Lab: Transfer assets in a business network

Overview

In this lab, you learn the basic concepts of a blockchain by seeing how a blockchain can be used to transfer assets between participants in a business network. You use car leasing as a scenario for the demo.

The lab runs inside the IBM Bluemix environment; however for this lab, you will ignore Bluemix and focus on the car leasing demo itself. There is a follow-on lab that will properly introduce you to the Bluemix environment and allows you to create and monitor the IBM Blockchain service and application.

Tip: This lab uses the IBM Bluemix interface in the Classic Experience view. If you log in to Bluemix and want to work in the Classic Experience UI, click **Go to Classic Experience** at the top of the page.

Prerequisites

It's recommended that you use Firefox or Chrome web browsers.

You need a Bluemix account to create the sample application.

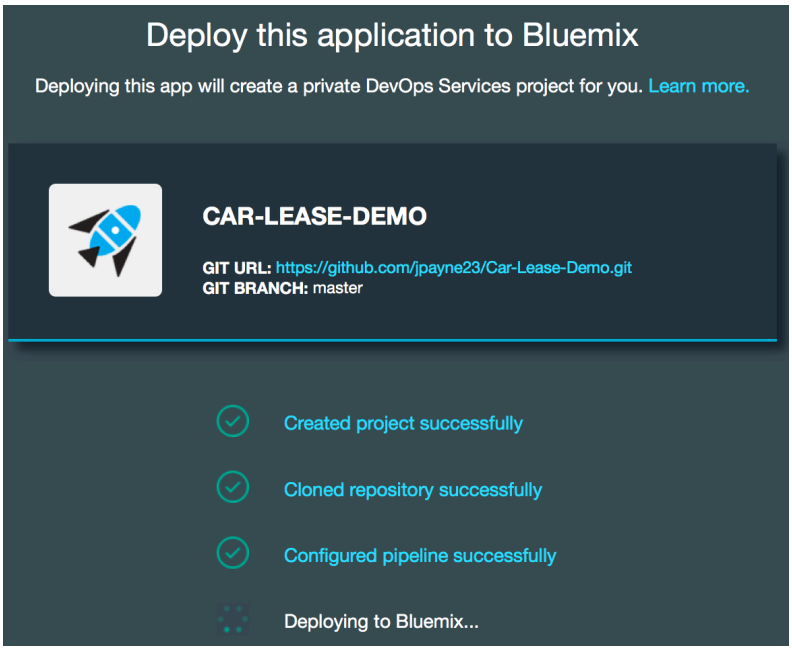
Step 1. Deploy and configure the sample application

To deploy the sample application:

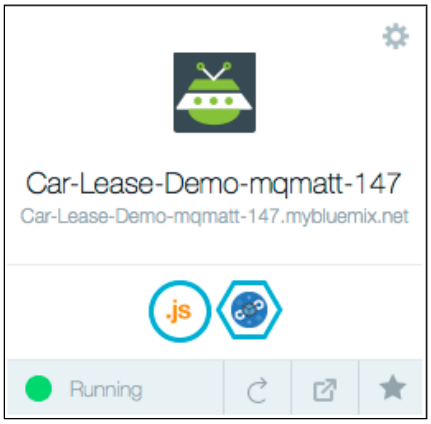
1. Open your browser and go to http://www.bluemix.net.
2. Click **Sign up** or **Log in** to create a new Bluemix account or log into your existing account.
3. After you have successfully signed up and logged into Bluemix, click **CATALOG** from the top bar.
4. Scroll down to the **Network** section and click **Blockchain**. Review the service description and information about the service.
5. Click **View Docs** to learn about the process of creating a blockchain environment.
6. Expand **Sample Apps and Tutorials** on the right side of the page to view the available apps.
7. Select the **Using Car Lease Demo** item from the list of apps
8. Click **Deploy to Bluemix** after the Car-Lease-Demo overview paragraph. You might need to log into Bluemix again.

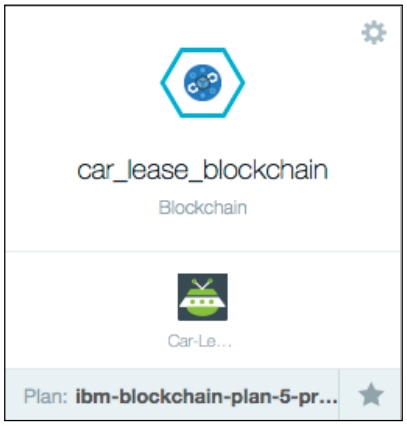
   If this is your first time using Bluemix DevOps services, you will be prompted to create an alias for the DevOps Services Git repository that will to link to your IBM id. This could be the first part of your email address; add a number afterward if needed to make it unique. Click **Create** after providing the alias.

