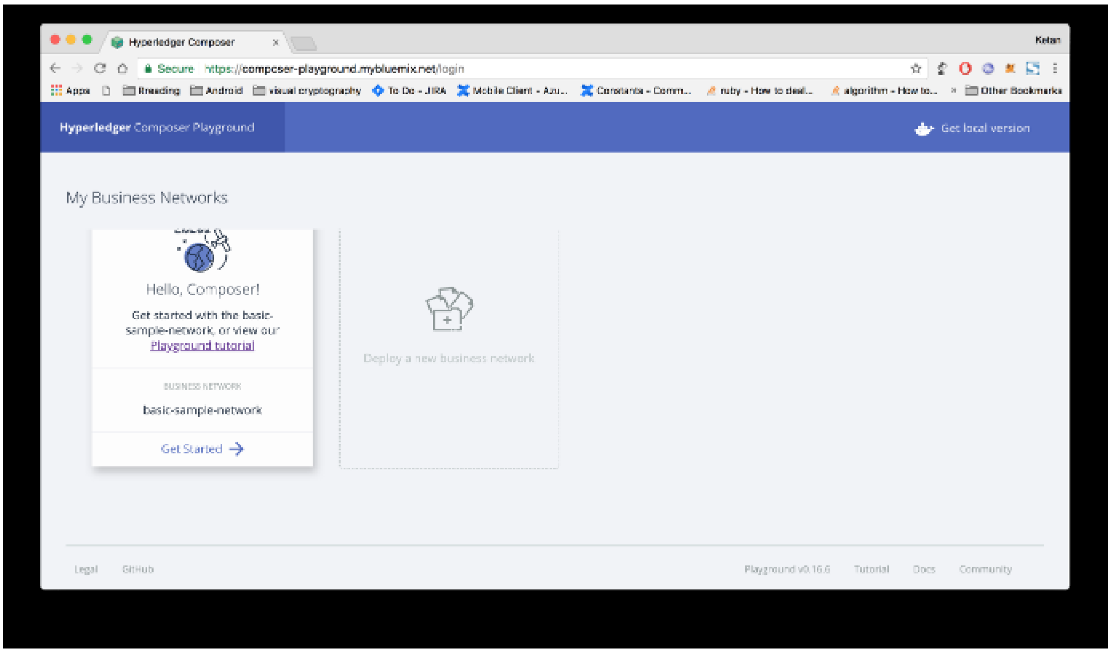
Step 1: Start Hyperledger Composer Online version of Local. Click on Deploy a new business network



My Business Networks

Hello, Composer!

Get started with the basic-sample-network, or view our Playground tutorial

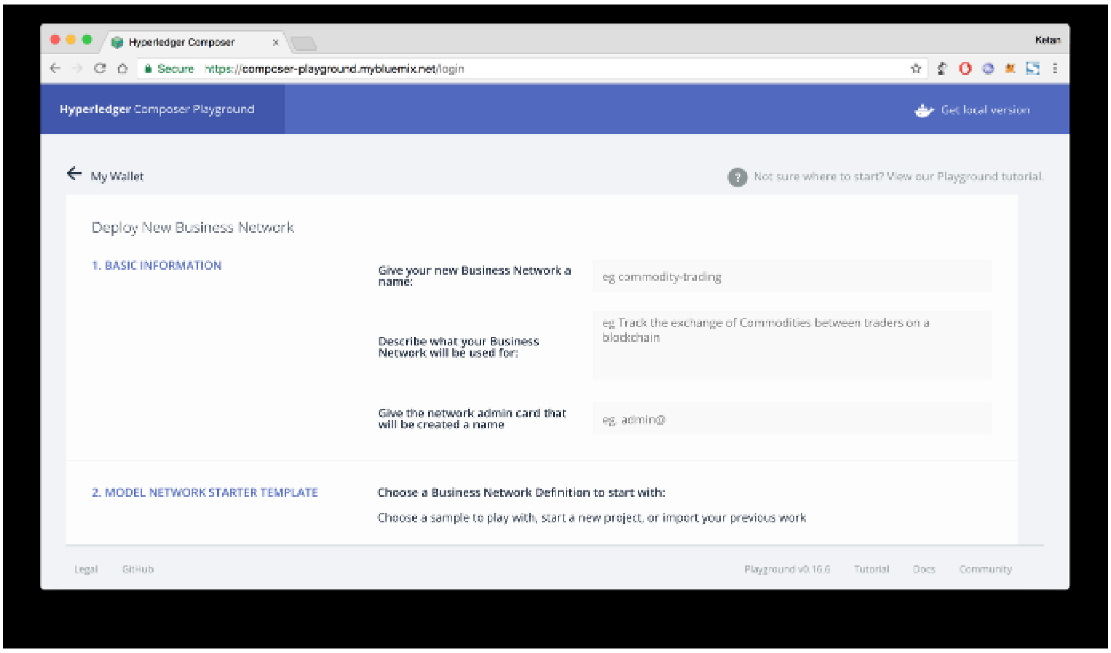
BUSINESS NETWORK

basic-sample-network

Get Started →

Deploy a new business network

Step 2: Select empty business network


Hyperledger Composer
Ketan
Secure https://composer-playground.mybluemix.net/login
Hyperledger Composer Playground
Get local version
My Wallet
Not sure where to start? View our Playground tutorial.

Deploy New Business Network

1. BASIC INFORMATION

Give your new Business Network a name: eg commodity-trading

Describe what your Business Network will be used for: eg Track the exchange of Commodities between traders on a blockchain

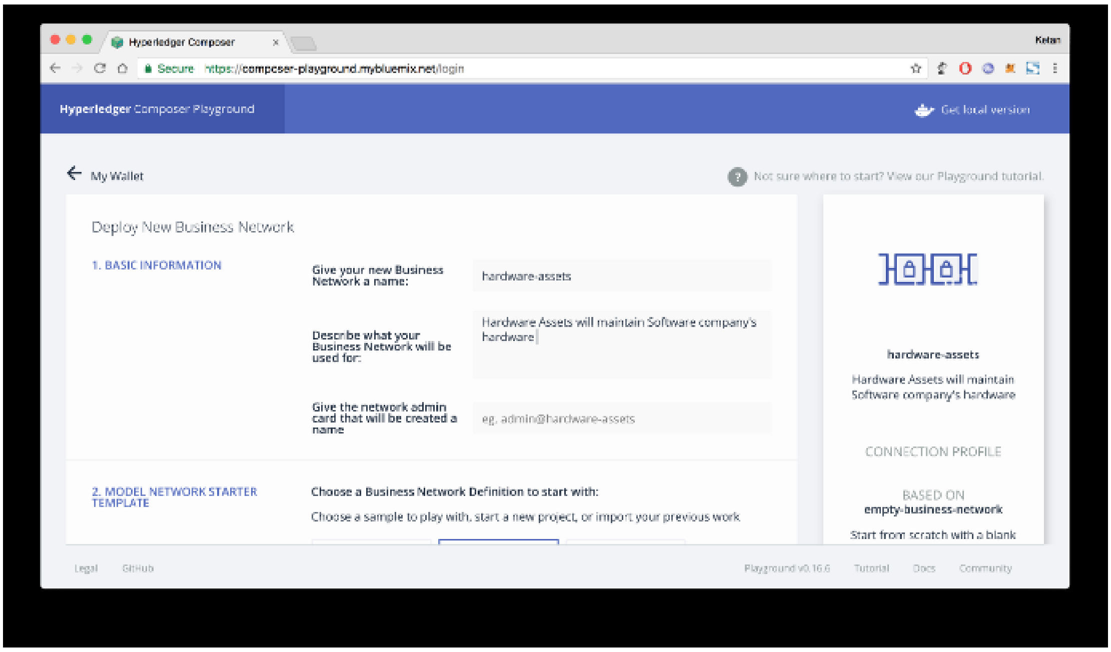
Give the network admin card that will be created a name eg. admin@

2. MODEL NETWORK STARTER TEMPLATE

Choose a Business Network Definition to start with:

Choose a sample to play with, start a new project, or import your previous work

Step 3: Fill basic information, select empty business network and click —deploy‖ button from right panel



Hyperledger Composer
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Hyperledger Composer Playground
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My Wallet
Not sure where to start? View our Playground tutorial.

