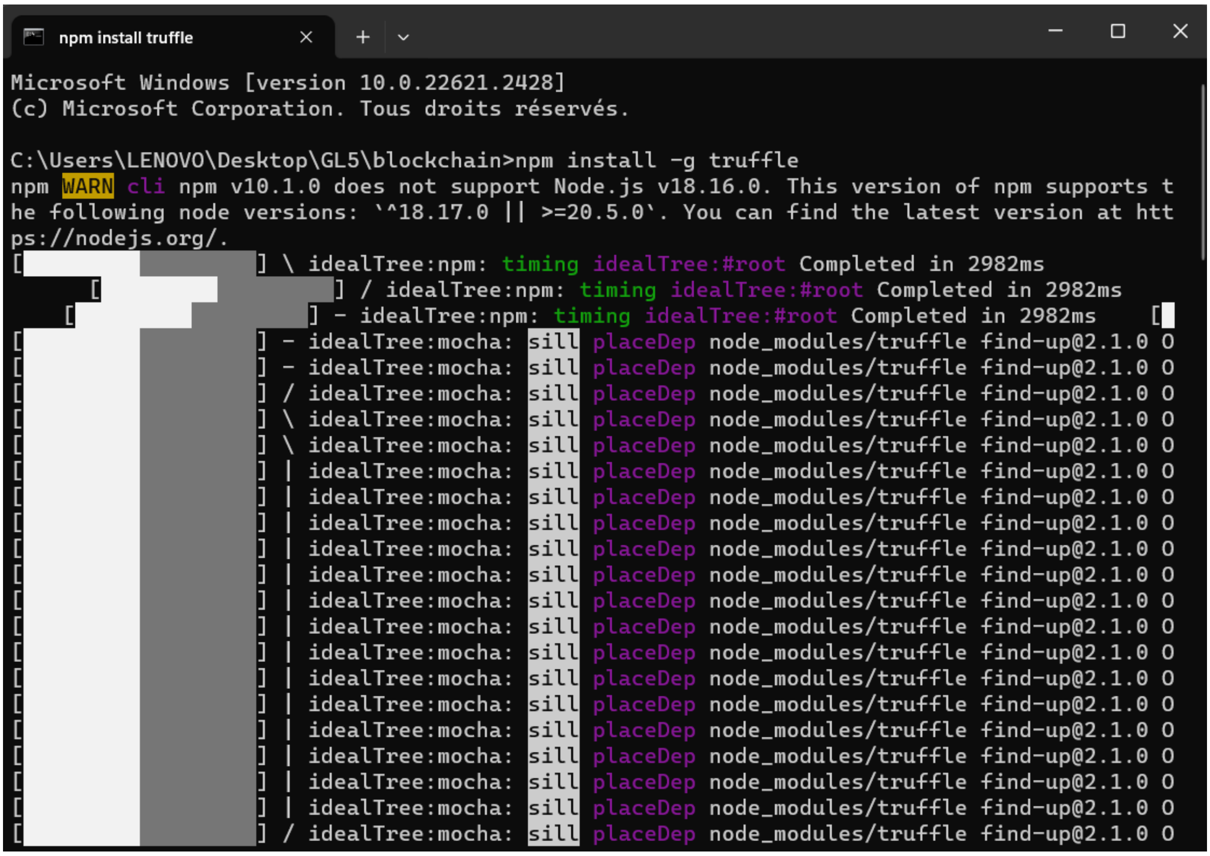
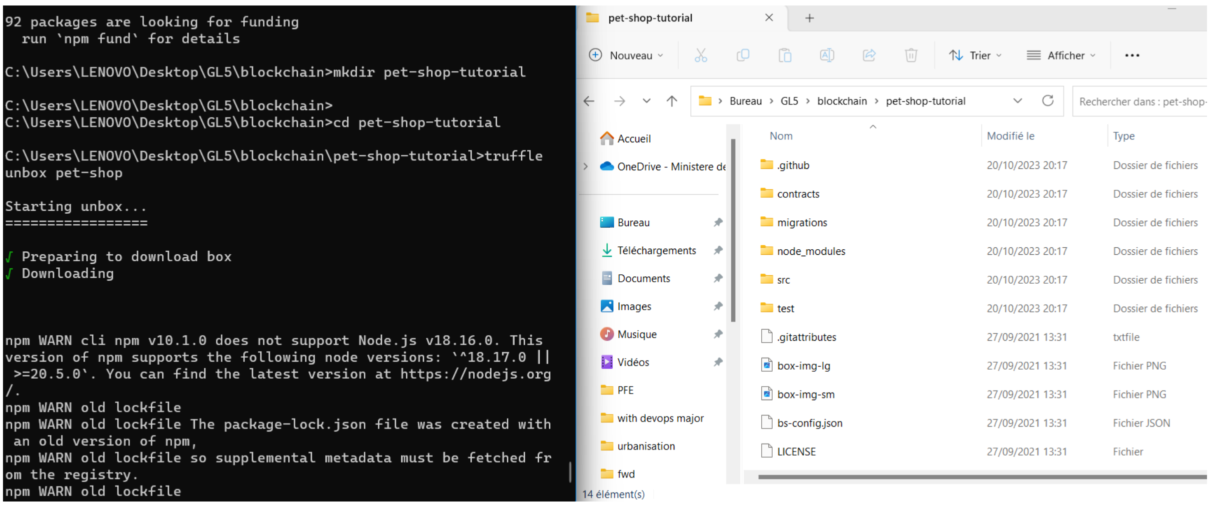
PetShop truffle Tutorial

Laribi Fatma - Kahla Soulaima - Trimech Raoua

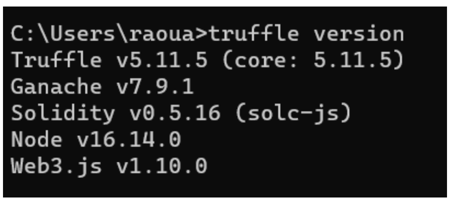
1- truffle installation :

we execute the command : ***npm install -g truffle***





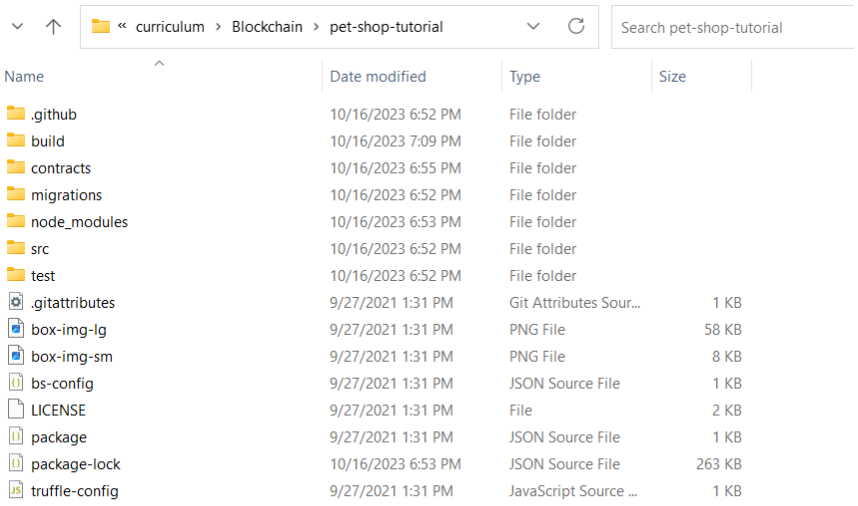
to check that truffle is installed, we used the command: ***truffle version*** which allows us to see the version of truffle installed



2- Creating a truffle project using Truffle Box:

we start by creating the “pet-shop-tutorial” folder where we will execute our project

- To start we will use a Truffle Box dedicated to this tutorial: pet-shop . So we use **truffle unbox pet-shop** to unpack the Truffle Box we will then have this structure



3-Writing the smart contract :

What is a Smart Contract :

Smart contracts are simply programs stored on a blockchain that run when predetermined conditions are met. They typically are used to automate the execution of an agreement so that all participants can be immediately certain of the outcome, without any intermediary’s involvement or time loss. They can also automate a workflow, triggering the next action when conditions are met.