You can leave the `App Name`, `Region`, `Organization`, and `Space` attributes in the default state and click **Deploy**. It will take a few seconds for the default field values to be populated. This action will cause the Car-Lease-Demo to be deployed to your Bluemix environment and might take a couple of minutes to complete.



When you see the “Success!” message, click **DASHBOARD** to see the new car leasing application and associated blockchain service that you created.





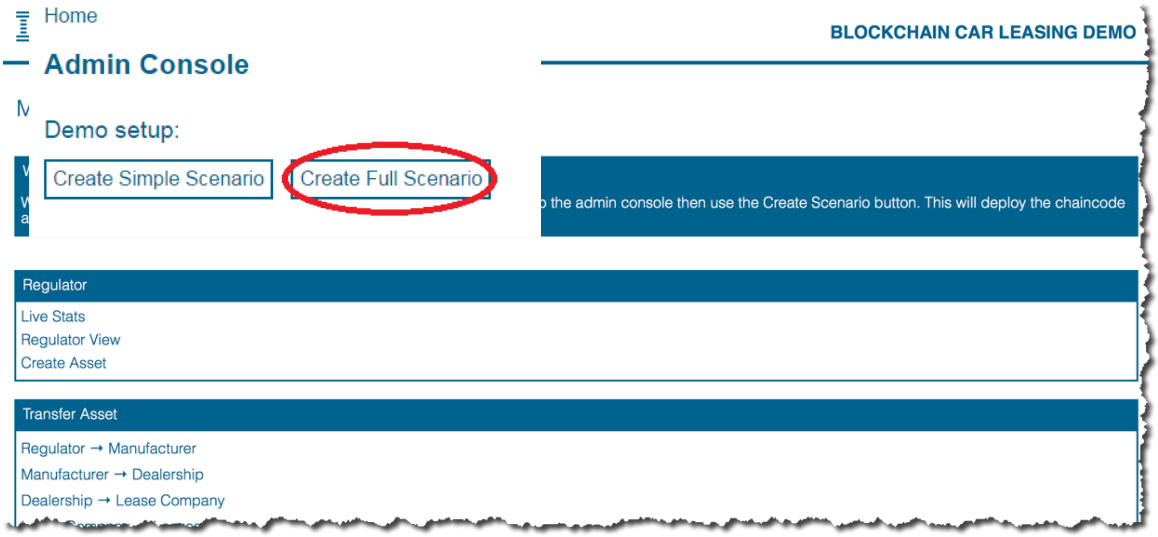
9. Click the application icon in the dashboard.

Your application icon might be different from the sample in the demo. Clicking the icon will show you information about the application, including memory consumption and the activity log.

To configure the sample application:

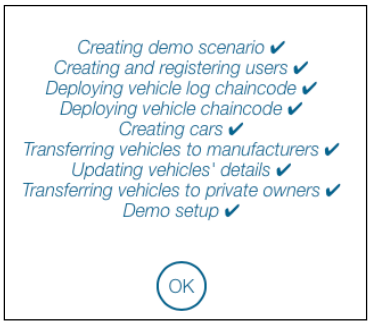
1. Click the link displayed on the route for the application to run the scenario, for example:

2. Click **Admin Console > Create Full Scenario** to load the initial set of assets into the blockchain. This will take several minutes to complete.



The scenario setup is complete when “Demo setup” is displayed.

If an error occurs when creating the scenario, read “Remove the sample application” at the end of this document for instructions about how to delete the service.



Step 2. Run the asset transfer and disposal scenarios

In the following scenarios, you discover how blockchain technology can be used to track ownership of an asset across multiple parties. The scenario describes how blockchain technology can be used to model the lifecycle of vehicle ownership and control between the following participants:

- Manufacturer to Dealership
- Dealership to Leasing Company
- Leasing Company to Lessee
- Leasing Company to Scrap Merchant

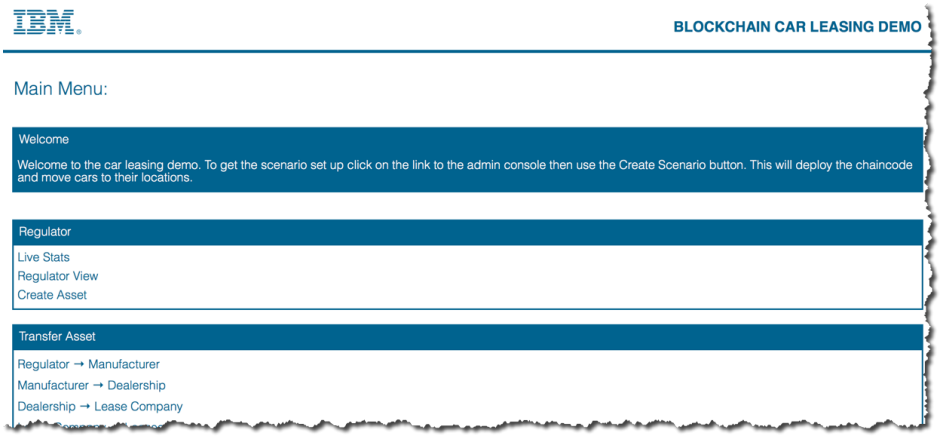
The Scrap Merchant's role in this scenario also demonstrates how asset disposal can be represented by using blockchain technology.

