica Sets. The main content area is divided into two sections: 'Details' and 'Containers'. The 'Details' section shows the following information: Name: nd5c97apeerOrg2-5447fcd7c-xc7t8, Namespace: nd5c97a, Labels: app: ibm-ibp, chart: peer, component: peer, heritage: Tiller, name: peerOrg2 (with a 'show all' link), Annotations: kubernetes.io/psp: ibm-privileged-psp, Creation Time: 2019-09-13T14:21 UTC, Status: Running (with an 'Annotations' button), QoS Class: Burstable, Network: Node: 10.76.217.127, IP: 172.30.231.10. The 'Containers' section shows a single container named 'peer' with Image: us.icr.io/ibp2/hlfabric-peer:amd64-alpine-1.4.1-a3f82fa and Environment variables: LICENSE: accept, CORE_PEER_LISTENADDRESS: 0.0.0.0:7051, and CORE_PEER_CHAINCODELISTENADDRESS: 0.0.0.0:7053.

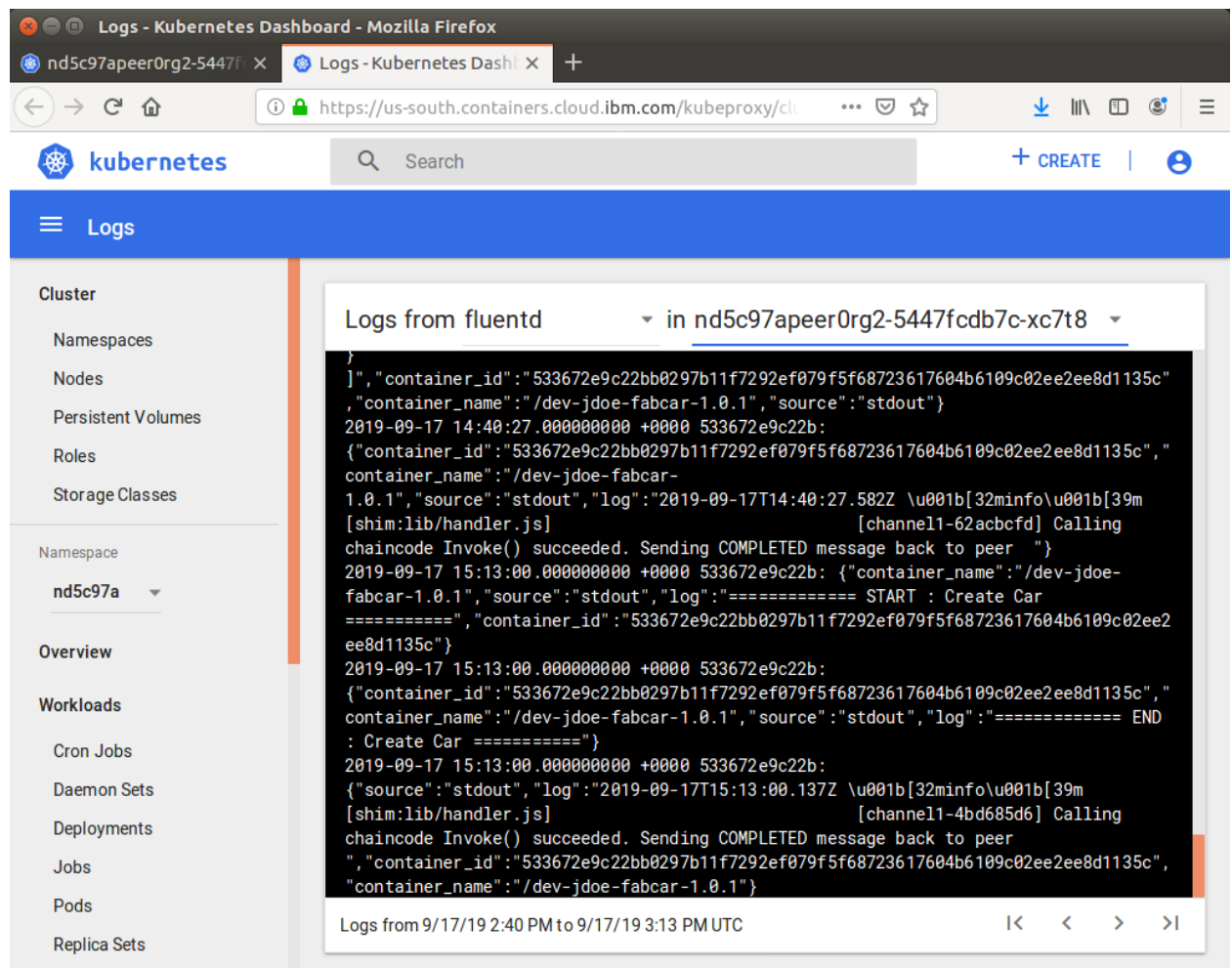
You can now see the details of the containers that make up the Pod, along with their environment and configuration details. You should see containers for the **Peer**, **couchdb**, **dind**, **proxy** and **fluentd** along with an **Init** container. At the bottom you will be able to see the **Persistent Volume Claims** made by the Pod as well.