–IBM–

- We begin by creating our first smart contract entitled Adoption .We indicate first the adopted variable which represents the adopters address for each pet (we have 16 pets) . Then we created the function Adopting a pet , that will allow us to associate the adopter to the adopted pet . Furthermore , we added a function getAdopters to be able to retrieve the list of adopters

Welcome | Adoption.sol

contracts > Adoption.sol

```
1   pragma solidity ^0.5.0;
2
3   contract Adoption {
4   address[16] public adopters;
5
6   // Adopting a pet
7   function adopt(uint petId) public returns (uint) {
8     require(petId >= 0 && petId <= 15);
9
10    adopters[petId] = msg.sender;
11
12    return petId;
13  }
14
15  // Retrieving the adopters
16  function getAdopters() public view returns (address[16] memory) {
17    return adopters;
18  }
19
20  }
```

4- Compiling and migrating the smart contract

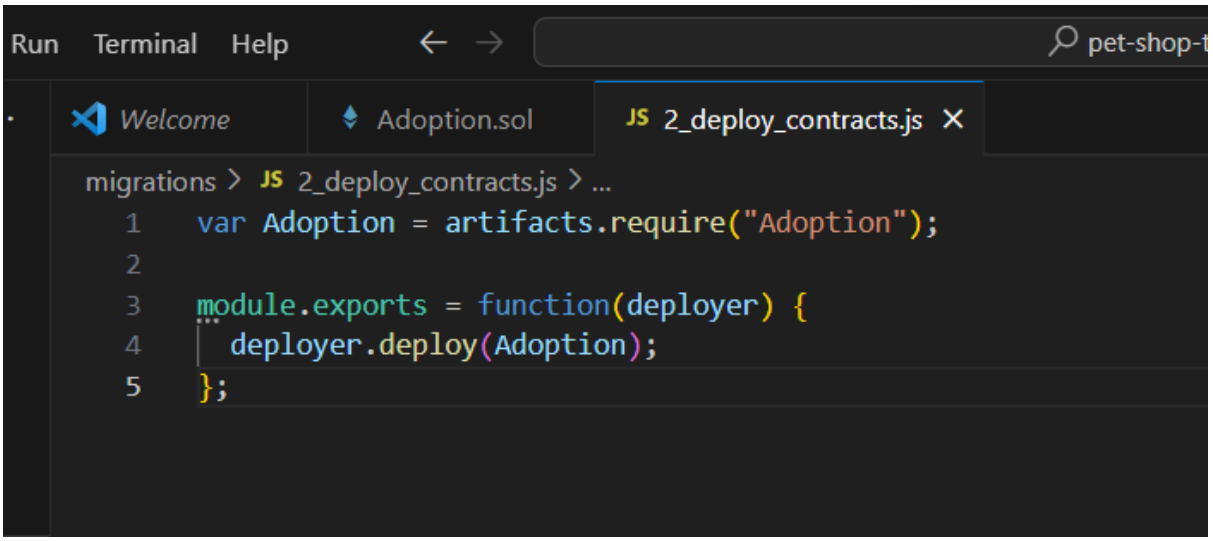
4.1 Compilation :

- to compile our solidity file we use : **truffle compile**

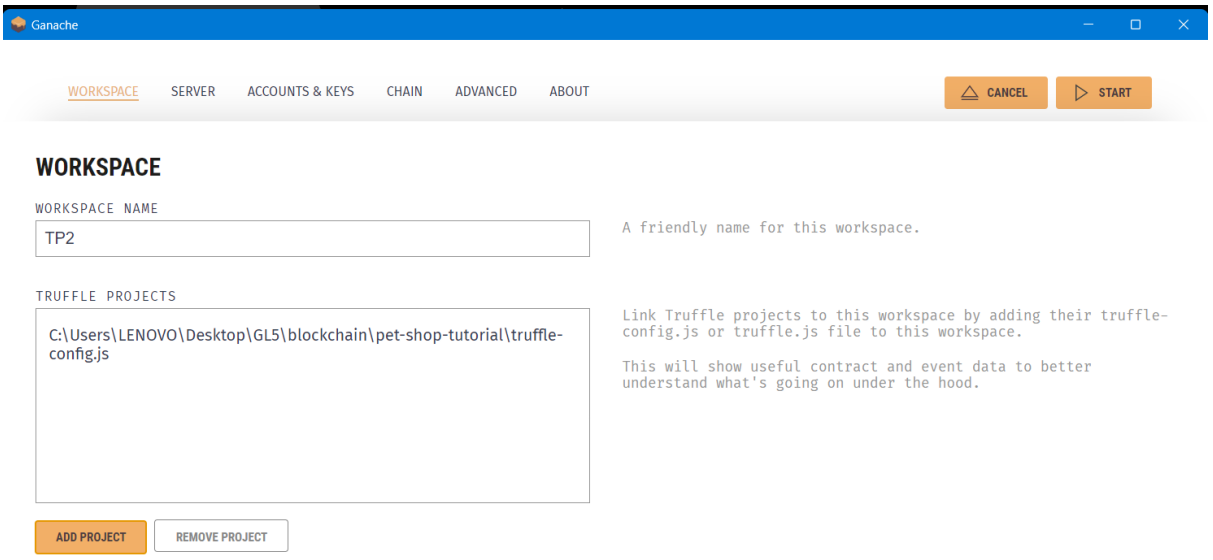
```
PROBLEMS  OUTPUT  TERMINAL  PORTS  DEBUG CONSOLE

PS C:\Users\LENOVO\Desktop\GL5\blockchain\pet-shop-tutorial> truffle compile
>>

Compiling your contracts...
===========================
> Compiling .\contracts\Adoption.sol
> Compiling .\contracts\Migrations.sol
> Artifacts written to C:\Users\LENOVO\Desktop\GL5\blockchain\pet-shop-tutorial\build\contracts
> Compiled successfully using:
   - solc: 0.5.16+commit.9c3226ce.Emscripten.clang
PS C:\Users\LENOVO\Desktop\GL5\blockchain\pet-shop-tutorial>
```

4.2 Migration :

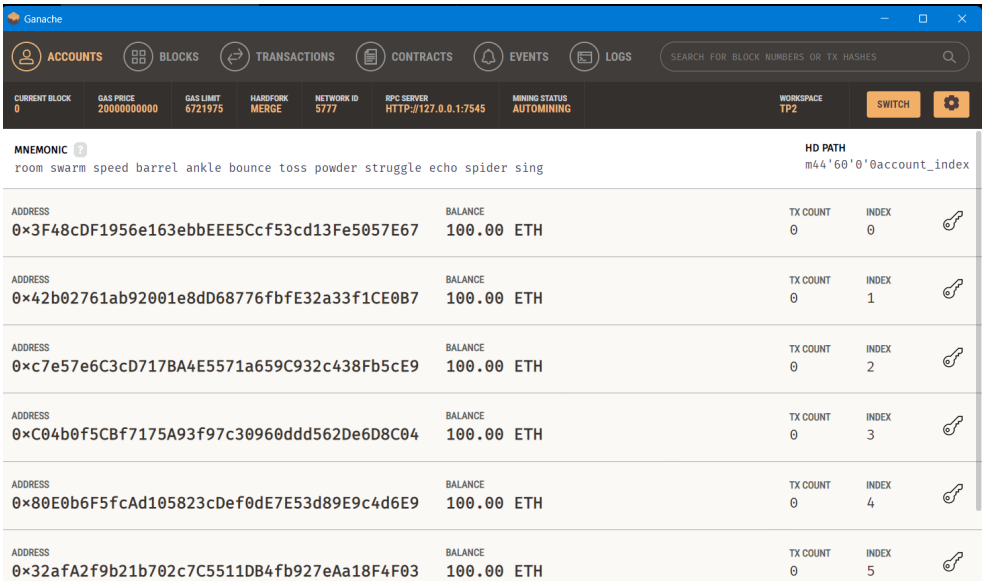
- we start by creating our own migration script :



- to run the blockchain , we downloaded and set-up Ganache as Following : We named our workspace TP2 and added the config file to the Truffle Projects



- after clicking on start we get the following interface :

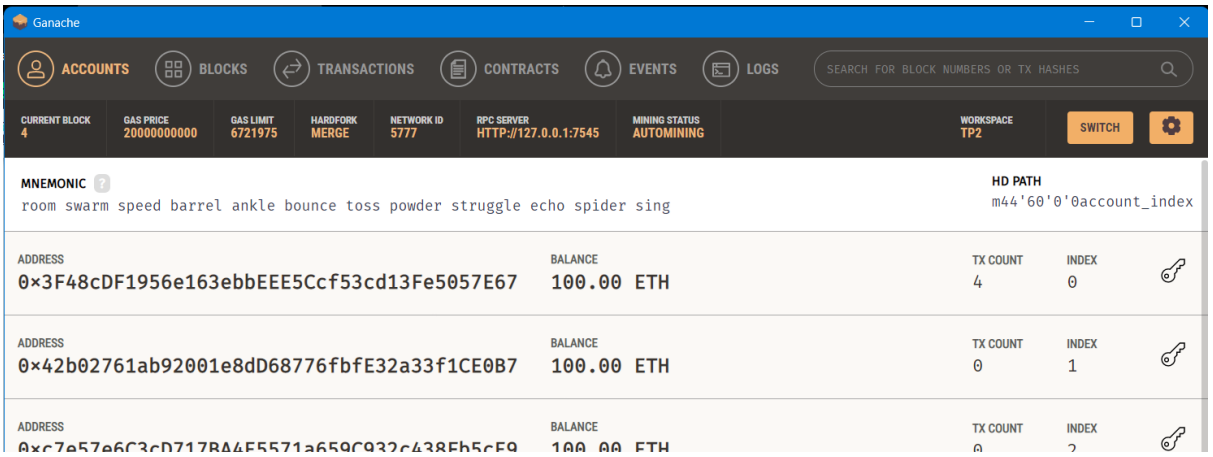


- to migrate the contract to the blockchain we execute : **truffle migrate**

```
PS C:\Users\LENOVO\Desktop\GL5\blockchain\pet-shop-tutorial> truffle migrate
>>

Compiling your contracts...
===========================
> Compiling .\contracts\Adoption.sol
> Compiling .\contracts\Migrations.sol
> Artifacts written to C:\Users\LENOVO\Desktop\GL5\blockchain\pet-shop-tutorial\build\contracts
> Compiled successfully using:
   - solc: 0.5.16+commit.9c3226ce.Emscripten.clang


Starting migrations...
======================
> Network name:    'development'
> Network id:      5777
> Block gas limit: 6721975 (0x6691b7)


1_initial_migration.js
======================

   Deploying 'Migrations'
   ----------------------
   > transaction hash:    0x5cea359be1658f58608d84260dc5dd501c242440bcf960bc615c002634b82953
   > Blocks: 0            Seconds: 0
   > contract address:    0x06bDe0469509DE4D1213D0283372790544C2b270
   > block number:        1
   > block timestamp:     1697831059
   > account:             0x3F48cDF1956e163ebbEEE5Ccf53cd13Fe5057E67
   > balance:             99.999347804875
   > gas used:            193243 (0x2f2db)
   > gas price:           3.375 gwei
   > value sent:          0 ETH
   > total cost:          0.000652195125 ETH

   > Saving migration to chain.
   > Saving artifacts
   -------------------------------------
   > Total cost:      0.000652195125 ETH


2_deploy_contracts.js
=====================
```