In this business scenario, each participant has entered into a business agreement with each other and all parties are known and trusted by each other. The process of transferring vehicles has been negotiated and agreed to by all participants. As a result, the order in which the processes take place is strictly defined within the demo showing that, for example, a Manufacturer cannot transfer directly to a Lessee by skipping the Dealership and Leasing Company transfers.

This demo has been simplified so that by default each role, such as the Manufacturer, shows only one participant, such as Martin (Manufacturer: Alfa Romeo), in the transfer assets page.

2.2. Start the Asset Transfer Demo

1. Click **OK** after the demo setup is completed and click **Home** to return to the home page of the Car Leasing Demo.



2.3. Scenario: Transfer: Manufacturer to Dealership

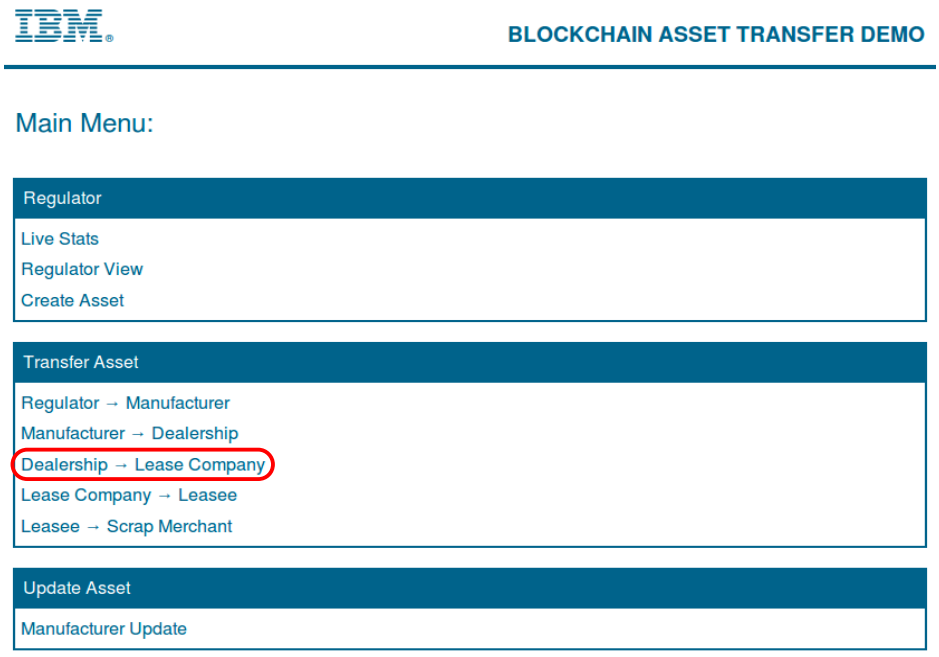
In this scenario, you transfer the ownership of a vehicle from a Manufacturer to a Dealership (known as “Beechvale Group”) by using the blockchain.

Before transferring the vehicle to the dealership, you verify which assets the target dealership currently owns.

2.3.1. Verify the target Dealership Assets

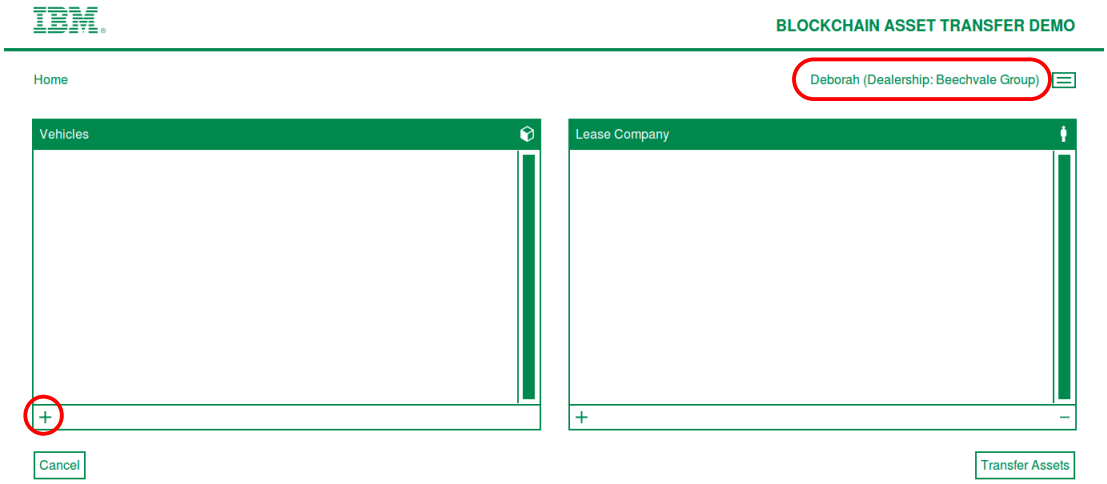
In this section, you act as a Dealership and verify which assets the Beechvale Group dealership owns and is permitted to transfer.