Deploy New Business Network

1. BASIC INFORMATION

Give your new Business Network a name: hardware-assets

Describe what your Business Network will be used for: Hardware Assets will maintain Software company's hardware

Give the network admin card that will be created a name: eg. admin@hardware-assets

2. MODEL NETWORK STARTER TEMPLATE

Choose a Business Network Definition to start with:

Choose a sample to play with, start a new project, or import your previous work

hardware-assets

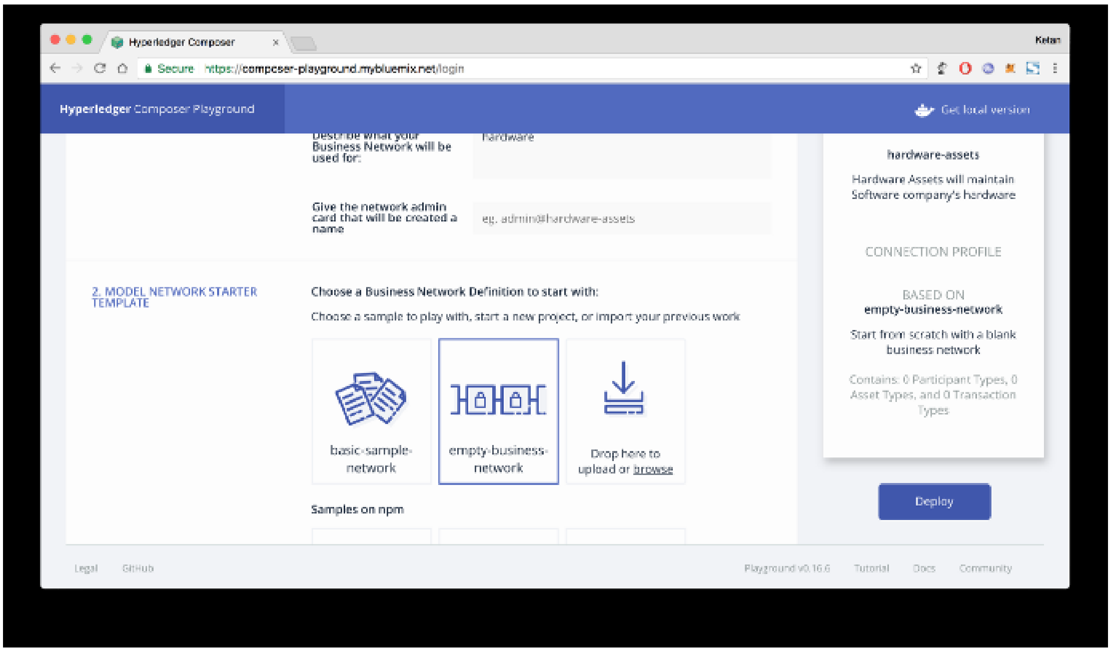
Hardware Assets will maintain Software company's hardware

CONNECTION PROFILE

BASED ON
empty-business-network

Start from scratch with a blank

Fill Basic Information:



Hyperledger Composer
Secure https://composer-playground.mybluemix.net/login
Hyperledger Composer Playground
Get local version

Describe what your Business Network will be used for: hardware

Give the network admin card that will be created a name: eg. admin@hardware-assets

2. MODEL NETWORK STARTER TEMPLATE

Choose a Business Network Definition to start with:

Choose a sample to play with, start a new project, or import your previous work

basic-sample-network
empty-business-network
Drop here to upload or browse

Samples on npm

hardware-assets

Hardware Assets will maintain Software company's hardware

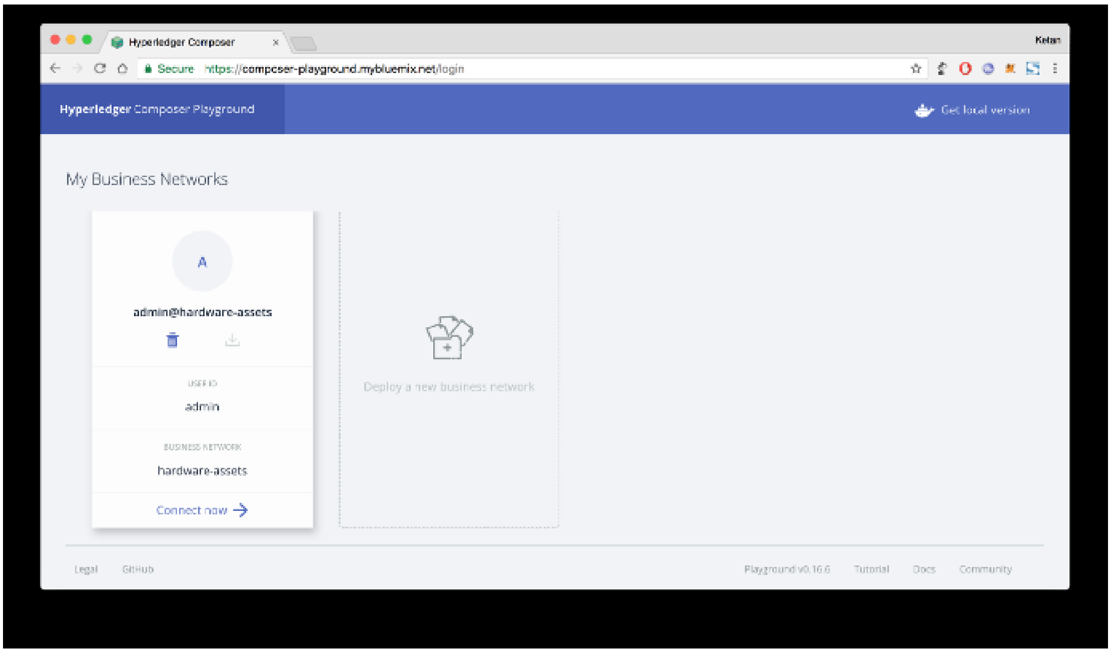
CONNECTION PROFILE

BASED ON
empty-business-network

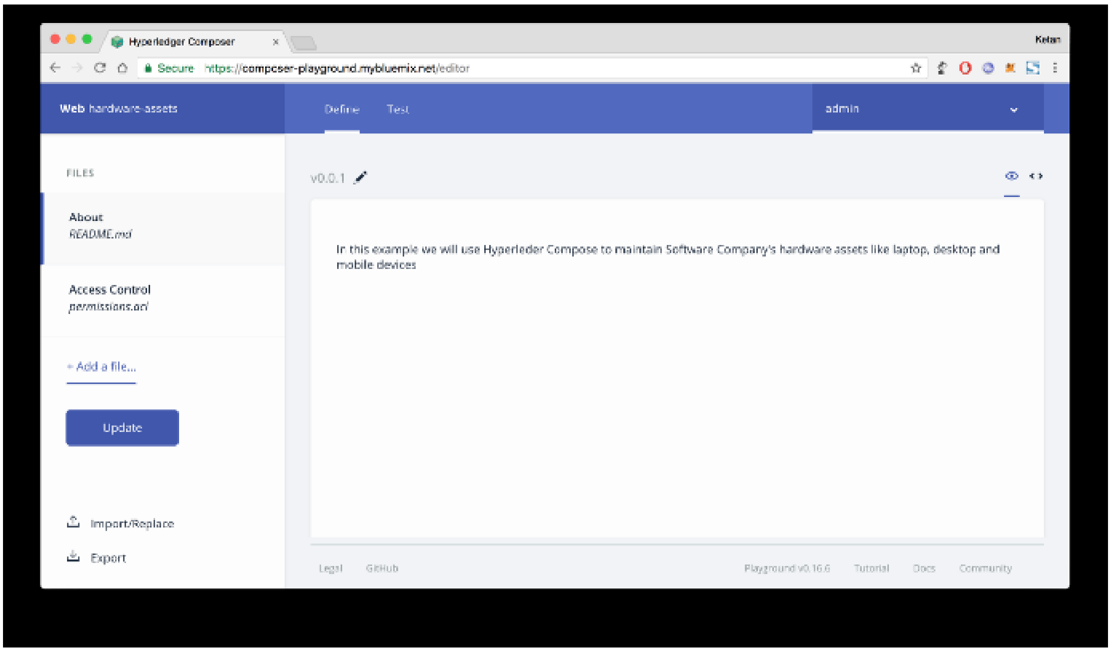
Start from scratch with a blank business network