- __ 9. From the top of the screen, click on the “**Logs**” button to see the log viewer which will open in a new tab:



- __ **10.** By default, you will be looking at the logs for the peer itself. However, it is more common to want to look at the logs for the smart contract. As there can be many smart contracts, each of which run in a separate container, there logs are piped to a “collector” container called “**fluentd**”.

From the top of the log window, click on the drop-down list called “**Logs from peer**” and instead choose the logs from **fluentd**:



If you scroll down to the bottom you can see output from the most recent call to the “**createCar**” transaction. If you look at the source code for the fab car smart contract, you will see the “**console.info**” output from the **createCar** transaction is captured in these logs.

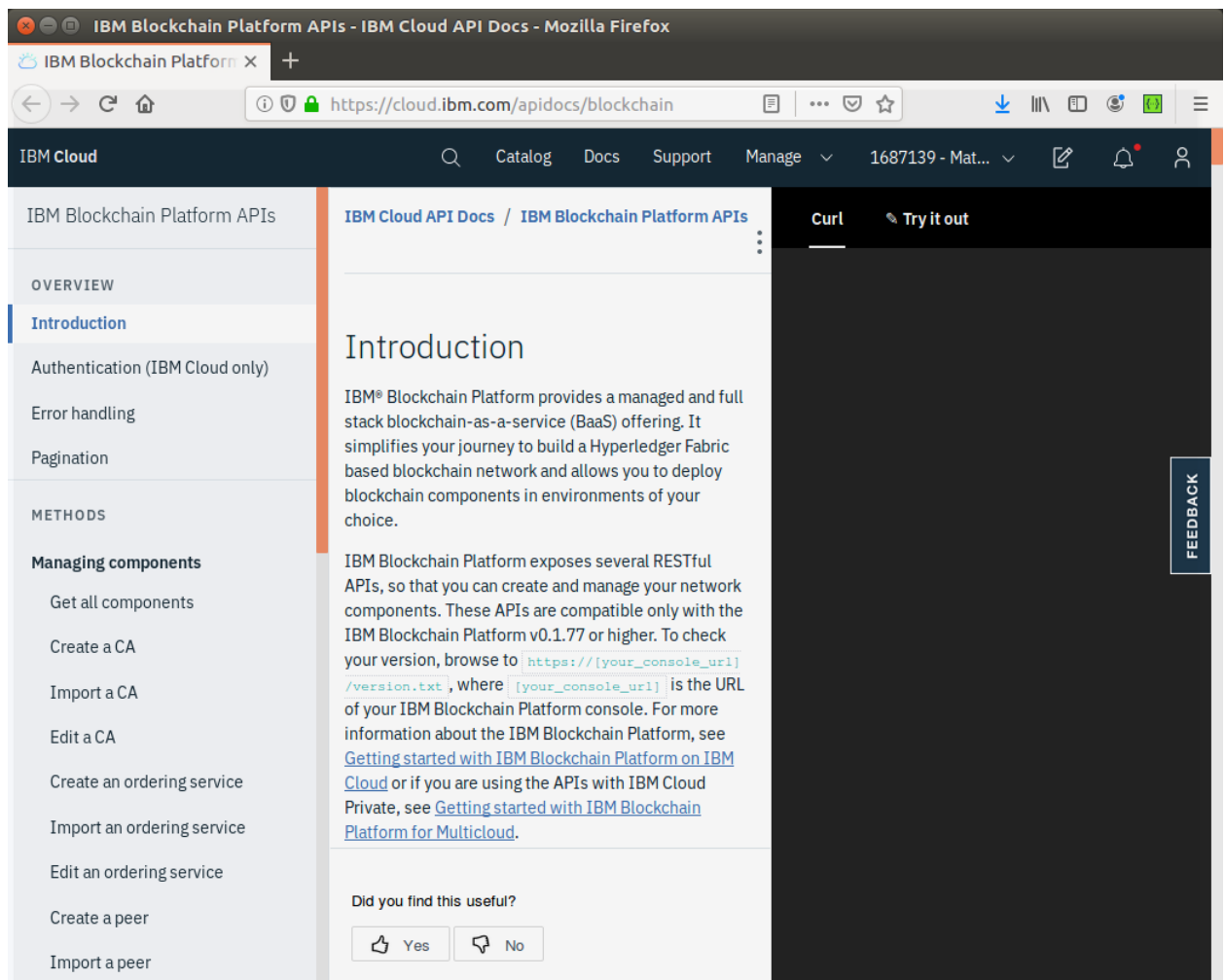
As a reminder you can quickly open the smart contract from a terminal with this command:

```
code ~/workspace/fabric-getting-started/fabric-samples/chaincode/fabcar/javascript/lib/fabcar.js
```