1. From the main demo asset page, click **Dealership > Lease Company**.



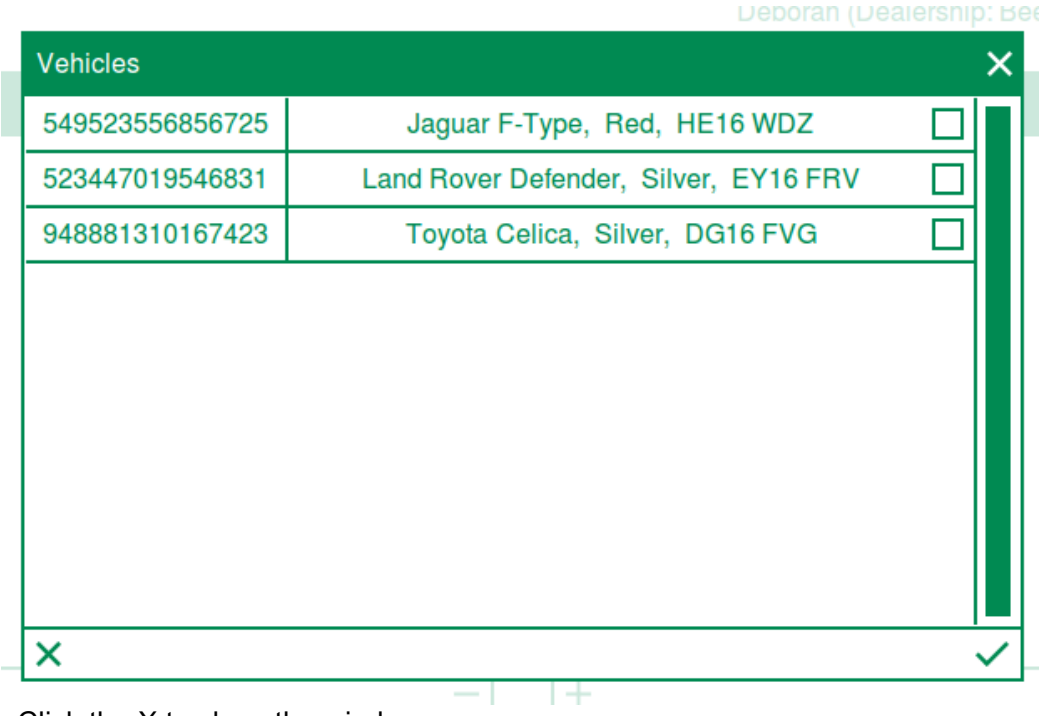
2. In the Dealership Transfer window, click the plus sign in the Vehicles window to verify which vehicles are owned by the dealership known as Beechvale Group according to the blockchain.

   The demo application interrogates the blockchain to identify all vehicles that are owned by the dealership and will present a window with the results. The dealership user Deborah will see only vehicles owned by the dealership.



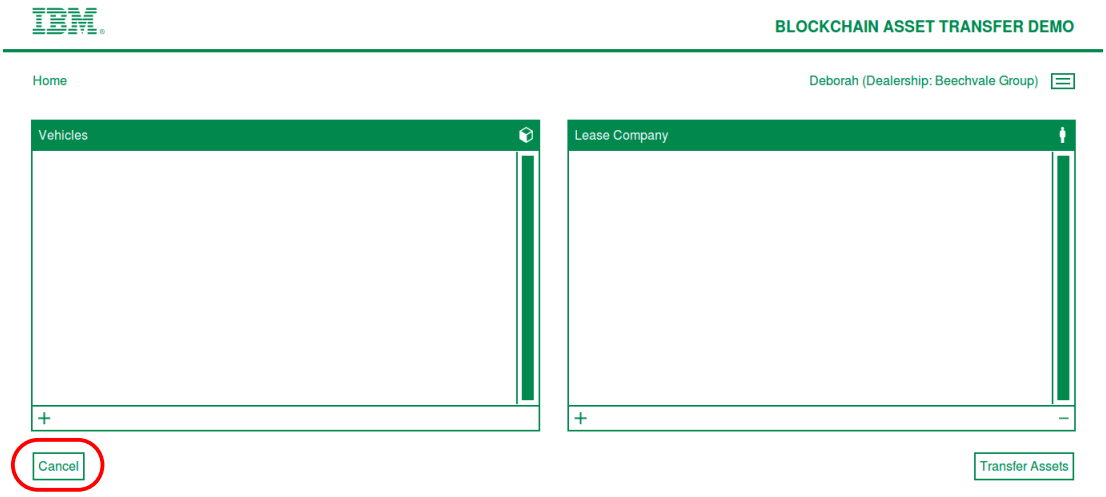
3. In the results window, verify the number of cars and their make. The number in the first column of this table is used to model the vehicle identification number (VIN).