Contains: 0 Participant Types, 0 Asset Types, and 0 Transaction Types

Step 4: Connect to —hardware-assets‖ business network that we have just deploied

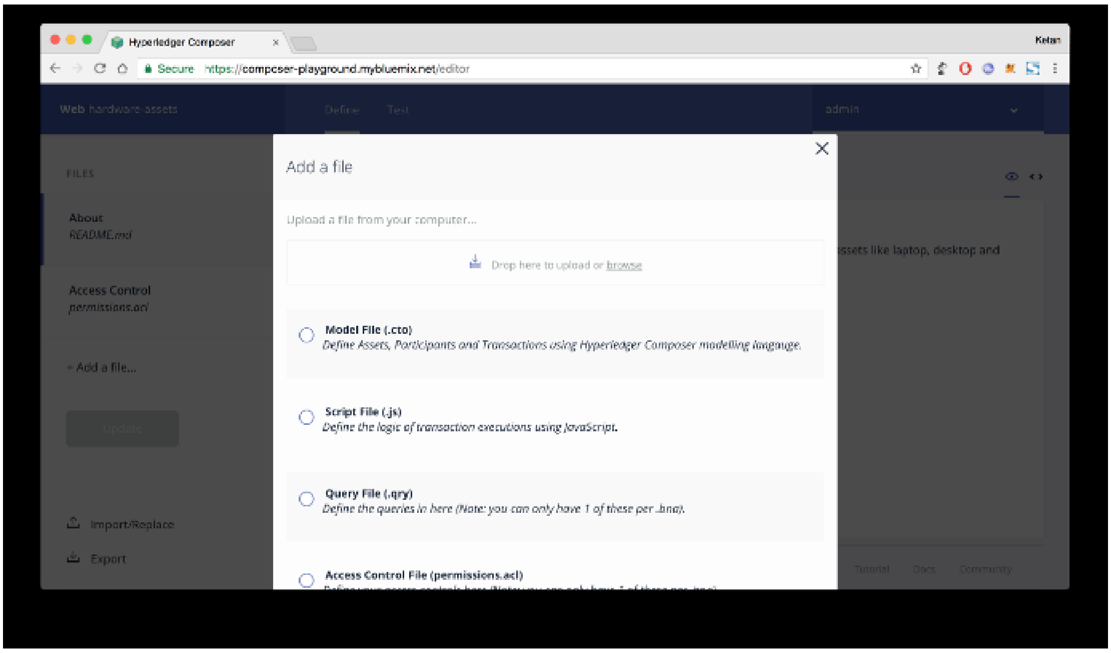


click on —connect now‖ button



In this example we will use Hyperleder Compose to maintain Software Company's hardware assets like laptop, desktop and mobile devices

Step 5: Click on —+Add a file…‖ from left panel and select —model file (.cto)‖



Add a file

Upload a file from your computer...

Drop here to upload or browse

○ **Model File (.cto)**
Define Assets, Participants and Transactions using Hyperledger Composer modelling language.

○ **Script File (.js)**
Define the logic of transaction executions using JavaScript.

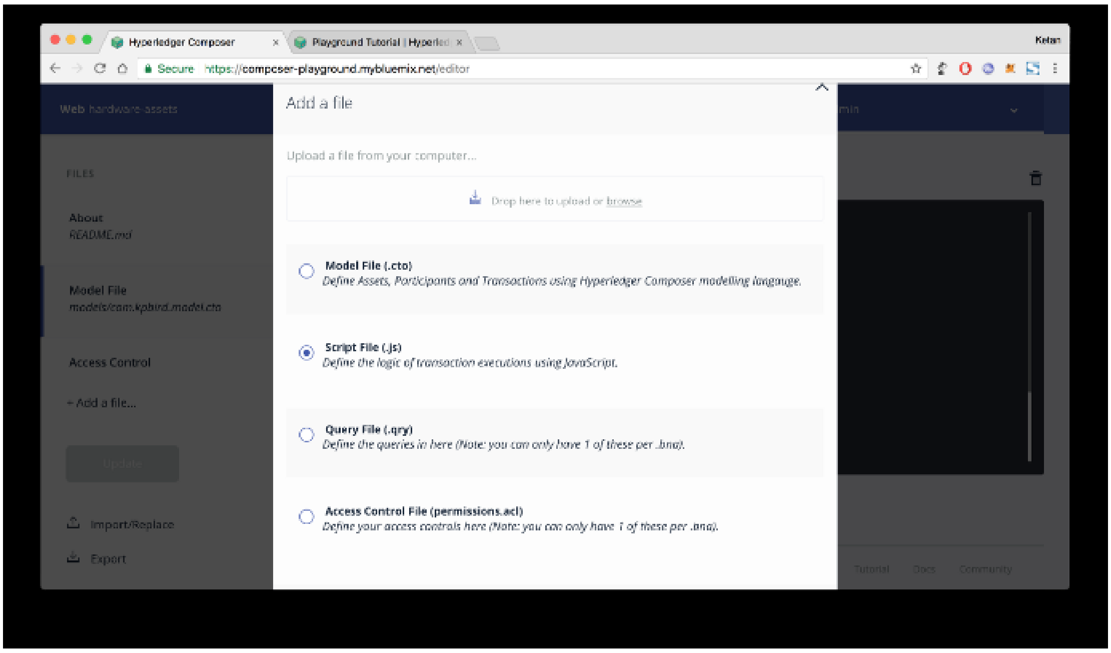
○ **Query File (.qry)**
Define the queries in here (Note: you can only have 1 of these per .bna).

○ **Access Control File (permissions.acl)**

Write the following code in modal File:

```
/**
* Hardware model
*/namespace com.kpbirdasset Hardware identified by hardwareId {
o String hardwareId
o String name
o String type
o String description
o Double quantity
→ Employee owner
}
participant Employee identified by employeeId {
o String employeeId
o String firstName
o String lastName
}
transaction Allocate {
→ Hardware hardware
→ Employee newOwner
}
```

Step 6: Click on —+Add a file...‖ from left panel and select —script file (*.js)‖



Add a file

Upload a file from your computer...

Drop here to upload or browse

○ **Model File (.cto)**
Define Assets, Participants and Transactions using Hyperledger Composer modelling language.

● **Script File (.js)**
Define the logic of transaction executions using JavaScript.

○ **Query File (.qry)**
Define the queries in here (Note: you can only have 1 of these per .bna).

○ **Access Control File (permissions.acl)**
Define your access controls here (Note: you can only have 1 of these per .bna).

Write following code in Script File.