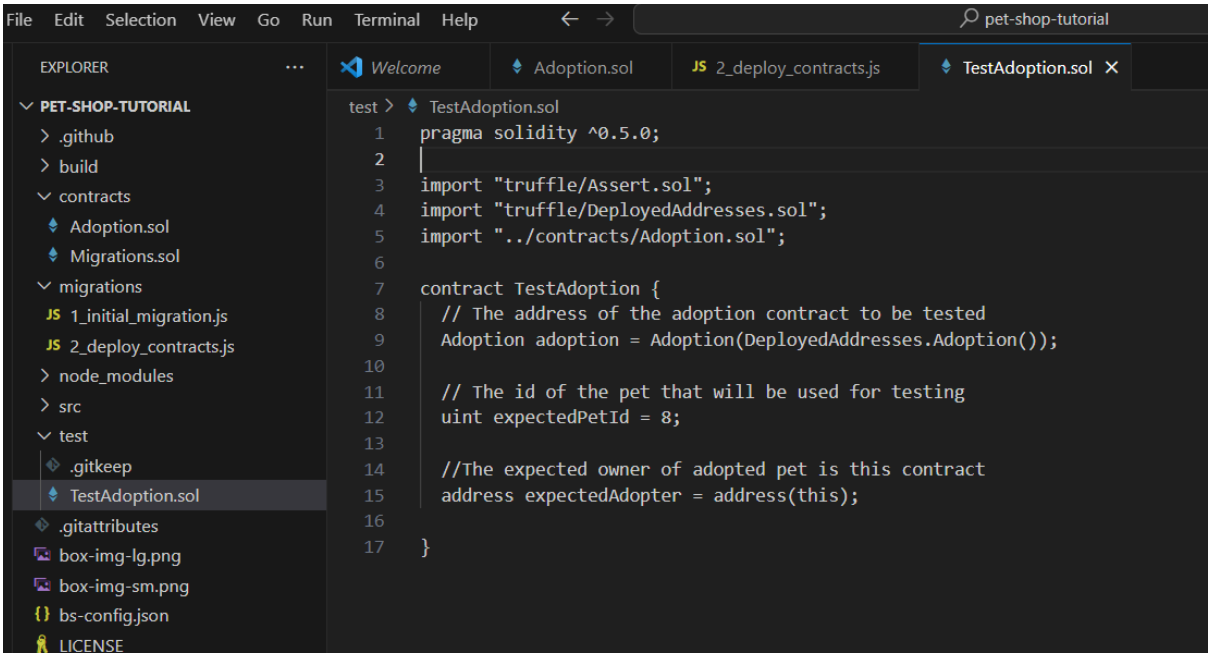
```
2_deploy_contracts.js
=====================

   Deploying 'Adoption'
   --------------------
   > transaction hash:    0x35326d4f6d03bae58327accac994d8401b73f0922e214e1f1a0097b1ad085966
   > Blocks: 0            Seconds: 0
   > contract address:    0x5DbBAa1072270FA876092F456009294F986ce601
   > block number:        3
   > block timestamp:     1697831059
   > account:             0x3F48cDF1956e163ebbEEE5Ccf53cd13Fe5057E67
   > balance:             99.998550649218314381
   > gas used:            203827 (0x31c33)
   > gas price:           3.176737487 gwei
   > value sent:          0 ETH
   > total cost:          0.000647504871762749 ETH

   > Saving migration to chain.
   > Saving artifacts
   -------------------------------------
   > Total cost:     0.000647504871762749 ETH

Summary
=======
> Total deployments:   2
> Final cost:          0.001299699996762749 ETH
```

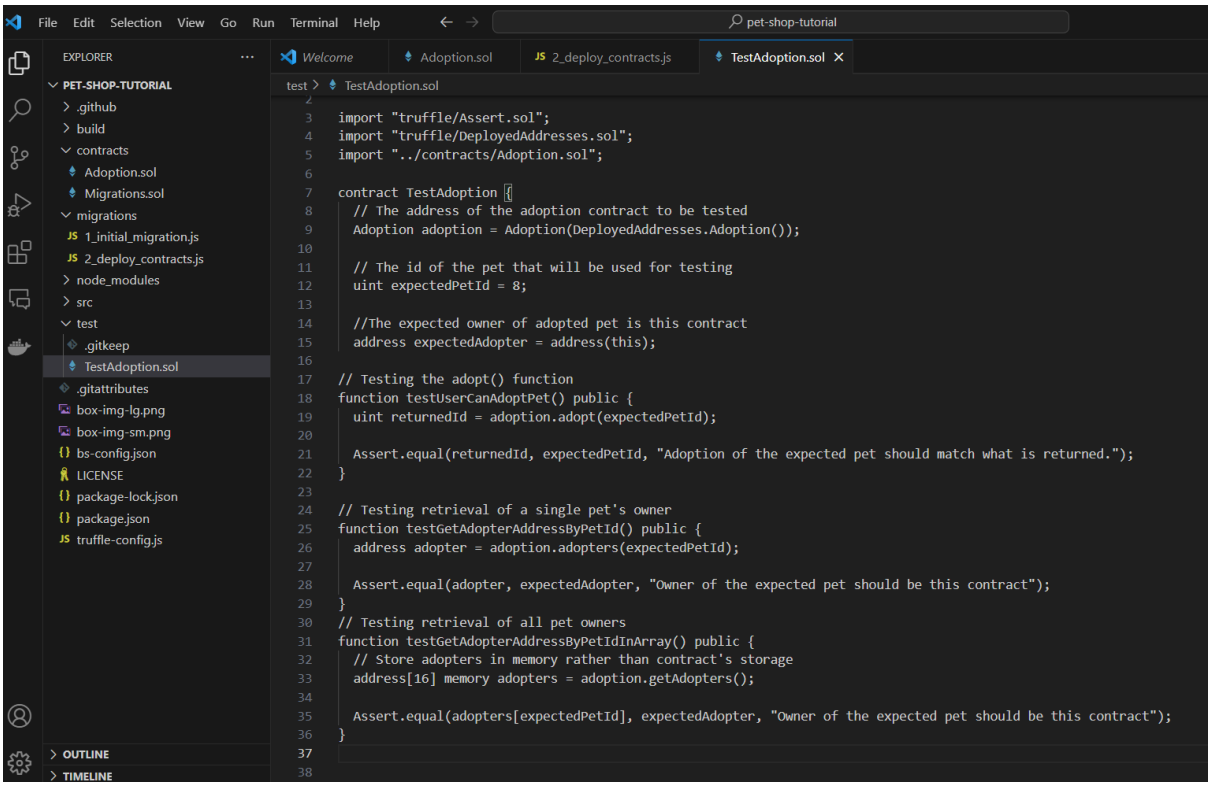
- in the Ganache interface , we noticed that our current block number changed from 0 to 4 due to the migration of our blocks , Furthermore , we noticed that we have lower than 100 Ether



5- Testing the smart contract using Solidity :