2.2 Using the Admin REST API

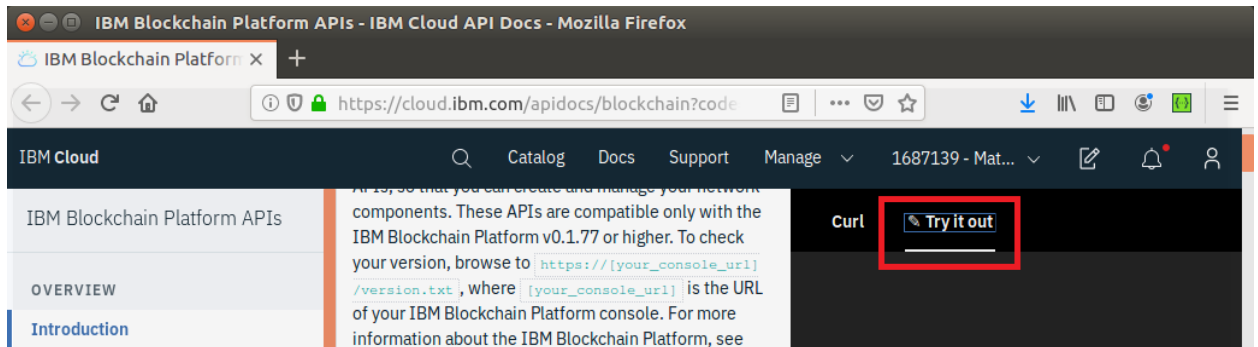
- __ 11. Many of the administration actions can be automated using the IBM Blockchain Platform REST API. So start using the API, open Firefox and navigate to the API home page:

`https://cloud.ibm.com/apidocs/blockchain`



You can also navigate to this page from the **Table of Contents** on either of the **Build** or **Join** tutorial pages by clicking on the **API Reference** link.

- __ **12.** Spend a little time to read the **Introduction** section as this expands on what we will do next, then click on the **“Try it out”** link on the top of the right-hand pane:



Next we need to perform Authentication which is a multi-step process.

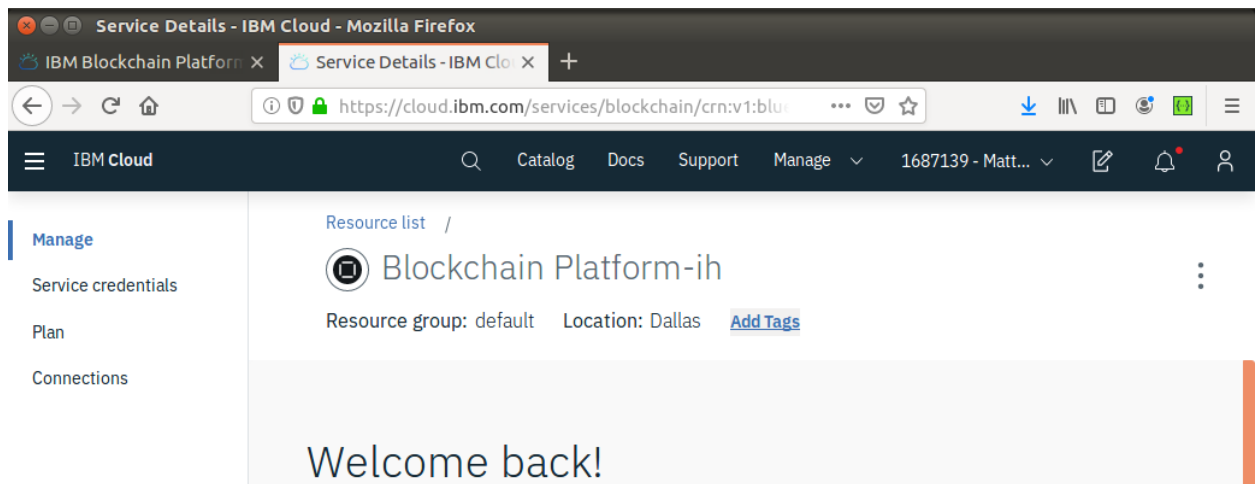
- __ **13.** In the Authentication section, click on the **“IBM Cloud dashboard”** link which will open in a new tab, at this URL:

`https://cloud.ibm.com/resources`

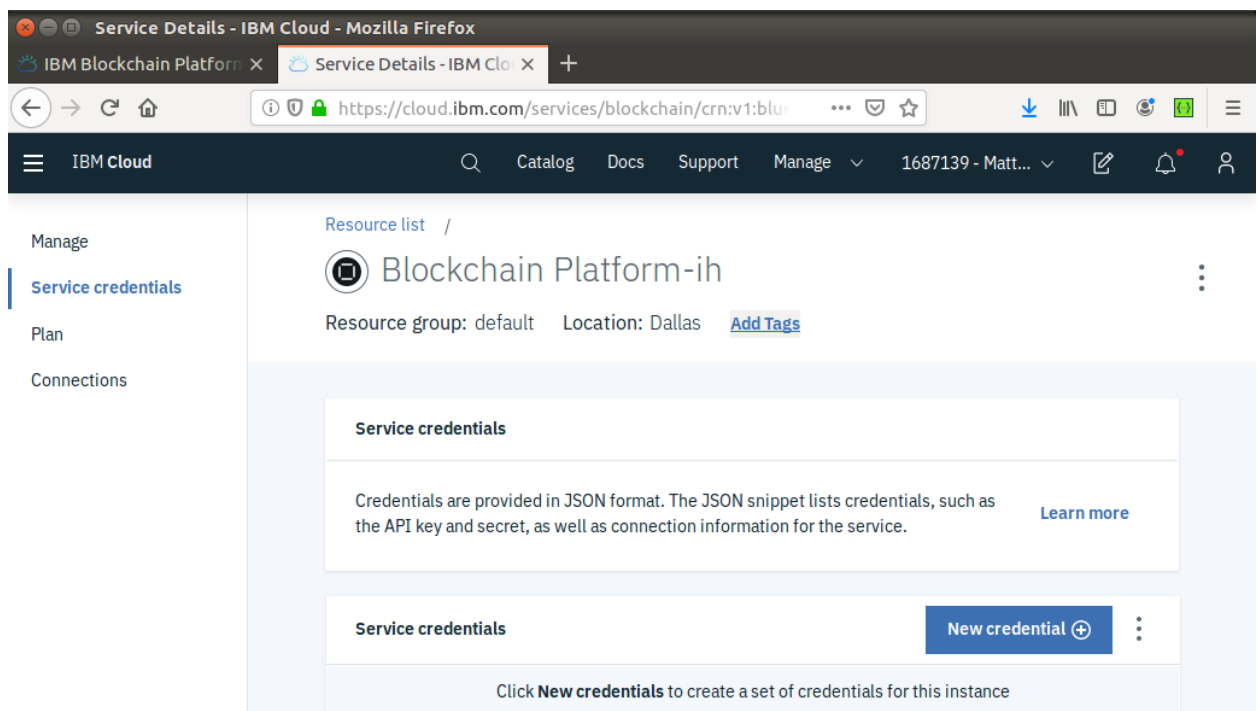
- __ **14.** From your **Resources List** expand the **Services** section and you should see the **IBM Blockchain Service** that you created back at the beginning of the Lab:

Name ▲	Group	Location	Status	Tags
Filter by name or IP address...	Filter by group or org ▼	Filter.. ▼	Filter...	Filter...
> Devices (0)				
> VPC Infrastructure (0)				
▼ Clusters (1)				
ibp-cluster	workshop-rg	Houston 02	Normal	—
> Cloud Foundry Apps (0)				
> Cloud Foundry Services (0)				
☑ Services (1)				
Blockchain Platform-ih	workshop-rg	Dallas	Provisioned	—
> Storage (0)				

- __ **15.** Click on the IBM Blockchain Platform Service and you will see the “**Welcome Back**” page:



- __ **16.** Next, click on the “**Service credentials**” in the left-hand bar to show the Service credentials page:



- __ **17.** Click on the “**New Credential**” button and enter your initials followed by “**-admin**” such as **mgk-admin** for the **Name** parameter. You can leave the **Role** as **Manager** and the other fields at their default and click **Add**:

×

Add new credential

Name:

mgk-admin

Role: ⓘ

Manager ▾

Select Service ID (Optional) ⓘ

Select Service ID... ▾

Add Inline Configuration Parameters (Optional): ⓘ

Cancel

Add

- **18.** Click on the “**View credentials**” Action to see the contents of the credential and copy the “**api_endpoint**” and the “**apikey**” to a new empty file in **VS Code**:

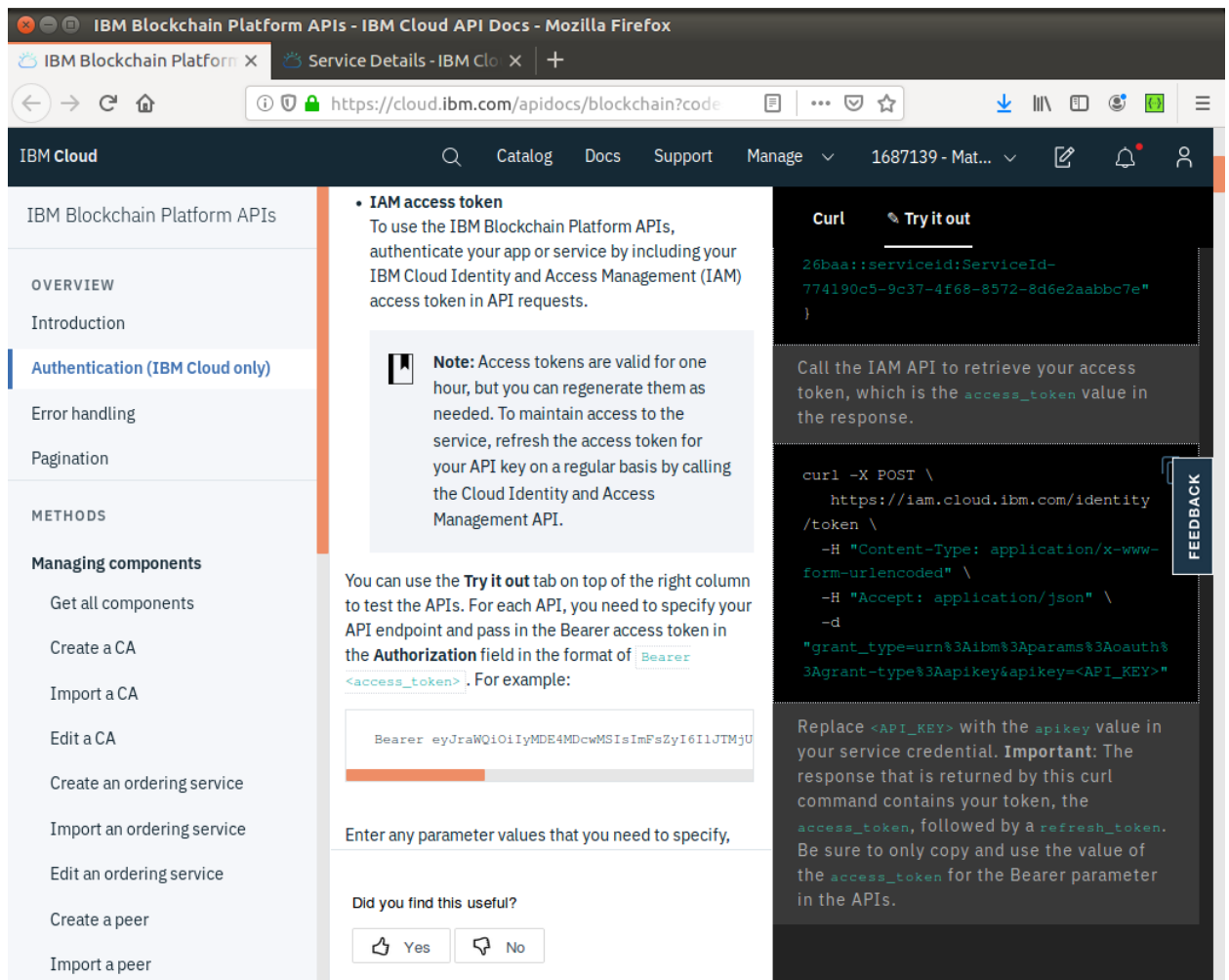
The screenshot shows the 'Service credentials' management interface. At the top, there's a 'New credential +' button and a list of items. Below the header, a table lists the credentials. The 'mgk-admin' credential is selected, and its details are shown in a modal window below the table. The details include the API endpoint, API key, configtxlator URL, IAM API key description, IAM API key name, IAM role CRN, and IAM service ID CRN. Some parts of the API endpoint and API key are redacted with black boxes.