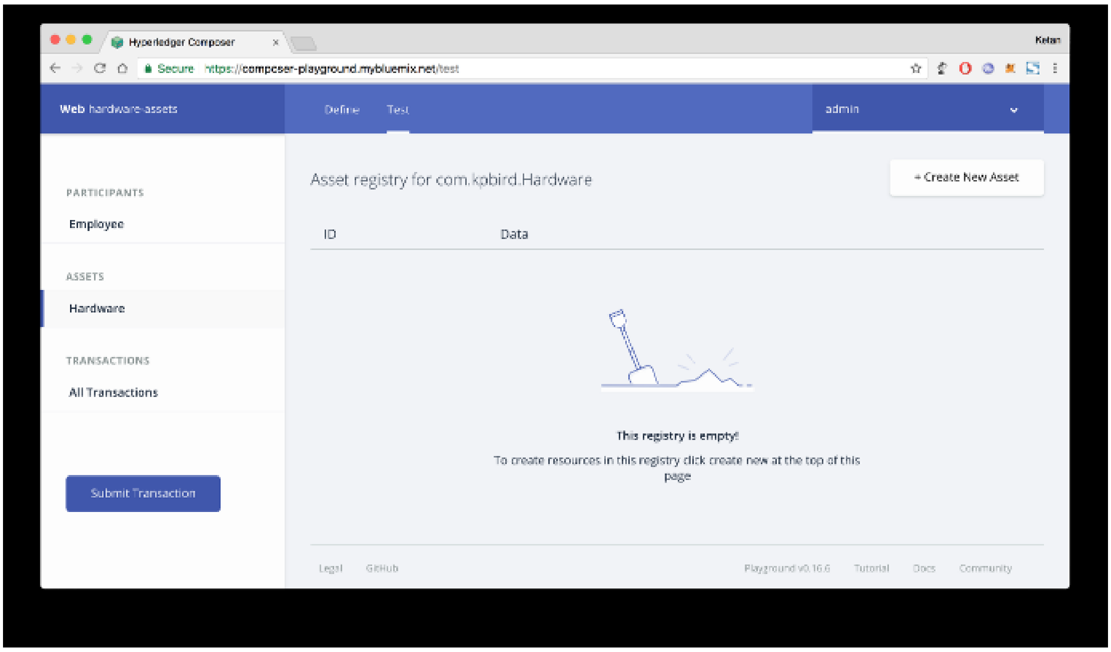
functions @params and @transaction

```
/**
* Track the trade of a commodity from one trader to another
* @param {com.kpbird.Allocate} trade — the trade to be processed
* @transaction
*/
function allocateHardware(allocate) {
allocate.hardware.owner = allocate.newOwner;
return getAssetRegistry(_com.kpbird.Hardware‘)
.then(function (assetRegistry) {
return assetRegistry.update(allocate.hardware);
});
}
```

Step 7: permissions.acl file sample is already available, Add following code in permissions.acl file.

```
/**
* New access control file
*/
rule AllAccess {
description: —AllAccess — grant everything to everybody.‖
participant: —ANY‖
operation: ALL
resource: —com.kpbird.**‖
action: ALLOW
}rule SystemACL{
description: —System ACL to permit all access‖
participant: —org.hyperledger.composer.system.Participant‖
operation: ALL
resource: —org.hyperledger.composer.system.**‖
action: ALLOW
}
```

Step 8: Now, It‘s time to test our hardware assets business network. Hyperledger composer gives —Test‖ facility from composer panel it self. Click on —Test‖ tab from top panel



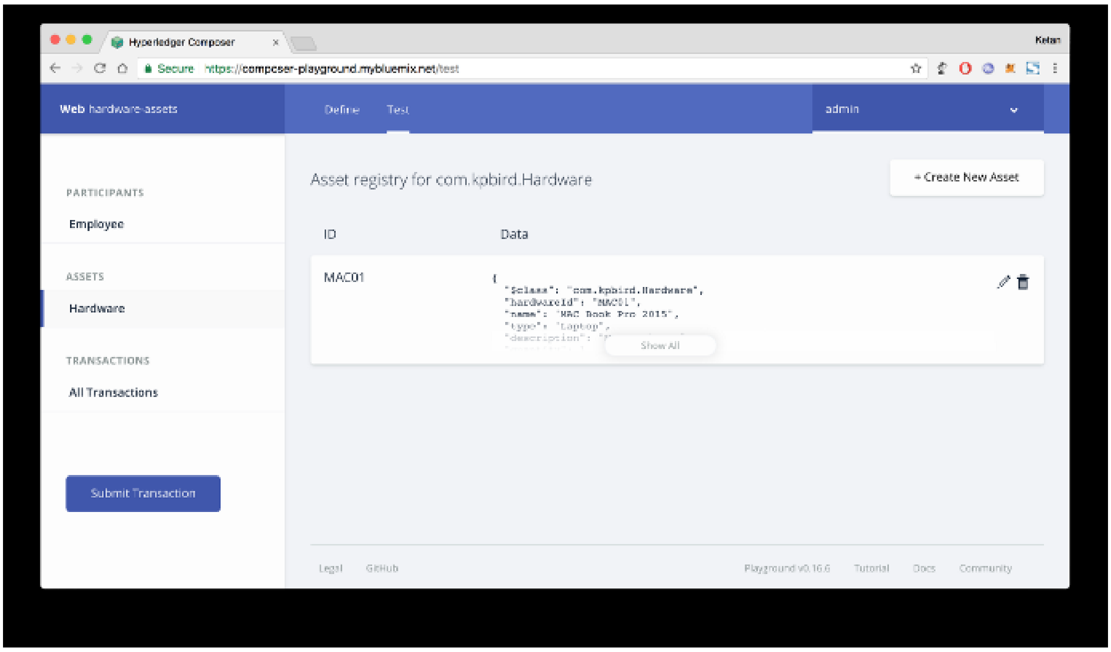
Asset registry for com.kpbird.Hardware

This registry is empty!

To create resources in this registry click create new at the top of this page

Step 9: Create Assets. Click on —Hardware‖ from left panel and click —+ Create New Assets‖ from right top corner and add following code. We will create Employee#01 in next step. Click on —Create New‖ button

```
{
—$class‖: —com.kpbird.Hardware‖,
—hardwareId‖: —MAC01‖,
—name‖: —MAC Book Pro 2015‖,
—type‖: —Laptop‖,
—description‖: —Mac Book Pro‖,
—quantity‖: 1,
—owner‖: —resource:com.kpbird.Employee#01‖
}
```



Asset registry for com.kpbird.Hardware

ID	Data
MAC01	{ "$class": "com.kpbird.Hardware", "hardwareId": "MAC01", "name": "MAC Book Pro 2015", "type": "Laptop", "description": "

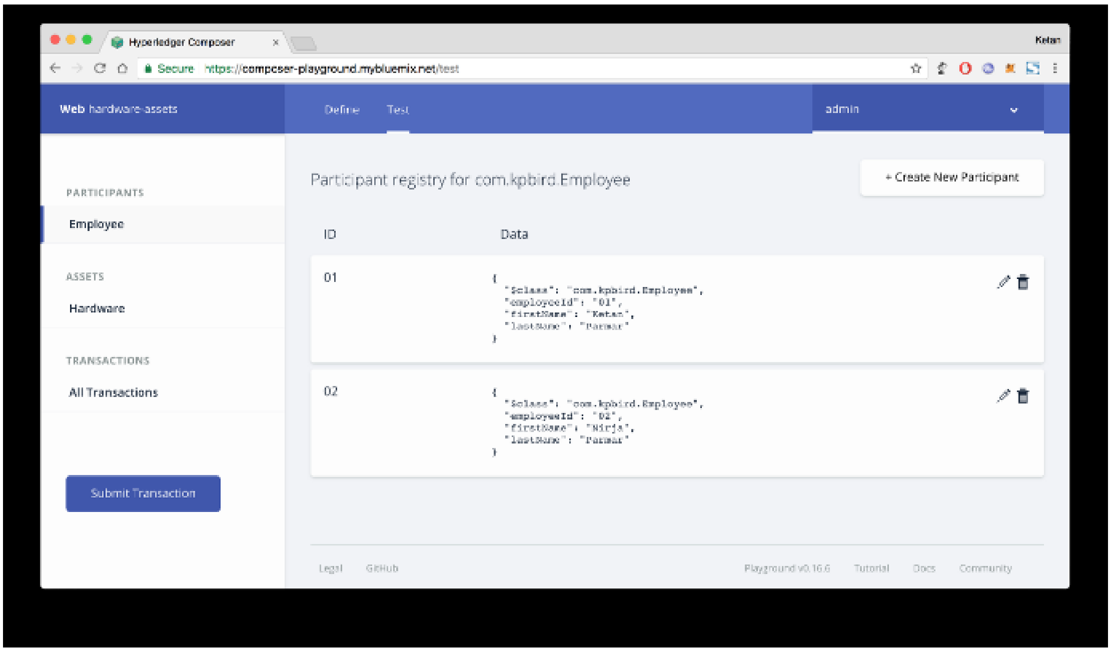
```
{
  "$class": "com.kpbird.Hardware",
  "hardwareId": "MAC01",
  "name": "MAC Book Pro 2015",
  "type": "Laptop",
  "description": "
```