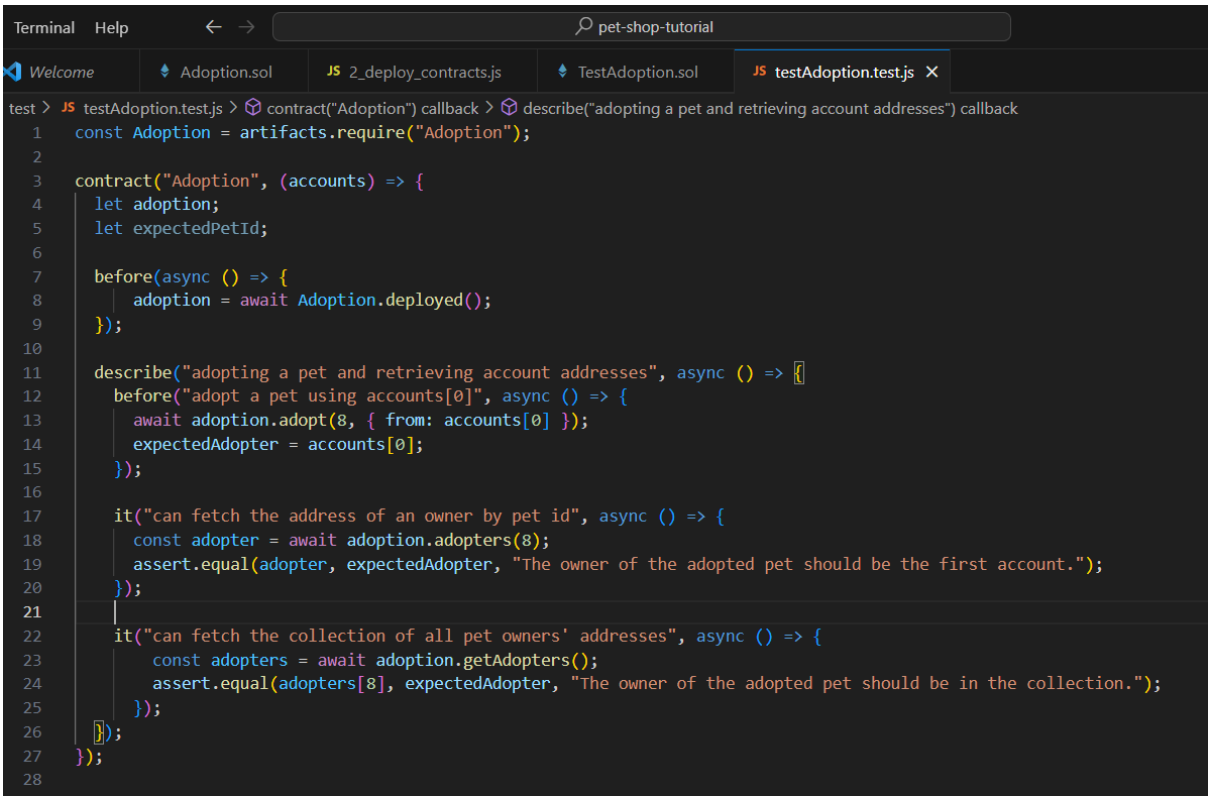
- Truffle allows us to create tests for our smart contracts. In this case, we will be writing tests in Solidity .
  - We first started by testing the adopting function , by comparing the expected PetId to the petId returned to the function.
  - Secondly , we tested the retrieval of a single pet's owner by getting the adopter's address by the PetId and comparing it to the expected Adopter.
  - And finally we tested the retrieval of all pet owners, we first got the list of the adopters and stored it in the memory to be able to retrieve fully as one entity and then we compared the expected Adopter to the Adopter stored in this list by referring to the expectedPetId.





6- Testing the smart contract using JavaScript :

- in this section we rewrote the previous tests that wrote in Solidity in JavaScript



7- Running the tests:

- to run the tests we execute the command : **truffle test**
  we noticed that in our Ganache interface 5 Blocks are added

```
PROBLEMS  OUTPUT  TERMINAL  PORTS  DEBUG CONSOLE

PS C:\Users\LENOVO\Desktop\GL5\blockchain\pet-shop-tutorial> truffle test
>>
Using network 'development'.


Compiling your contracts...
===========================
> Compiling .\contracts\Adoption.sol
> Compiling .\contracts\Migrations.sol
> Compiling .\test\TestAdoption.sol
> Compiling truffle\Assert.sol
> Compiling truffle\AssertAddress.sol
> Compiling truffle\AssertAddressArray.sol
> Compiling truffle\AssertBalance.sol
> Compiling truffle\AssertBool.sol
> Compiling truffle\AssertBytes32.sol
> Compiling truffle\AssertBytes32Array.sol
> Compiling truffle\AssertGeneral.sol
> Compiling truffle\AssertInt.sol
> Compiling truffle\AssertIntArray.sol
> Compiling truffle\AssertString.sol
> Compiling truffle\AssertUint.sol
> Compiling truffle\AssertUintArray.sol
> Compiling truffle\DeployedAddresses.sol
> Artifacts written to C:\Users\LENOVO\AppData\Local\Temp\test--10524-Qin7cgTGXzmV
> Compiled successfully using:
   - solc: 0.5.16+commit.9c3226ce.Emscripten.clang


  TestAdoption
    ✓ testUserCanAdoptPet (84ms)
    ✓ testGetAdopterAddressByPetId (72ms)
    ✓ testGetAdopterAddressByPetIdInArray (95ms)

  Contract: Adoption
    adopting a pet and retrieving account addresses
      ✓ can fetch the address of an owner by pet id
      ✓ can fetch the collection of all pet owners' addresses


  5 passing (7s)
```

8- Creating a user interface to interact with the smart contract :

8.1 Instantiating web3 :

- we start by linking our front end to our Ethereum blockchain by using the **web3 JavaScript library**

```
  initWeb3: async function() {
    // Modern dapp browsers...
if (window.ethereum) {
  App.web3Provider = window.ethereum;
  try {
    // Request account access
    await window.ethereum.enable();
  } catch (error) {
    // User denied account access...
    console.error("User denied account access")
  }
}
// Legacy dapp browsers...
else if (window.web3) {
  App.web3Provider = window.web3.currentProvider;
}
// If no injected web3 instance is detected, fall back to Ganache
else {
  App.web3Provider = new Web3.providers.HttpProvider('http://localhost:7545');
}
web3 = new Web3(App.web3Provider);
```

8.2 Instantiating the contract

- To keep migrations synchronized with the contract's information, we need to initiate our smart contract so that we don't need to change the contract's deployed address manually . We insert the following code in our app.js file

```
initContract: function() {
  $.getJSON('Adoption.json', function(data) {
    // Get the necessary contract artifact file and instantiate it with @truffle/contract
    var AdoptionArtifact = data;
    App.contracts.Adoption = TruffleContract(AdoptionArtifact);

    // Set the provider for our contract
    App.contracts.Adoption.setProvider(App.web3Provider);

    // Use our contract to retrieve and mark the adopted pets
    return App.markAdopted();
  });
  return App.bindEvents();
},

bindEvents: function() {
  $(document).on('click', '.btn-adopt', App.handleAdopt);
},
```

9- Getting The Adopted Pets and Updating The UI

- With add the following code to our app.js file to be able to coordinate between the front and our blockchain so that the front end will take into consideration the already adopted pets and disable their adoption button

```
  markAdopted: function() {
    var adoptionInstance;

App.contracts.Adoption.deployed().then(function(instance) {
  adoptionInstance = instance;

  return adoptionInstance.getAdopters.call();
}).then(function(adopters) {
  for (i = 0; i < adopters.length; i++) {
    if (adopters[i] !== '0x0000000000000000000000000000000000000000') {
      $('.panel-pet').eq(i).find('button').text('Success').attr('disabled', true);
    }
  }
}).catch(function(err) {
  console.log(err.message);
});
  },
```

10- Handling the adopt() Function :

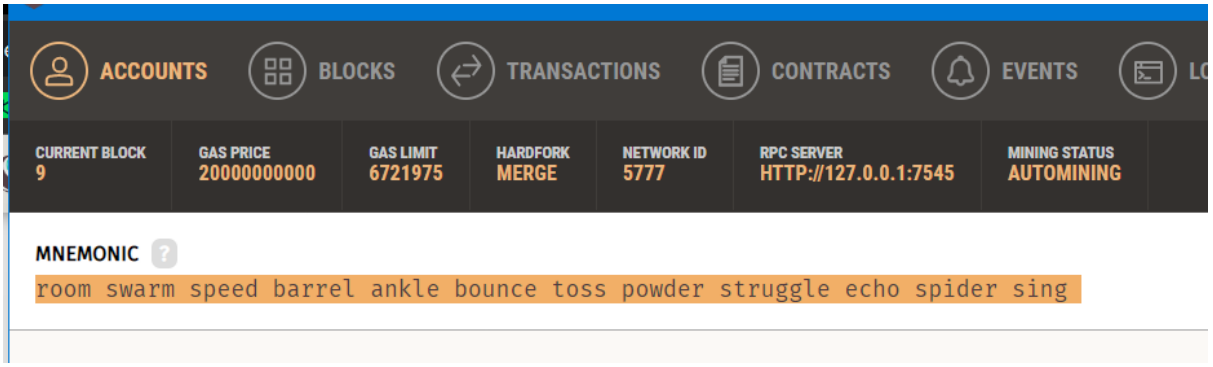
- In our app.js file , we add the following code to describe the adoption process and linked it to our ethereum account so that we can execute the fee of this transaction.

```
Adoption.sol | 2_deploy_contracts.js | TestAdoption.sol | testAdoption.test.js | app.js
src > js > app.js > handleAdopt

87
88    handleAdopt: function(event) {
89      event.preventDefault();
90
91      var petId = parseInt($(event.target).data('id'));
92
93      var adoptionInstance;
94
95  web3.eth.getAccounts(function(error, accounts) {
96    if (error) {
97      console.log(error);
98    }
99
100   var account = accounts[0];
101
102   App.contracts.Adoption.deployed().then(function(instance) {
103     adoptionInstance = instance;
104
105     // Execute adopt as a transaction by sending account
106     return adoptionInstance.adopt(petId, {from: account});
107   }).then(function(result) {
108     return App.markAdopted();
109   }).catch(function(err) {
110     console.log(err.message);
111   });
112 });
113
```