KEY NAME	DATE CREATED	ACTIONS
<input type="checkbox"/> mgk-admin	SEP 20, 2019 - 02:06:12 PM	View credentials

```
{
  "api_endpoint": "https://d9fc60e7[REDACTED]4d0dfc-optools.uss02.b
lockchain.cloud.ibm.com",
  "apikey": "VmJgbxxVKfv[REDACTED]TB3xAa7WkV",
  "configtxlator": "https://d9fc60e7c5d64597bafdaf7a2b4d0dfc-configtxlator.
uss02.blockchain.cloud.ibm.com",
  "iam_apikey_description": "Auto-generated for key c983fcea-a300-43a5-8a9a
-edbb3b3558a7",
  "iam_apikey_name": "mgk-admin",
  "iam_role_crn": "crn:v1:bluemix:public:iam::::serviceRole:Manager",
  "iam_serviceid_crn": "crn:v1:bluemix:public:iam-identity::a/6539b8b0565c4
7c5ac40beb525cd80be::serviceid:ServiceId-1455067e-2d76-4d75-afcb-7a0052647d
b3"
}
```

Note: Some parts of the above screenshot have been anonymized.

- __ 19. Now switch back to the first API Docs tab that we were on earlier and scroll down to read the **IAM access token** part of the **Authentication** section:



The screenshot shows the IBM Blockchain Platform APIs documentation page in Mozilla Firefox. The page is titled "IBM Blockchain Platform APIs - IBM Cloud API Docs - Mozilla Firefox". The URL is "https://cloud.ibm.com/apidocs/blockchain?code". The page is divided into several sections:

- IBM Cloud** (top navigation bar)
- IBM Blockchain Platform APIs** (left sidebar)
- OVERVIEW** (left sidebar)
- Authentication (IBM Cloud only)** (left sidebar, highlighted)
- Introduction** (left sidebar)
- Error handling** (left sidebar)
- Pagination** (left sidebar)
- METHODS** (left sidebar)
- Managing components** (left sidebar)
- Get all components** (left sidebar)
- Create a CA** (left sidebar)
- Import a CA** (left sidebar)
- Edit a CA** (left sidebar)
- Create an ordering service** (left sidebar)
- Import an ordering service** (left sidebar)
- Edit an ordering service** (left sidebar)
- Create a peer** (left sidebar)
- Import a peer** (left sidebar)

The main content area is titled **IAM access token**. It contains the following text:

To use the IBM Blockchain Platform APIs, authenticate your app or service by including your IBM Cloud Identity and Access Management (IAM) access token in API requests.

Note: Access tokens are valid for one hour, but you can regenerate them as needed. To maintain access to the service, refresh the access token for your API key on a regular basis by calling the Cloud Identity and Access Management API.

You can use the **Try it out** tab on top of the right column to test the APIs. For each API, you need to specify your API endpoint and pass in the Bearer access token in the **Authorization** field in the format of `Bearer <access_token>`. For example:

```
Bearer eyJraWQ0OiIyMDE4MDcwMSIsImFsZyI6IjE1JTMjU
```

Enter any parameter values that you need to specify,

Did you find this useful?