Steps 10: Let‘s create participants. Click —Employee‖ and click —+ Create New Participants‖ and add following code. We will add two employees

```
{
—$class‖: —com.kpbird.Employee‖,
—employeeId‖: —01‖,
—firstName‖: —Ketan‖,
—lastName‖: —Parmar‖
}
```

Click on —Create New‖ on dialog

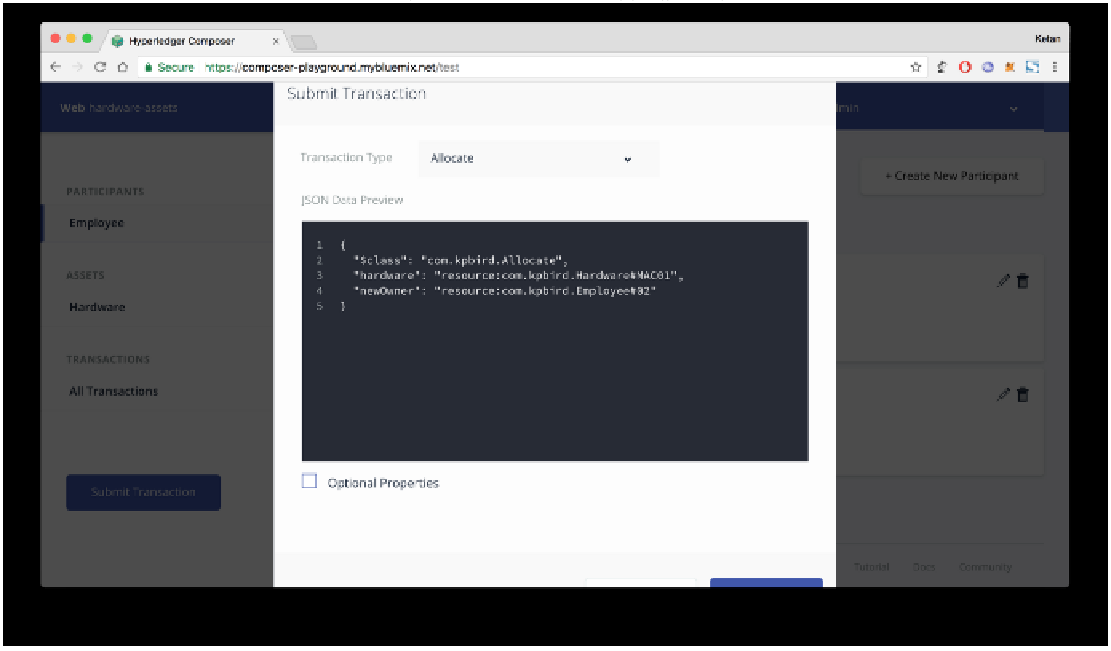
```
{
—$class‖: —com.kpbird.Employee‖,
—employeeId‖: —02‖,
—firstName‖: —Nirja‖,
—lastName‖: —Parmar‖
}
```



Participant registry for com.kpbird.Employee

ID	Data
01	{ "$class": "com.kpbird.Employee", "employeeId": "01", "firstName": "Ketan", "lastName": "Parmar" }
02	{ "$class": "com.kpbird.Employee", "employeeId": "02", "firstName": "Nirja", "lastName": "Parmar" }

Step 11: It‘s time to do transaction, We will allocate Macbook Pro from Ketan (Employee#01) to Nirja (Employee#02). Click on ―Submit Transaction‖ button from left panel. In Transaction dialog, We can see all transaction functions on top ―Transaction Type‖ dropdown.



Submit Transaction

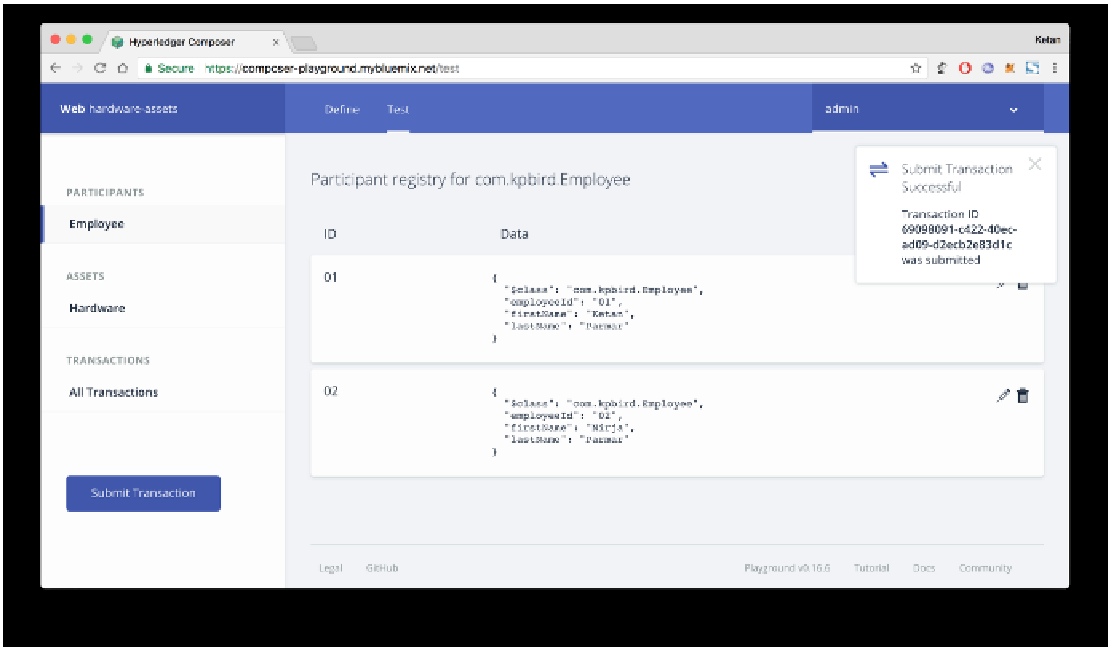
Transaction Type: Allocate

JSON Data Preview

```
{
  "$class": "com.kpbird.Allocate",
  "hardware": "resource:com.kpbird.Hardware#MAC01",
  "newOwner": "resource:com.kpbird.Employee#02"
}
```

□ Optional Properties

```
{
―$class‖: ―com.kpbird.Allocate‖,
―hardware‖: ―resource:com.kpbird.Hardware#MAC01‖,
―newOwner‖: ―resource:com.kpbird.Employee#02‖
}
```