11- Interacting with the dapp in a browser

11.1 Installing and configuring MetaMask :

- In this section we will installing MetaMask which is a popular and widely used cryptocurrency wallet and decentralized application (DApp) browser extension. It primarily serves as a bridge between your web browser and the Ethereum blockchain, allowing users to interact with Ethereum-based applications and manage their cryptocurrency assets, including Ether (ETH) and various Ethereum-based tokens. Here are the different step we went through to set up our MetMask extension



we past the MNEMONIC in the first column of the secret phrase :

votre identité, restaurer votre portefeuille et définir un nouveau mot de passe. Veuillez tout d'abord saisir la phrase secrète de récupération qui vous a été fournie lorsque vous avez créé votre portefeuille. En savoir plus

Saisissez votre phrase secrète de récupération

J'ai une phrase de 12 mots

Vous pouvez coller toute votre phrase de récupération secrète dans n'importe quel champ

1.	••••	2.	•••••	3.	•••••
4.	••••••	5.	•••••	6.	••••••
7.	••••	8.	••••••	9.	••••••••
10.	••••	11.	••••••	12.	••••

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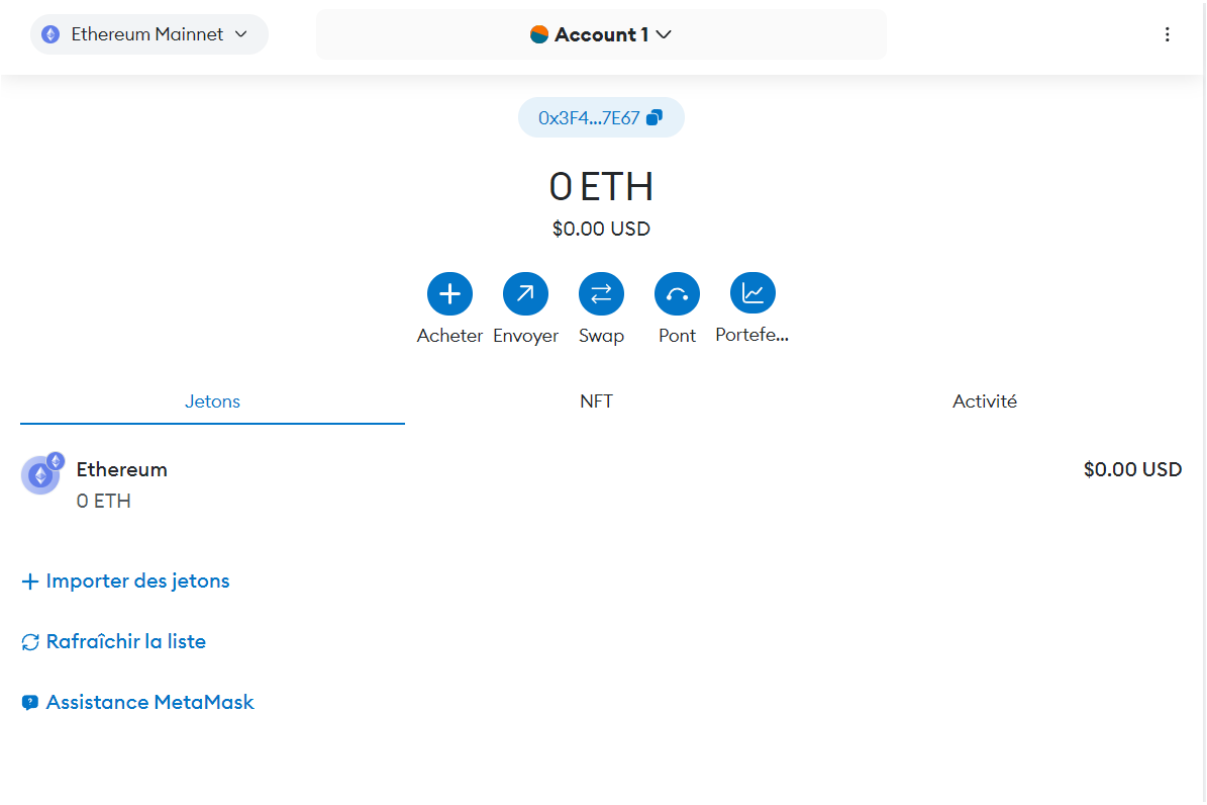


Réseaux > Ajouter un réseau > Ajouter manuellement un réseau

Un fournisseur de réseau malveillant peut mentir quant à l'état de la blockchain et enregistrer votre activité réseau. N'ajoutez que des réseaux personnalisés auxquels vous faites confiance.

Nom du réseau

New Network

Nouvelle URL de RPC

http://127.0.0.1:7545

ID de chaîne

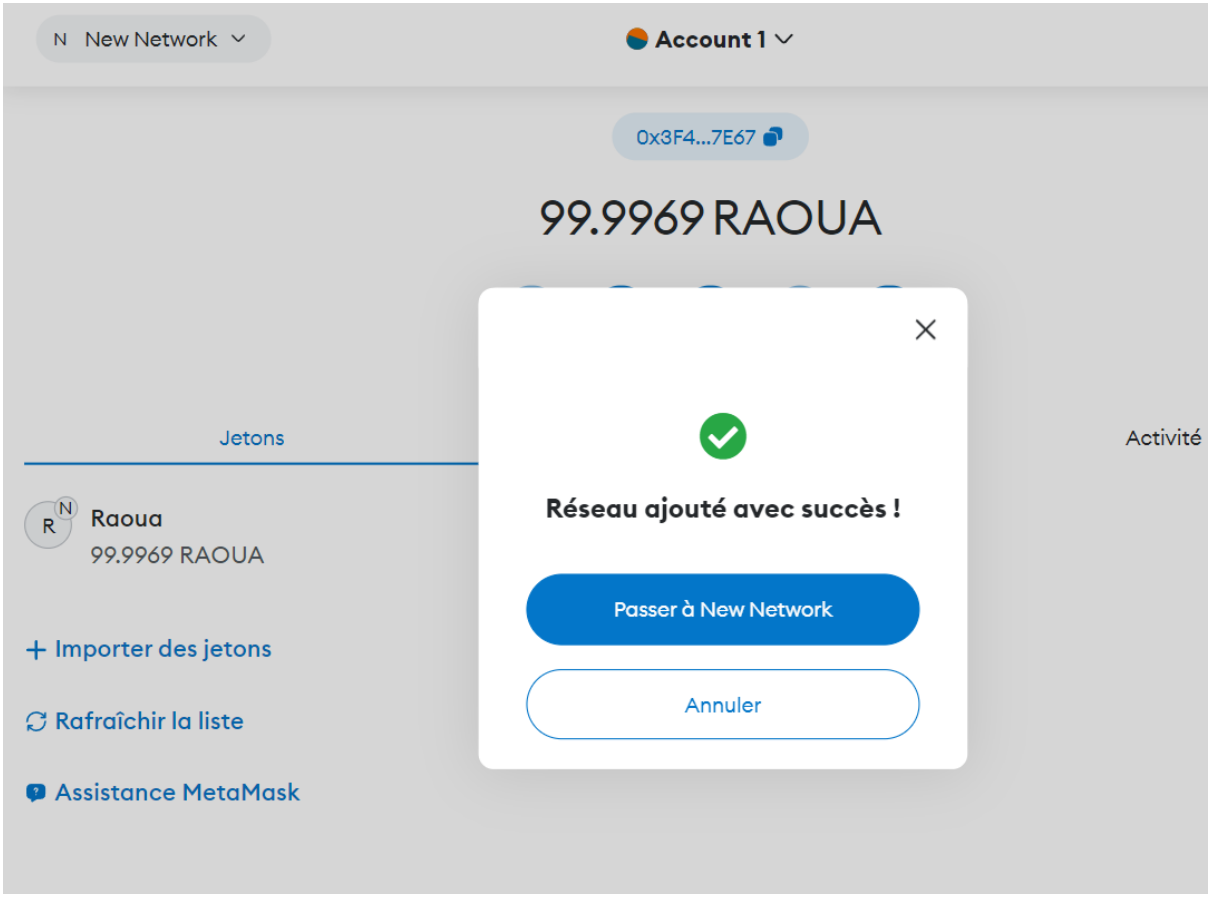
0x539

Symbole de la devise

Raoua

Les données de vérification de code mnémonique sont actuellement indisponibles. Assurez-vous que le code que vous avez saisi est correct. Il aura une incidence sur les taux de conversion que vous voyez pour ce réseau

URL de l'explorateur de blocs (Facultatif)