   According to the blockchain, the Beechvale Group dealership owns three cars, none of which are Alfa Romeos.



4. Click the X to close the window.

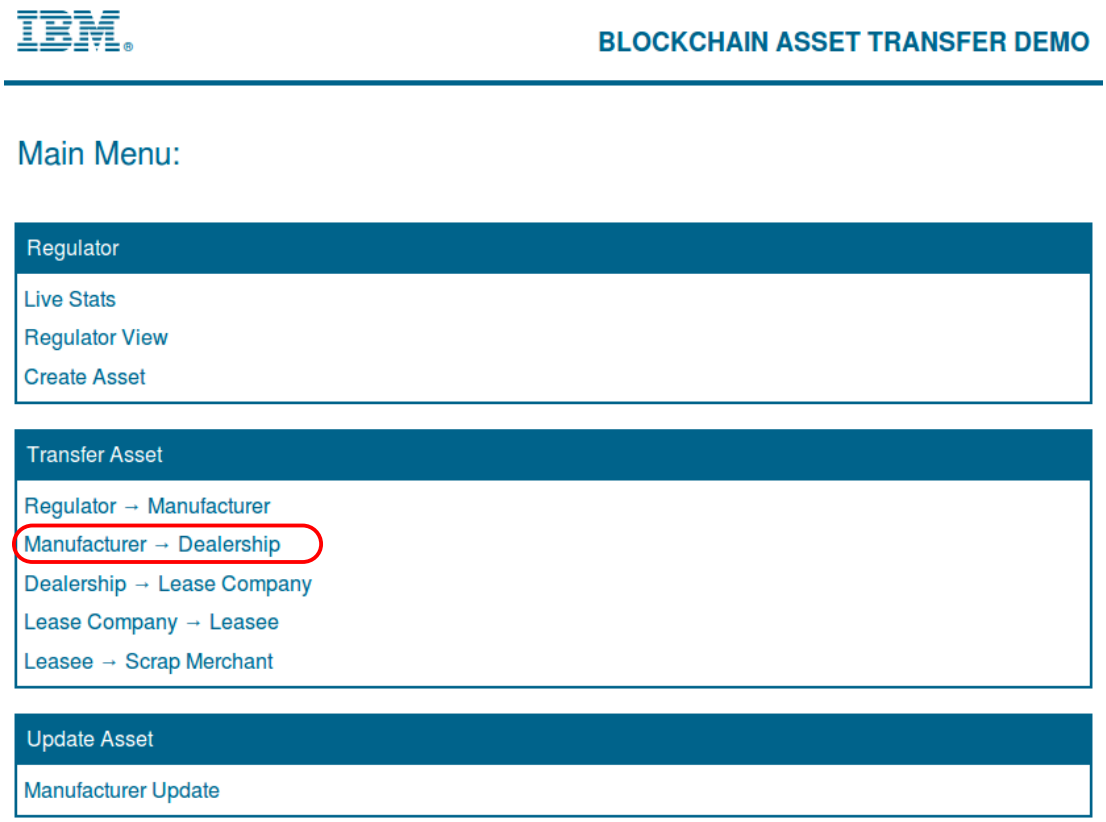
5. Click **Cancel** on the Dealership page to return to the Main demo menu.



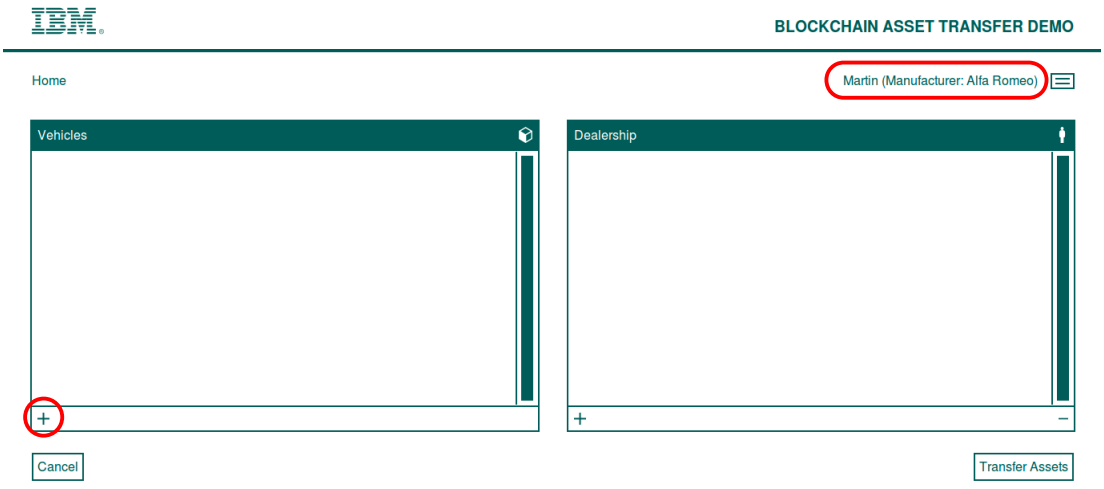
You will now transfer an Alfa Romeo car to the Beechvale Group dealership from the cars owned by Alfa Romeo (the Manufacturer).