☐ Yes ☐ No

The **Try it out** tab on the right contains the following curl command:

```
curl -X POST \
  https://iam.cloud.ibm.com/identity/token \
  -H "Content-Type: application/x-www-form-urlencoded" \
  -H "Accept: application/json" \
  -d "grant_type=urn%3Aibm%3Aparams%3Aoauth%3Agrant-type%3Aapikey&apikey=<API_KEY>"
```

Replace `<API_KEY>` with the `apikey` value in your service credential. **Important:** The response that is returned by this curl command contains your token, the `access_token`, followed by a `refresh_token`. Be sure to only copy and use the value of the `access_token` for the Bearer parameter in the APIs.

On the right-hand side you can see instructions for **curl**. We now need to follow these instructions in a **terminal** window, but first we need to construct the **curl** command to use in the **VS Code** file that the copied our **apikey** to above.

- __ **20.** Copy the **curl** command text into the VS Code file and replace the text <API_KEY> with the apikey we copied earlier. Initially the text should look like this:

```

1  curl -X POST \
2      https://iam.cloud.ibm.com/identity/token \
3      -H "Content-Type: application/x-www-form-urlencoded" \
4      -H "Accept: application/json" \
5      -d "grant_type=urn%3Aibm%3Aparams%3Aoauth%3Agrant-type%3Aapikey&apikey=<API_KEY>"
6

```

But then you replace the <API_KEY> it will look like this:

```

1  curl -X POST \
2      https://iam.cloud.ibm.com/identity/token \
3      -H "Content-Type: application/x-www-form-urlencoded" \
4      -H "Accept: application/json" \
5      -d "grant_type=urn%3Aibm%3Aparams%3Aoauth%3Agrant-type%3Aapikey&apikey=VmJgbxxVKfv[REDACTED]TB3xAa7WkV[REDACTED]"
6

```

- __ **21.** Copy the completed **curl** command to a new terminal window and paste it into the terminal to execute it. When it completes you should see a lot of output in a simple json format:

```

blockchain@ubuntu: ~
{
  "access_token": "ic3ViX3R5cGUioiJTZXJ2aWNlSWQiLCJhY2NvdW50Ijpb7InZhbGkIjpb0cnVLLCJic3MiOiI2NTM5Yjh",
  "refresh_token": "ReWz-__3twAUXvrrCFUeHJ8oZDx4z73_3B6SgMlnDd4w5rf-VxfEppwt2J",
  "token_type": "Bearer",
  "expiration": 3600,
  "scope": "ibm openid"
}
blockchain@ubuntu:~$

```

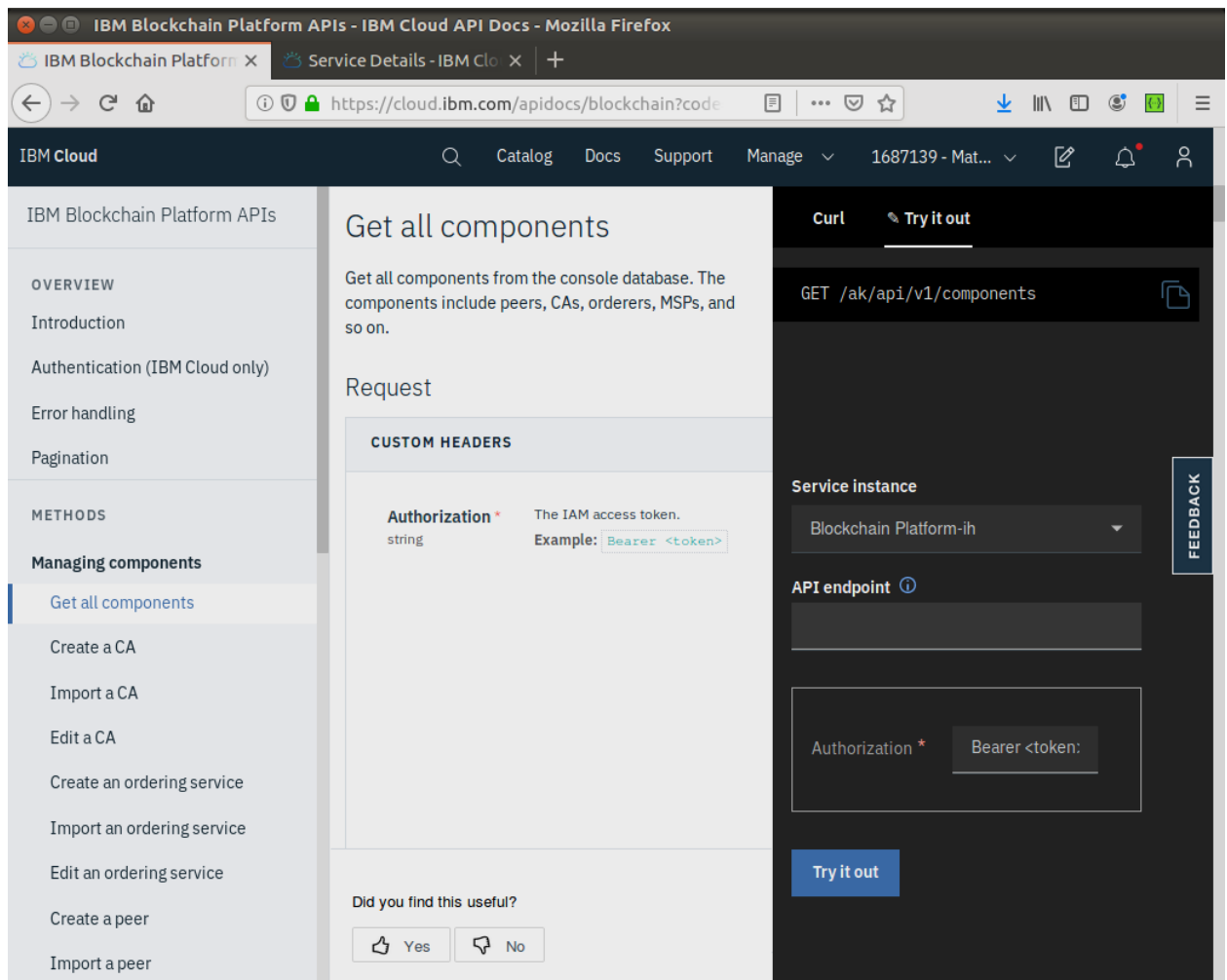
The output contains a new token, which will only be valid for one hour.