11.2 Installing and configuring lite-server :

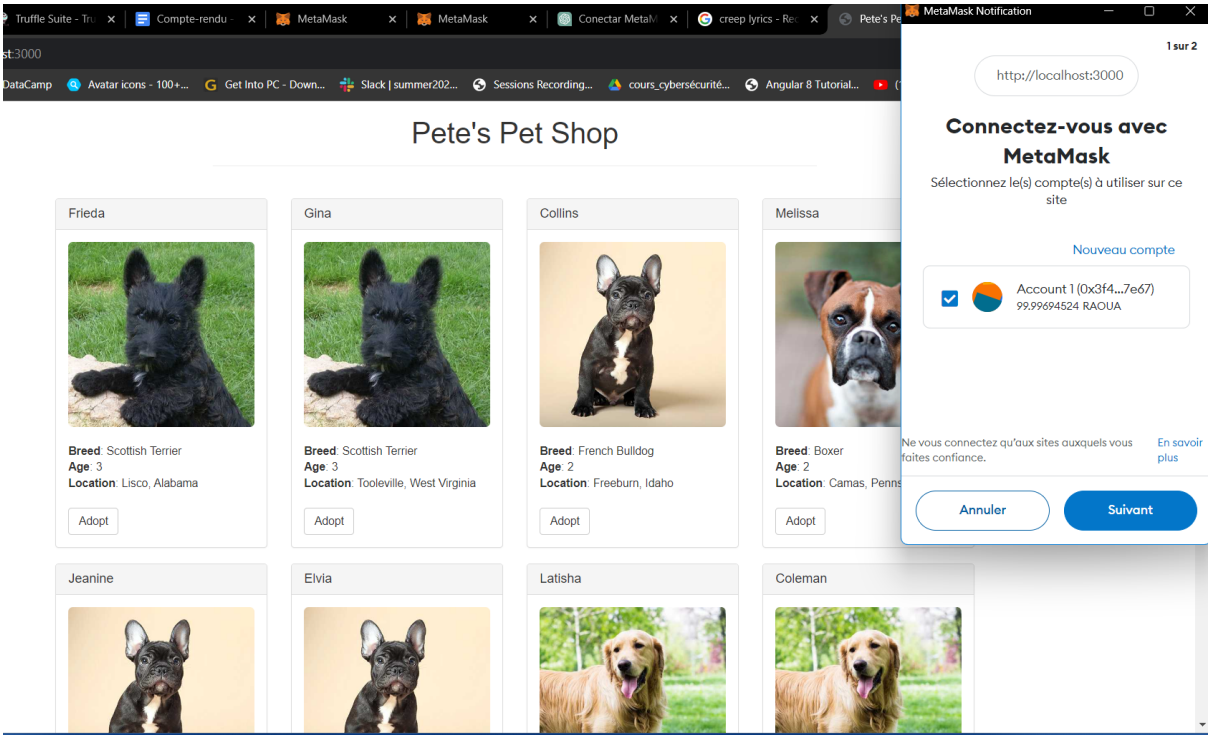
- Lite-server, often written as "lite-server" or "liteServer," is a simple and lightweight development server for web applications. It is primarily used for local development and testing of web applications and websites. Lite-server is often associated with front-end development, particularly when working on HTML, CSS, and JavaScript files. In our case we used it to be able to link our contracts files and the front end file under ./src and ./build/contracts . Furthermore , we used it to specify our dev run command .

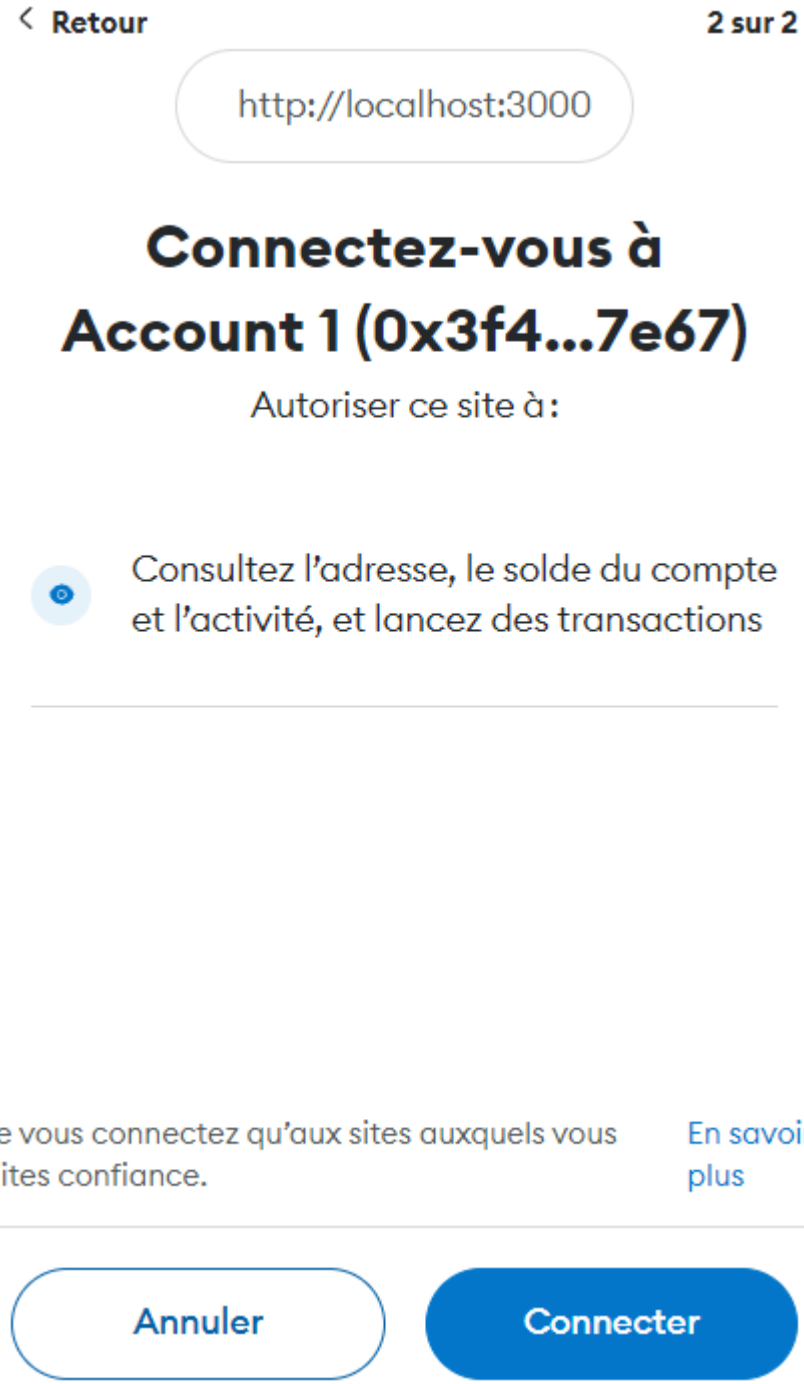
```
PS C:\Users\LENOVO\Desktop\GL5\blockchain\pet-shop-tutorial> npm run dev
npm WARN cli npm v10.1.0 does not support Node.js v18.16.0. This version of npm supports the following node versions: `^18.17.0 || >=20.5.0`. You can find the lat
est version at https://nodejs.org/.

> pet-shop@1.0.0 dev
> lite-server

** browser-sync config **
{
  injectChanges: false,
  files: [ './**/*.{html,htm,css,js}' ],
  watchOptions: { ignored: 'node_modules' },
  server: {
    baseDir: [ './src', './build/contracts' ],
    middleware: [ [Function (anonymous)], [Function (anonymous)] ]
  }
}
[Browsersync] Access URLs:
 ------------------------------------
       Local: http://localhost:3000
    External: http://169.254.137.243:3000
 ------------------------------------
         UI: http://localhost:3001
 UI External: http://localhost:3001
 ------------------------------------
[Browsersync] Serving files from: ./src
[Browsersync] Serving files from: ./build/contracts
[Browsersync] Watching files...
23.10.20 22:41:16 200 GET /index.html
23.10.20 22:41:16 200 GET /css/bootstrap.min.css
23.10.20 22:41:16 200 GET /js/bootstrap.min.js
23.10.20 22:41:16 200 GET /js/web3.min.js
23.10.20 22:41:16 200 GET /js/app.js
23.10.20 22:41:16 200 GET /js/truffle-contract.js
23.10.20 22:41:17 404 GET /favicon.ico
23.10.20 22:41:17 200 GET /pets.json
23.10.20 22:41:17 404 GET /favicon.ico
23.10.20 22:41:17 200 GET /images/scottish-terrier.jpeg
23.10.20 22:41:17 200 GET /images/french-bulldog.jpeg
23.10.20 22:41:17 200 GET /images/boxer.jpeg
23.10.20 22:41:17 200 GET /images/golden-retriever.jpeg
[Browsersync] Reloading Browsers... (buffered 6 events)
23.10.20 22:41:17 304 GET /index.html
23.10.20 22:41:17 304 GET /css/bootstrap.min.css
```

⚠ The component analysis couldn't fetch data from the following pr

11.3 Using the dapp :

- We run our local server by executing : **npm run dev** we will get the following page , we should also allow our MetaMask wallet to connect to our app which is shown down bellow :