2.3.2. Transfer the asset (from Manufacturer to Dealership)

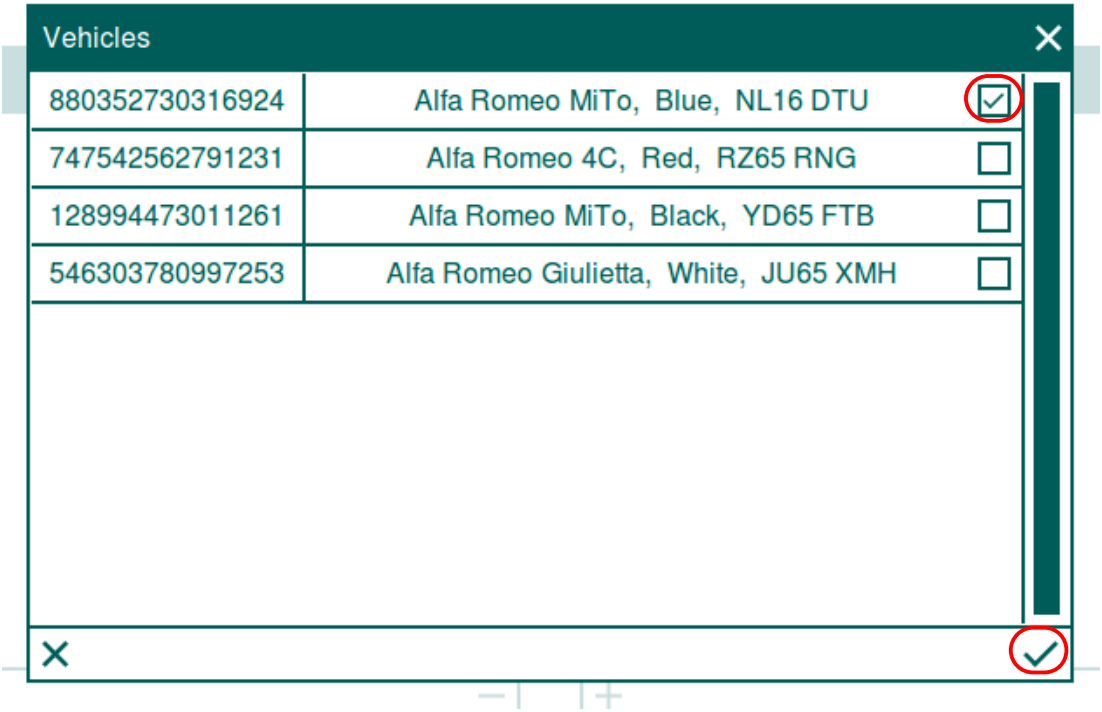
1. From the demo main menu, click **Manufacturer > Dealership** in the Transfer Asset window.



2. The Transfer Asset window shows an identity “Martin” (the manufacturer of Alfa Romeo vehicles). Click the plus sign in the Vehicles window.