- __ **22.** Scroll to the top of the terminal window, and you should see the start of an “**access_token**” section. As shown highlighted below, select and copy the contents on the access token, down to the next **refresh_token**. Make sure you do not include the quote marks:

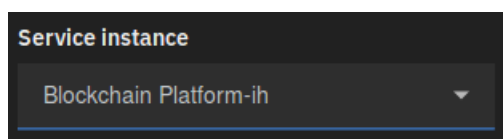
```
blockchain@ubuntu: ~
blockchain@ubuntu:~$ curl -X POST \
> https://iam.cloud.ibm.com/identity/token \
> -H "Content-Type: application/x-www-form-urlencoded" \
> -H "Accept: application/json" \
> -d "grant_type=urn%3Aibm%3Aparams%3Aoauth%3Agrant-type%3Aapikey&apikey=VmJgb
xxVKfvpgHwciwRIMRRd20oUqw2p iTB3xAa7WkV"
{"access_token":"eyJraWQiOiIyMDE5MDUxMyIsImFsZyI6IlJTMjU2In0.eyJpYW1faWQiOiJpYW0
tU2VydmljZULkLTE0NTUwNjdLLTJkNzYtNGQ3NS1hZmNiLTdhMDA1MjY0N2RiMyIsImkIjoiaWFtLVN
lcnZpY2VJZC0xNDU1MDY3ZS0yZDc2LTRkNzUyYWZjYi03YTawNTI2NDdkYjMiLCJyZWZsbWlkIjoiaWF
tIiwiaWRLbnRpZmllciI6IlNlcjZpY2VJZC0xNDU1MDY3ZS0yZDc2LTRkNzUyYWZjYi03YTawNTI2NDd
kYjMiLCJzdWIiOiJ0J2aWNlSWQ0MTQ1NTA2N2U0MmQ3Ni00ZDc1LWFMjY2ItN2EwMDUyNjQ3ZGIzIiw
ic3ViX3R5cGU0Ij0J2aWNlSWQ0LCJhY2NvdW50Ijp7InZhbGlkIjp0cnVLLCJic3MiOiI2NTM5Yjh
iMDU2NWM0N2M1YW00MGJLYjUyNWk0DBiZSJ9LCJpYXQ0IjE1Njg5ODk0MDYsImV4cCI6MTU2ODk5MzA
wNiwiXNzIjoiaHR0cHM6Ly9pYW0uY2xvdWQuaWJtLmNvbS9pZGVudG0eSIsImdyYW50X3R5cGU0Ij0J
1cm46aWJ0OnBhcmFtczpvYXV0aDpncmFudC10eXB0mFwaWtleSIsInNjb3BlIjoiaWJtIG9wZW5pZCI
sImNsaWVudF9pZCI6ImRlZmF1bHQ0LCJhY3IiOiJESImFtcCI6WyJwd2QiXX0.gPRktlKGVN96HpcmIjQ
HAEw07sJw0ENRfTrDqjCWjXWU2KyRIwrKCYy9PrvUQyhoYc89zaNV7N2YLAw0SJCe_sfr-eD8auS_dE
ufPBVvhZ7ymdxwrDLTIWia6QPxl3PBL06MIw2f5fronV_cYWYTF7Bmb077qEq3k5X6DFQEpSJoqmG6cc
UCT9a9aLBz6ogngVq1w800ybGN00Pcrl7GgnNSfu04C0JiWHD9KV6fPyk8nSbnWjy4wpUE9Y61IEynY
-hiPcxXd3DH-d44ZCTaaa45cuaHovCaYQ8HUzM0Th1511cCStawlgAflipwtXwBCKo0Wnb13b-g6NdXn
6Gq","refresh_token":"ReWz-__3twAUXvrrCFUeHJ8oZDx4z73_3B6SgMlnDd4w5rf-VxfEppwt2J
nHFN4w4tEeBBECRqtFzCVM0VsNH6QCL4Hnv0SRW4XfVb0kXdae4CefQTJ70KBuDNKZQak8nZwUAj61ef
SpCHpVN7jhFJfeFAMgDKzcYJvN7CZpyaSY4_V5xRfNVkHiXcdF0MkXHaro7TleWYYCITSBNEeyoJGoxd
7dw-vZ1ndB9ty5uHx3s6BIvx2BHthIet--PTlnfyeu-L5M_9sr6Mf0hjG9phUd8fkb33gl6hko0DuabI
```

- __ **23.** Paste the contents of the access token into the VS Code file to make it easier to copy it again in later steps.