- when we click on adopt a dog we notice that in our MetaMask Wallet we are asked to confirm the transaction . Upon that we notice that our Ether count has gone down and the dog is no long available for adopting

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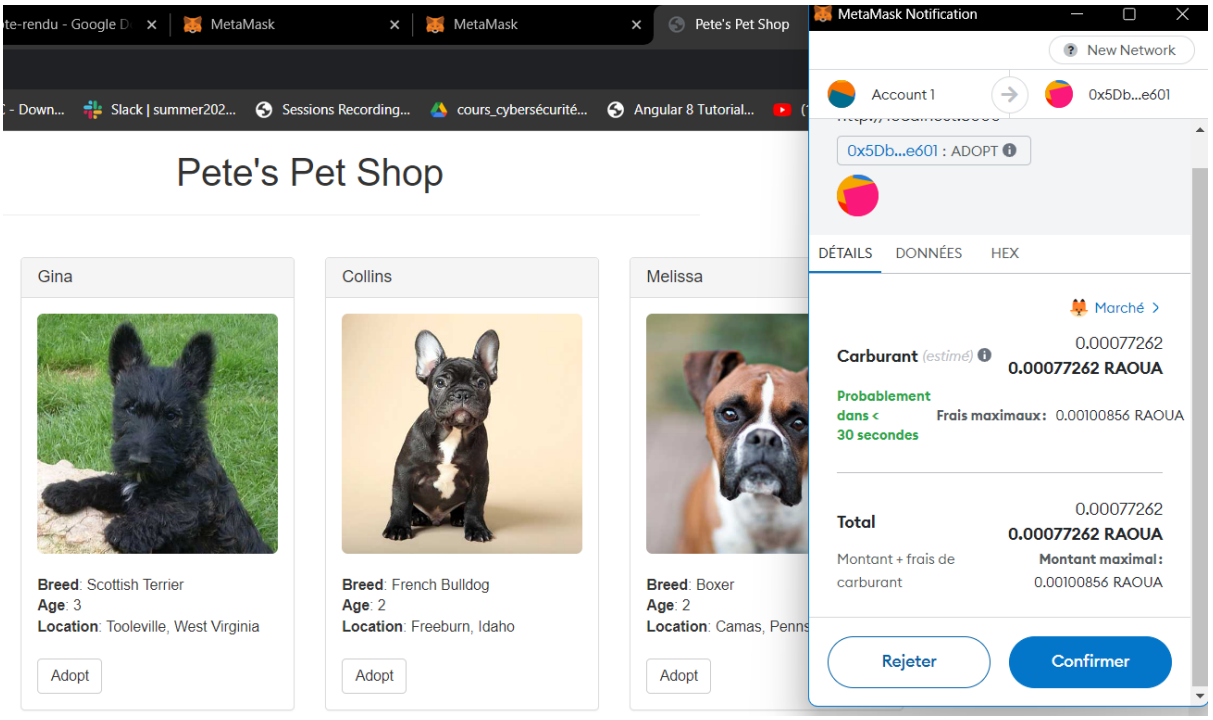

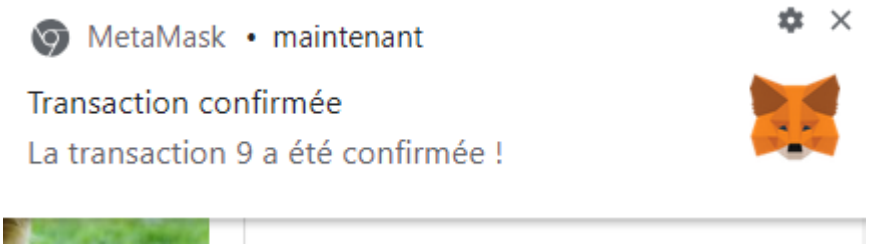

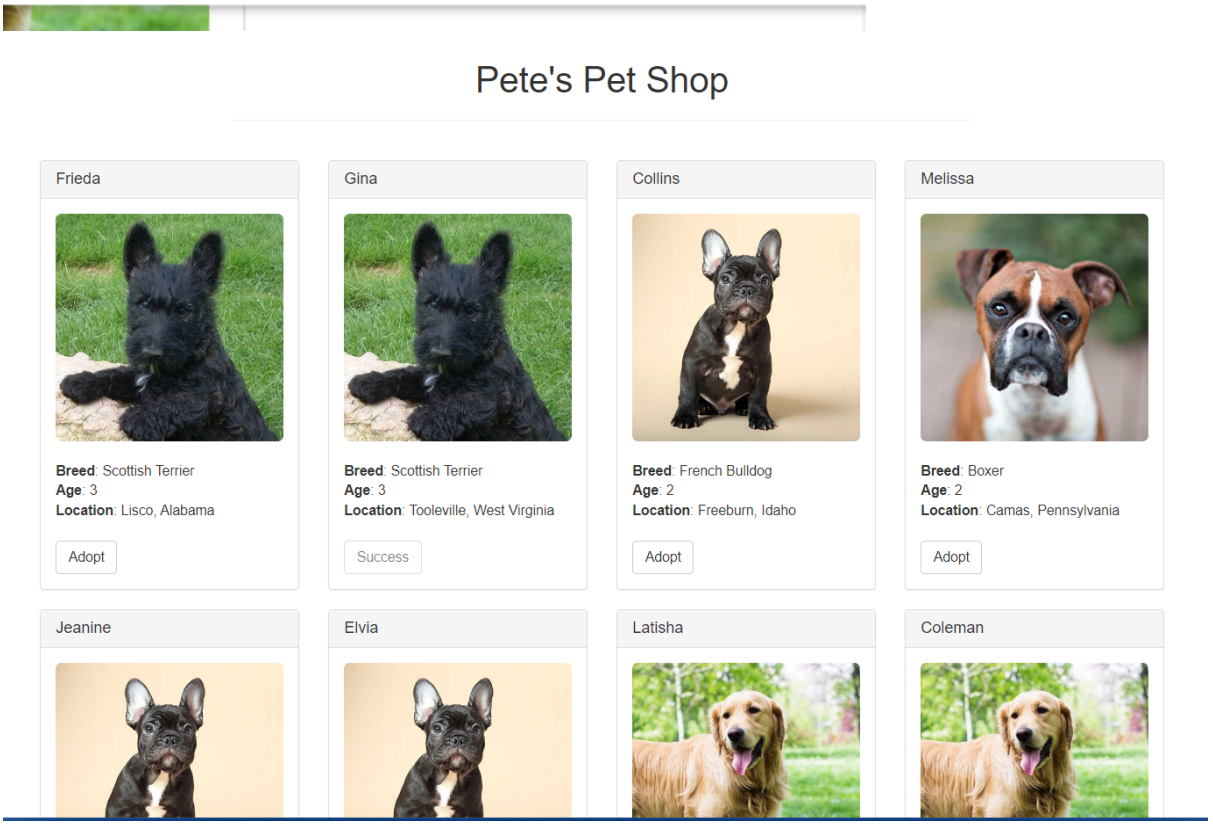

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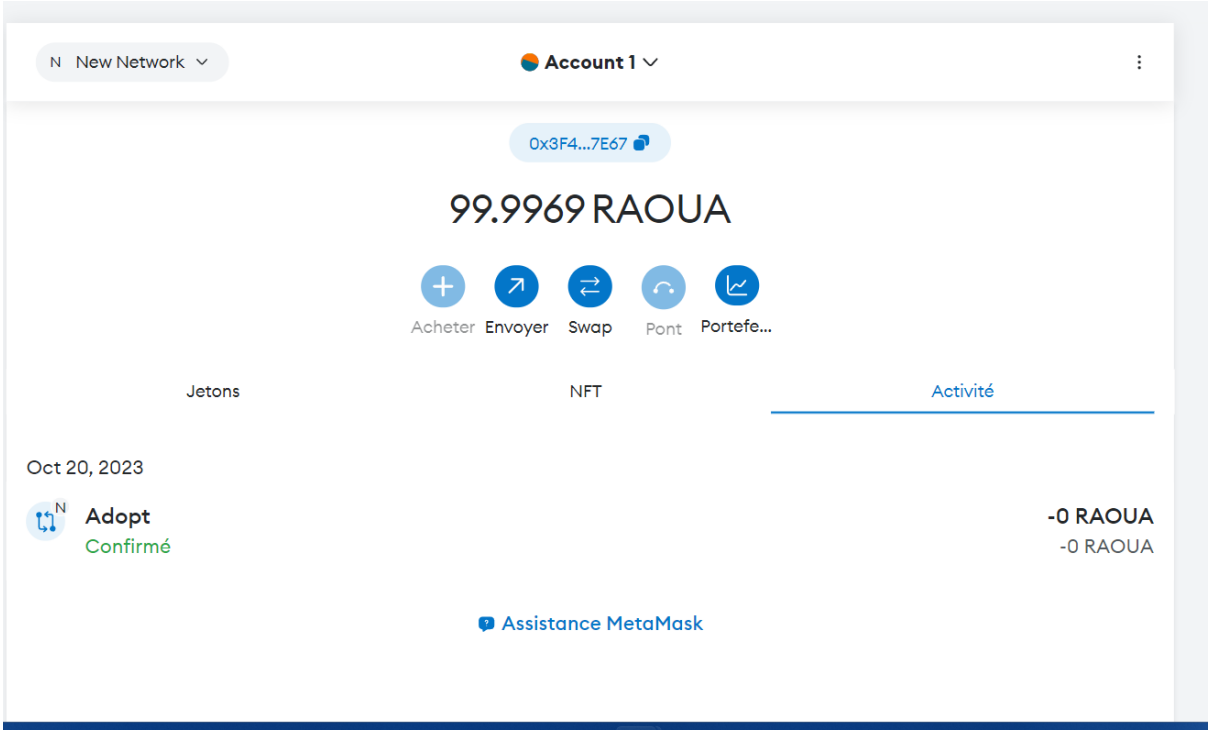