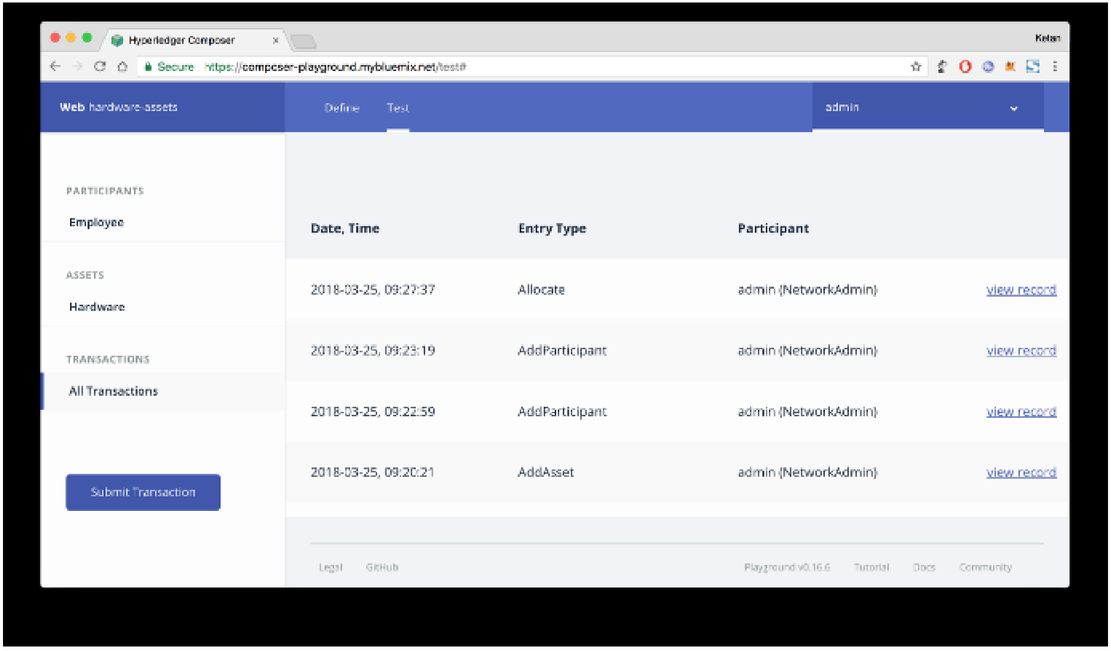
Participant registry for com.kpbird.Employee

Submit Transaction Successful

Transaction ID 69098091-c422-40ec-ad09-d2ecb2e83d1c was submitted

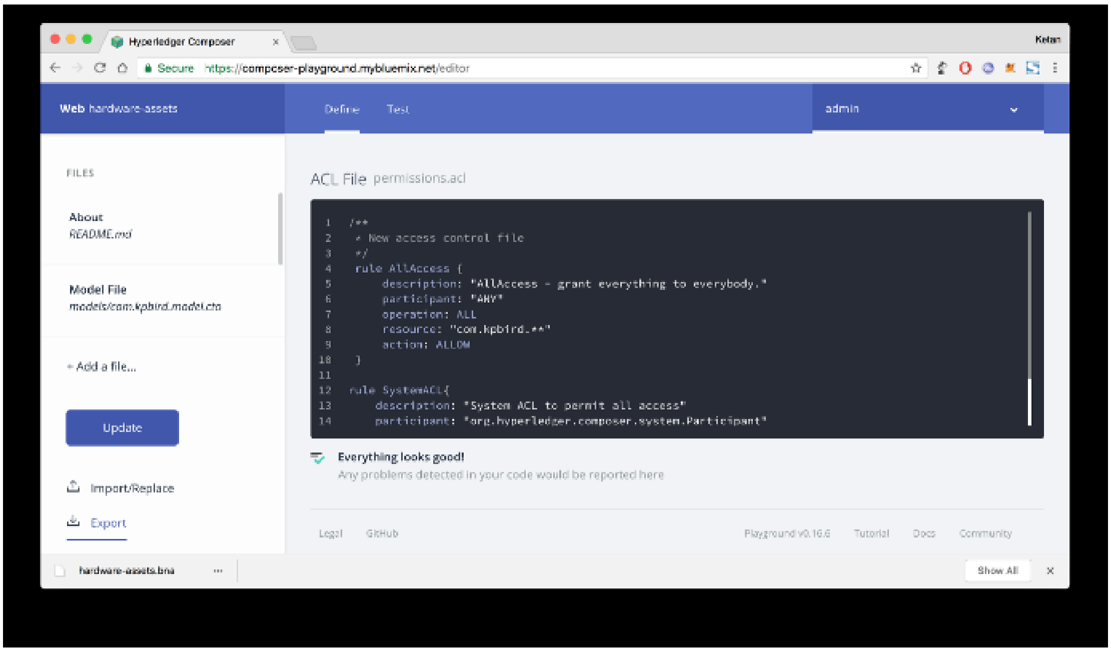
ID	Data
01	{ "$class": "com.kpbird.Employee", "employeeId": "01", "firstName": "Ketan", "lastName": "Parmar" }
02	{ "$class": "com.kpbird.Employee", "employeeId": "02", "firstName": "Nirja", "lastName": "Parmar" }

Step 12: Click on ―All Transactions‖ from left panel to verify all transactions. In following screenshots you can see add assets, ass participants and allocation all operation are consider as transactions. ―view records‖ will give us more information about transaction.



Date, Time	Entry Type	Participant	
2018-03-25, 09:27:37	Allocate	admin (NetworkAdmin)	view record
2018-03-25, 09:23:19	AddParticipant	admin (NetworkAdmin)	view record
2018-03-25, 09:22:59	AddParticipant	admin (NetworkAdmin)	view record
2018-03-25, 09:20:21	AddAsset	admin (NetworkAdmin)	view record

Step 13: Now, It‘s time to deploy —hardware-assets‖ business network to Hyperledger Fabric. Click on —Define‖ tab from top panel and click —Export‖ button from left panel. Export will create hardware-assets.bna file.



ACL File permissions.acl

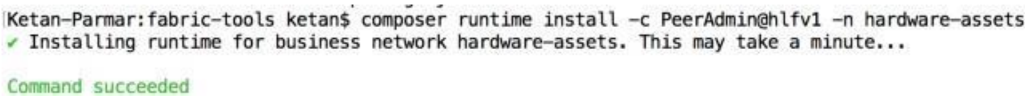
```
/**
 * New access control file
 */
 rule AllAccess {
     description: "AllAccess - grant everything to everybody."
     participant: "ANY"
     operation: ALL
     resource: "com.kpbird.**"
     action: ALLOW
 }

rule SystemACL{
    description: "System ACL to permit all access"
    participant: "org.hyperledger.composer.system.Participant"
```

Everything looks good!
Any problems detected in your code would be reported here

Download hardware-assets.bna file

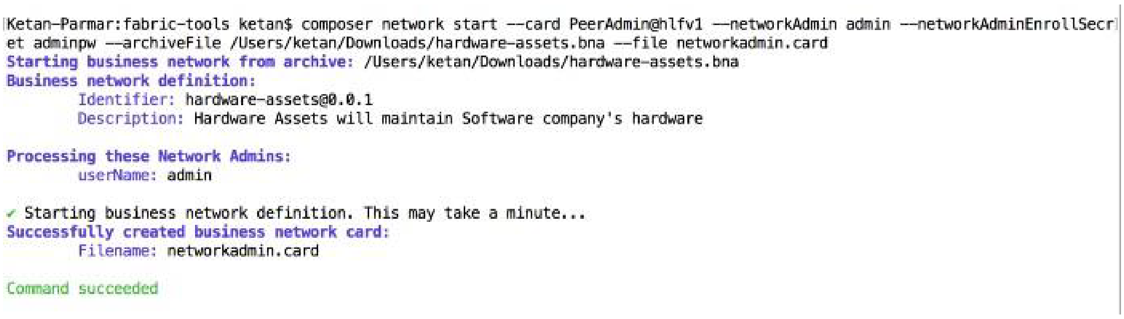
bna is Business Network Archive file which contains model, script, network access and query file

Step 14: Start Docker and run following commands from ~/fabric-tools directory
Install business network to Hyperledger Fabric, If business network is already installed you can use —update‖
instead of —install‖
$composer runtime install -c PeerAdmin@hlfv1 -n hardware-assets