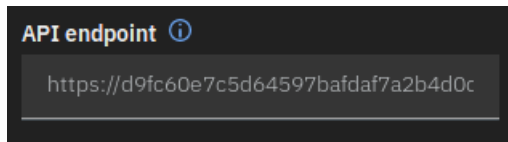
- __ 24. Now switch back to the **API Docs** tab in Firefox and click on the “**Get all components**” in the contents bar on the left:



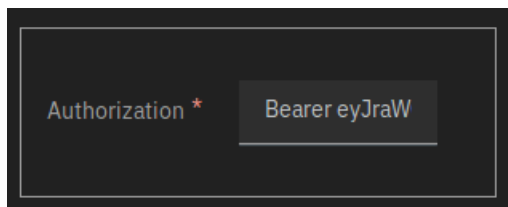
- __ 25. In the “**Try it out**” section on the right, make sure your “**Service instance**” is set to the IBM Blockchain Platform instance you created earlier:



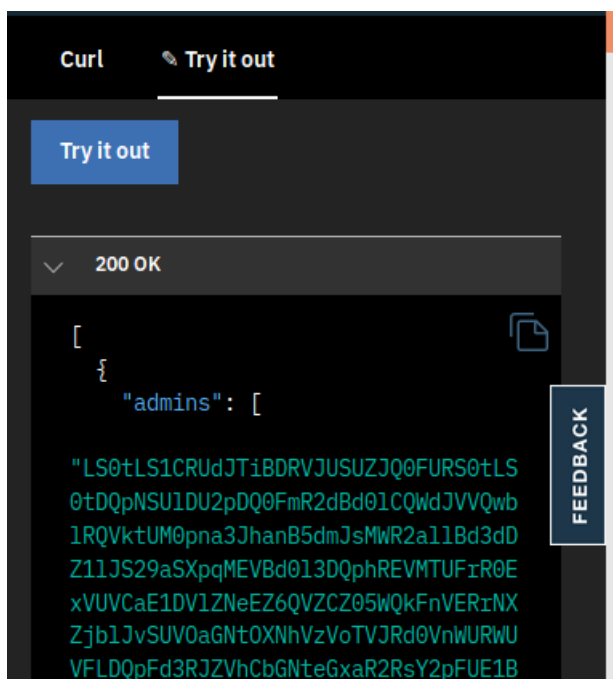
- ___ **26.** In the “**API Endpoint**” box, you need to paste the “**api_endpoint**” you obtained earlier from the “**Service Credentials**” and should have copied into your VS Code file. The **api_endpoint** will start with **https://xxx**:



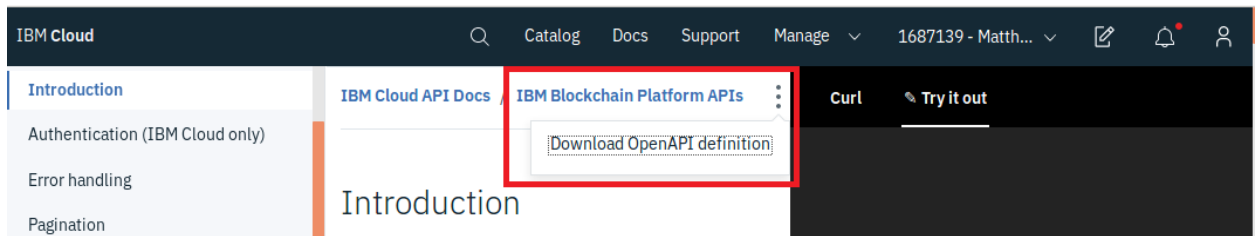
- ___ **27.** Next, in the **Authorization** box, you need to paste in your access token that you obtained from the **curl** command in the terminal window. You need to make sure you paste your token over the **<token>** text present in the box, but leave the “**Bearer**” text alone so you end up with “**Bearer xxx**” where **xxx** is your token:



- ___ **28.** Finally, click on the “**Try it out**” button under the **Authorization** box. When the command completes, you should see a lot of output if you scroll down, listing the components in your network:



- ___ **29.** If you scroll through the list of APIs on the left in the table of contents, you can look at trying out others if you wish. You will need to use the **api_endpoint** and **token** again as you did with the **Get all components** API call.
- ___ **30.** If you wish to obtain the **Swagger** “OpenAPI” definition for all the Admin API, you can click on the “**option**” button at the top of the API page, and chose the “**Download OpenAPI definition**” option:



- ___ **31.** Once downloaded, the **OpenAPI** definition can be used with other tools such as Swagger Builder (<https://inspector.swagger.io/builder>) but that’s outside the scope of this Lab.

3 We Value Your Feedback!

- Please ask your instructor for an evaluation form. Your feedback is very important to us as we use it to continually improve the lab material.
- If no forms are available, or you want to give us extra information after the lab has finished, please send your comments and feedback to “**blockchain@uk.ibm.com**”