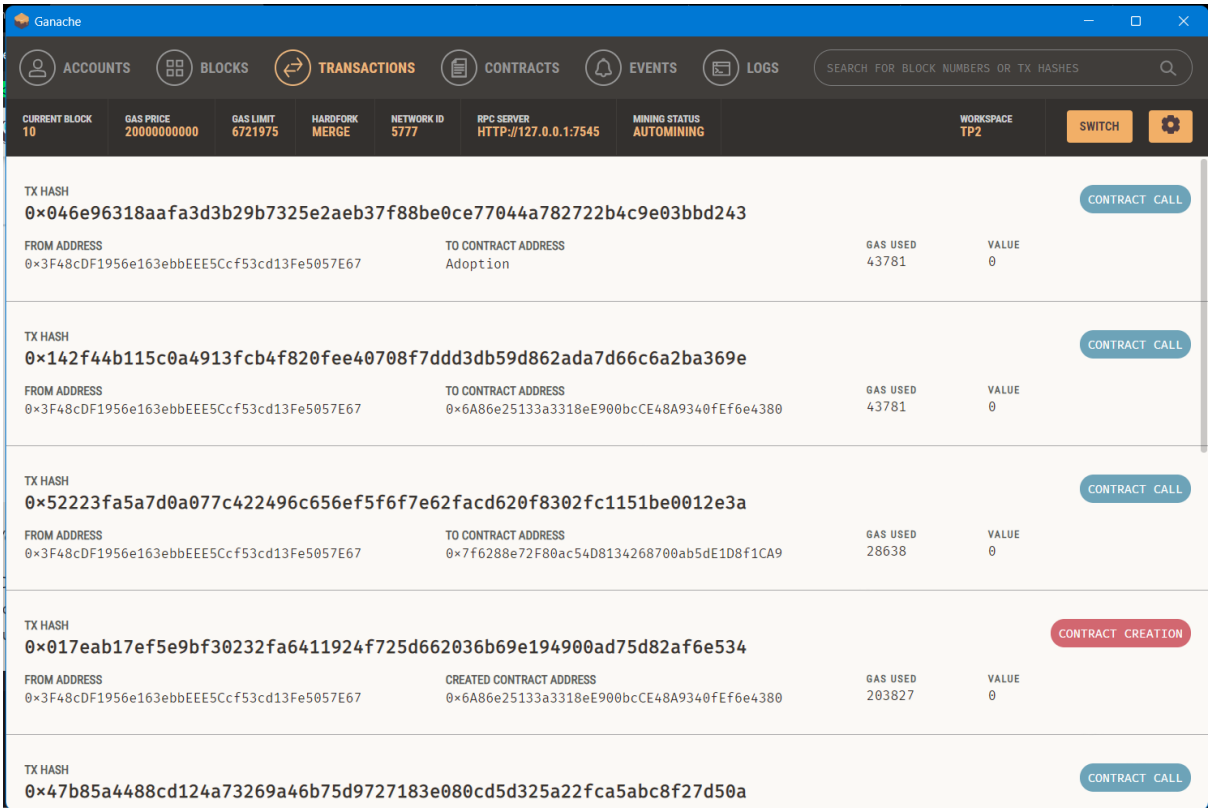

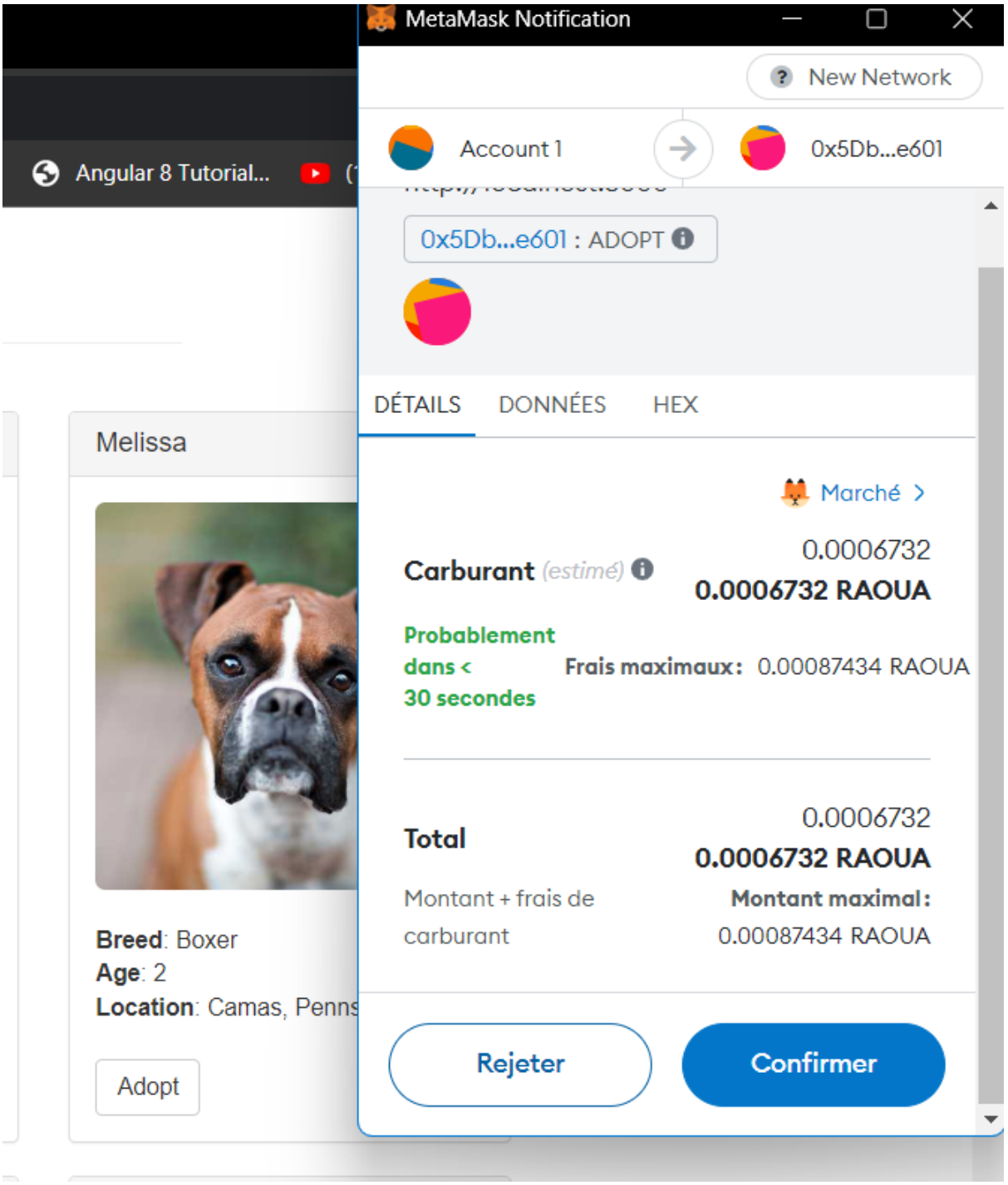
MetaMask Notification
New Network
Account 1
0x5Db...e601
0x5Db...e601 : ADOPT
DÉTAILS
DONNÉES
HEX
Marché
Carburant (estimé)
0.0006732
0.0006732 RAOUA
Probablement dans < 30 secondes
Frais maximaux: 0.00087434 RAOUA
Total
0.0006732
0.0006732 RAOUA
Montant + frais de carburant
Montant maximal:
0.00087434 RAOUA
Rejeter
Confirmer
Angular 8 Tutorial...
Melissa
Breed: Boxer
Age: 2
Location: Camas, Penns
Adopt

PetShop truffle Tutorial

Laribi Fatma - Kahla Soulaima - Trimech Raoua

Pete's Pet Shop

Frieda

Breed: Scottish Terrier
Age: 3
Location: Lisco, Alabama

Adopt

Gina

Breed: Scottish Terrier
Age: 3
Location: Tooleville, West Virginia

Success

Collins

Breed: French Bulldog
Age: 2
Location: Freeburn, Idaho

Adopt

Melissa

Breed: Boxer
Age: 2
Location: Camas, Pennsylvania

Success

PetShop truffle Tutorial

Laribi Fatma - Kahla Soulaima - Trimech Raoua