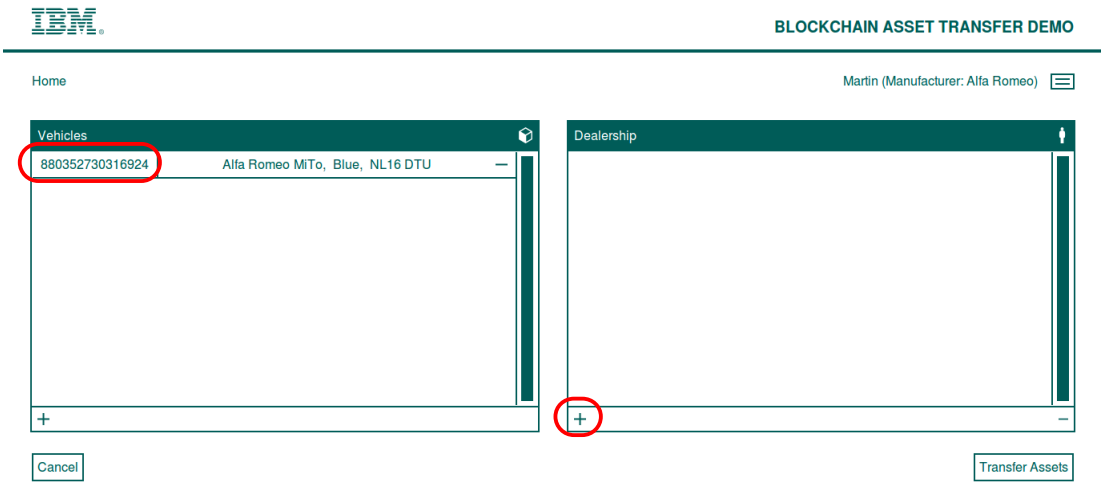


The demo asset collects details from the blockchain on cars that Martin (the Alfa Romeo manufacturer) owns and presents the results.



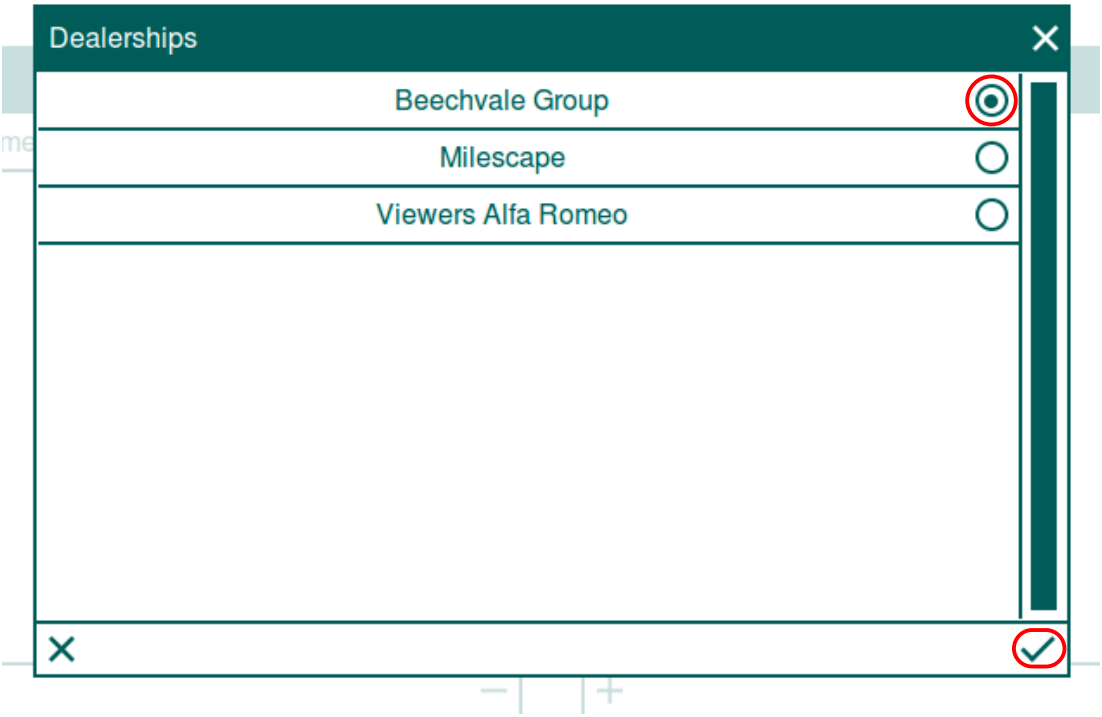
3. Click the checkbox of the first car in the list to include it in the transfer request.
4. Click the checkmark at the bottom of the list of Vehicles to save the choice.

   The Alfa Romeo with VIN number “880352730316924” now appears in the list of vehicles to be transferred:



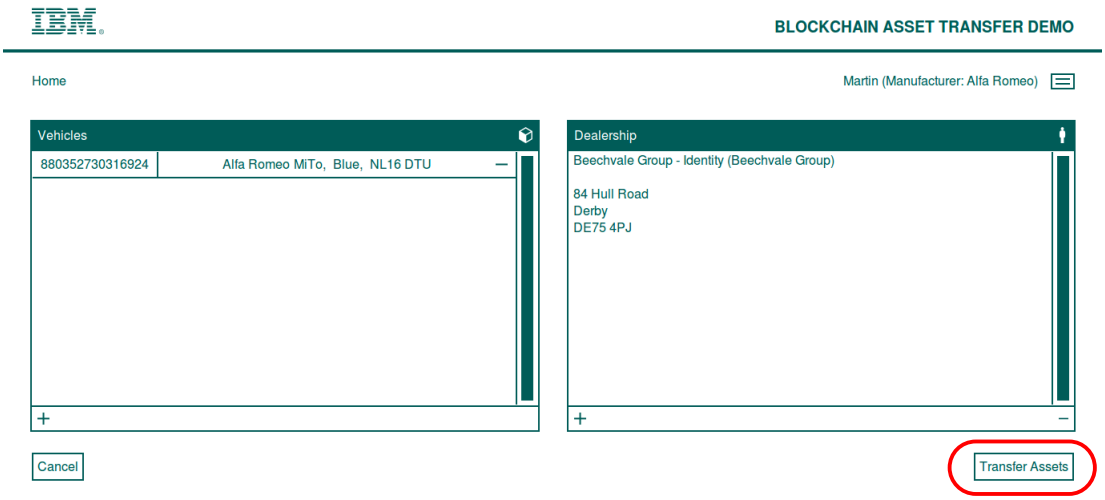
5. Click the plus sign in the Dealership window.