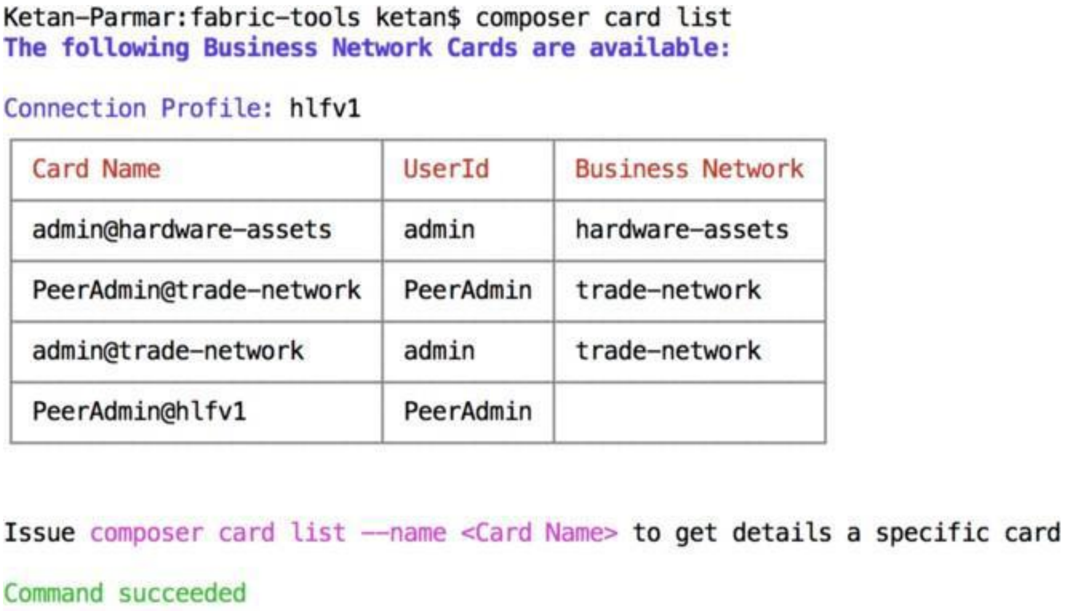
```
Ketan-Parmar:fabric-tools ketan$ composer runtime install -c PeerAdmin@hlfv1 -n hardware-assets
✔ Installing runtime for business network hardware-assets. This may take a minute...

Command succeeded
```

Following command will deploy and start hardware-assets.bna file. Change hardware-assets.bna file before
you execute following command. networkadmin.card file will generate in ~/fabric-tools directory from previous
command.
$composer network start — card PeerAdmin@hlfv1 — networkAdmin admin — networkAdminEnrollSecret
adminpw — archiveFile /Users/ketan/Downloads/hardware-assets.bna — file networkadmin.card



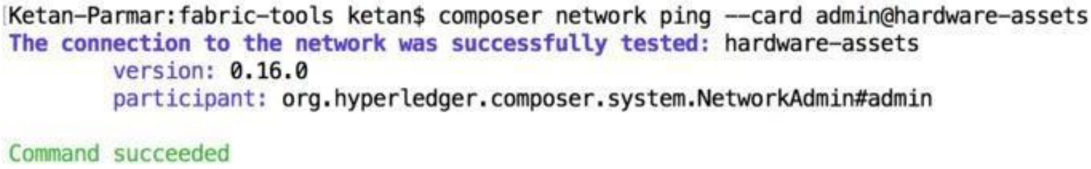
```
Ketan-Parmar:fabric-tools ketan$ composer network start --card PeerAdmin@hlfv1 --networkAdmin admin --networkAdminEnrollSecr
et adminpw --archiveFile /Users/ketan/Downloads/hardware-assets.bna --file networkadmin.card
Starting business network from archive: /Users/ketan/Downloads/hardware-assets.bna
Business network definition:
        Identifier: hardware-assets@0.0.1
        Description: Hardware Assets will maintain Software company's hardware

Processing these Network Admins:
        userName: admin

✓ Starting business network definition. This may take a minute...
Successfully created business network card:
        Filename: networkadmin.card

Command succeeded
```

To connect business network you need connection card. so we can import networkadmin.card using following
command
$composer card import -f networkadmin.card
To make sure networkadmin.card successfully install you can list cards using following command
$composer card list



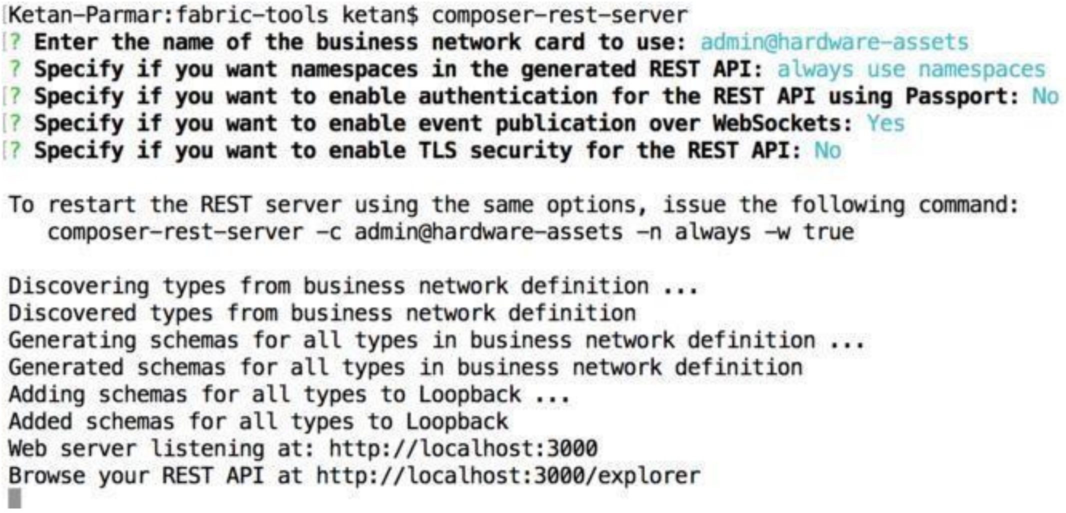
```
Ketan-Parmar:fabric-tools ketan$ composer card list
The following Business Network Cards are available:

Connection Profile: hlfv1
┌─────────────────────────┬───────────┬──────────────────┐
│ Card Name               │ UserId    │ Business Network │
├─────────────────────────┼───────────┼──────────────────┤
│ admin@hardware-assets   │ admin     │ hardware-assets  │
├─────────────────────────┼───────────┼──────────────────┤
│ PeerAdmin@trade-network │ PeerAdmin │ trade-network    │
├─────────────────────────┼───────────┼──────────────────┤
│ admin@trade-network     │ admin     │ trade-network    │
├─────────────────────────┼───────────┼──────────────────┤
│ PeerAdmin@hlfv1         │ PeerAdmin │                  │
└─────────────────────────┴───────────┴──────────────────┘


Issue composer card list --name <Card Name> to get details a specific card

Command succeeded
```

Following command will make sure that our hardware-assets business network is successfully running in Hyperledger Fabric.
$composer network ping — card admin@hardware-assets



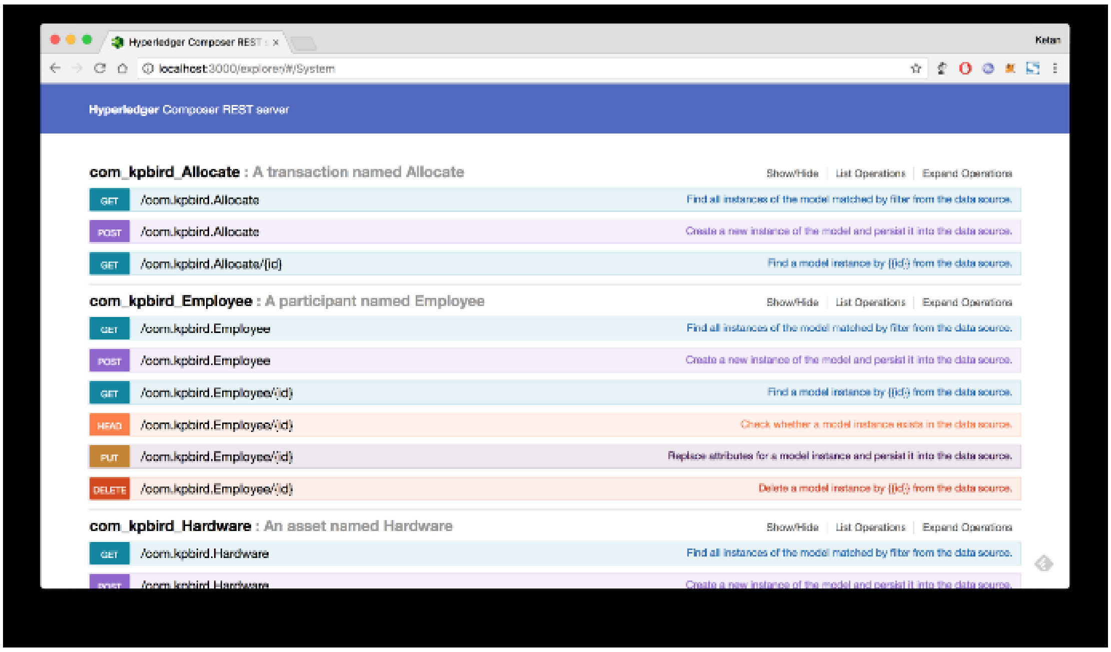
```
Ketan-Parmar:fabric-tools ketan$ composer network ping --card admin@hardware-assets
The connection to the network was successfully tested: hardware-assets
        version: 0.16.0
        participant: org.hyperledger.composer.system.NetworkAdmin#admin

Command succeeded
```

Now It‘s time to interact with REST API. To develop Web or Mobile Application we require REST API. you can run following command to generate REST API for hardware-assets business network.
$composer-rest-server



```
[Ketan-Parmar:fabric-tools ketan$ composer-rest-server
[? Enter the name of the business network card to use: admin@hardware-assets
 ? Specify if you want namespaces in the generated REST API: always use namespaces
[? Specify if you want to enable authentication for the REST API using Passport: No
[? Specify if you want to enable event publication over WebSockets: Yes
[? Specify if you want to enable TLS security for the REST API: No

 To restart the REST server using the same options, issue the following command:
    composer-rest-server -c admin@hardware-assets -n always -w true

 Discovering types from business network definition ...
 Discovered types from business network definition
 Generating schemas for all types in business network definition ...
 Generated schemas for all types in business network definition
 Adding schemas for all types to Loopback ...
 Added schemas for all types to Loopback
 Web server listening at: http://localhost:3000
 Browse your REST API at http://localhost:3000/explorer
```

rest server will ask few basic information before generate rest api



Hyperledger Composer REST
localhost:3000/explorer/#/System
Kelan

Hyperledger Composer REST server

com_kpbird_Allocate : A transaction named Allocate

Show/Hide | List Operations | Expand Operations

GET	/com.kpbird.Allocate	Find all instances of the model matched by filter from the data source.
POST	/com.kpbird.Allocate	Create a new instance of the model and persist it into the data source.
GET	/com.kpbird.Allocate/{id}	Find a model instance by {{id}} from the data source.

com_kpbird_Employee : A participant named Employee

Show/Hide | List Operations | Expand Operations

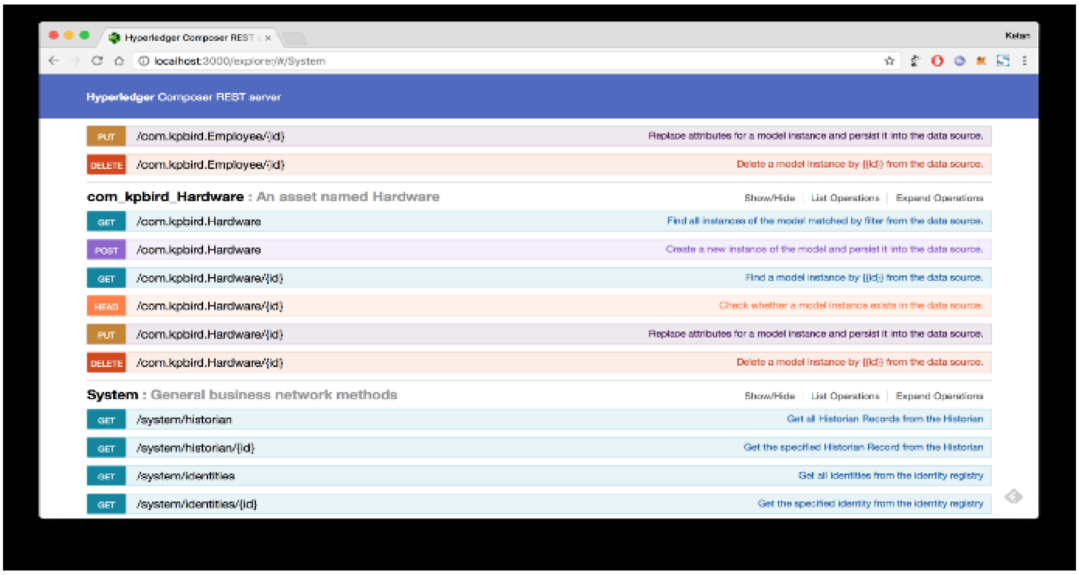
GET	/com.kpbird.Employee	Find all instances of the model matched by filter from the data source.
POST	/com.kpbird.Employee	Create a new instance of the model and persist it into the data source.
GET	/com.kpbird.Employee/{id}	Find a model instance by {{id}} from the data source.
HEAD	/com.kpbird.Employee/{id}	Check whether a model instance exists in the data source.
PUT	/com.kpbird.Employee/{id}	Replace attributes for a model instance and persist it into the data source.
DELETE	/com.kpbird.Employee/{id}	Delete a model instance by {{id}} from the data source.

com_kpbird_Hardware : An asset named Hardware

Show/Hide | List Operations | Expand Operations

GET	/com.kpbird.Hardware	Find all instances of the model matched by filter from the data source.
POST	/com.kpbird.Hardware	Create a new instance of the model and persist it into the data source.

REST API for our hardware assets



Hyperledger Composer REST
localhost:3000/explorer/#/System
Kelan

Hyperledger Composer REST server

PUT	/com.kpbird.Employee/{id}	Replace attributes for a model instance and persist it into the data source.
DELETE	/com.kpbird.Employee/{id}	Delete a model instance by {{id}} from the data source.

com_kpbird_Hardware : An asset named Hardware

Show/Hide | List Operations | Expand Operations

GET	/com.kpbird.Hardware	Find all instances of the model matched by filter from the data source.
POST	/com.kpbird.Hardware	Create a new instance of the model and persist it into the data source.
GET	/com.kpbird.Hardware/{id}	Find a model instance by {{id}} from the data source.
HEAD	/com.kpbird.Hardware/{id}	Check whether a model instance exists in the data source.
PUT	/com.kpbird.Hardware/{id}	Replace attributes for a model instance and persist it into the data source.
DELETE	/com.kpbird.Hardware/{id}	Delete a model instance by {{id}} from the data source.

System : General business network methods

Show/Hide | List Operations | Expand Operations

GET	/system/historian	Get all Historian Records from the Historian
GET	/system/historian/{id}	Get the specified Historian Record from the Historian
GET	/system/identities	Get all identities from the identity registry
GET	/system/identities/{id}	Get the specified identity from the identity registry

REST API methods for all operations