6. From the list of Dealerships, choose Beechvale Group and then click the checkmark to confirm your choice.

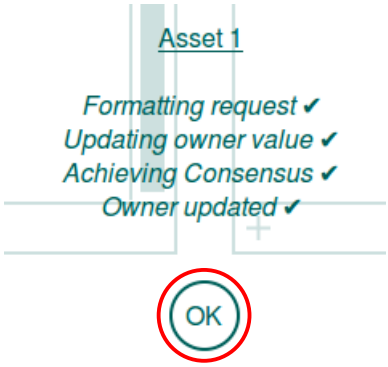


The Transfer menu should now have the following details.

7. Click **Transfer Assets**.

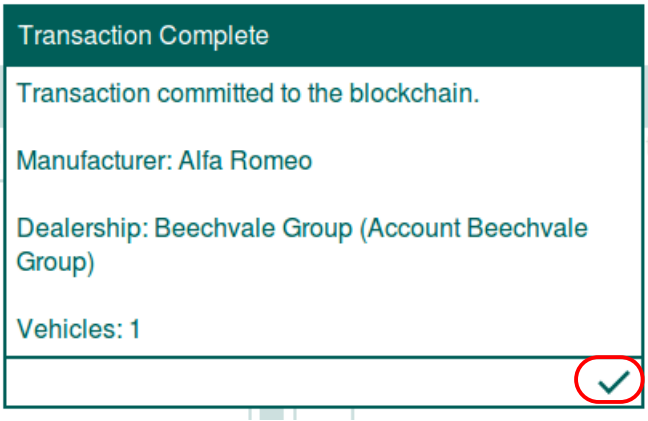


The demo asset highlights what it is doing with the blockchain in the status window.



The demo asset updates the owner of the contract based on the Dealership specified in the transfer request. The demo asset then waits for the open source blockchain technology to declare "consensus" shown by the stage "Achieving Consensus." After consensus is achieved, the transfer request is "committed" to the blockchain. You can then confirm that the information update was successful as shown by the confirmation message "Owner Updated."

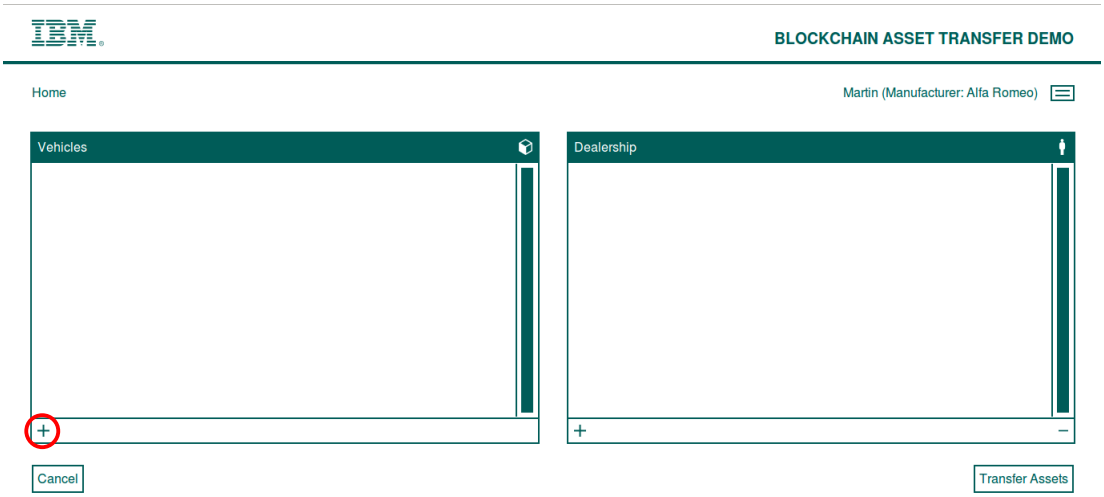
8. Click **OK** to acknowledge the transfer status messages.
9. Click the checkmark to acknowledge the Transaction Complete message.



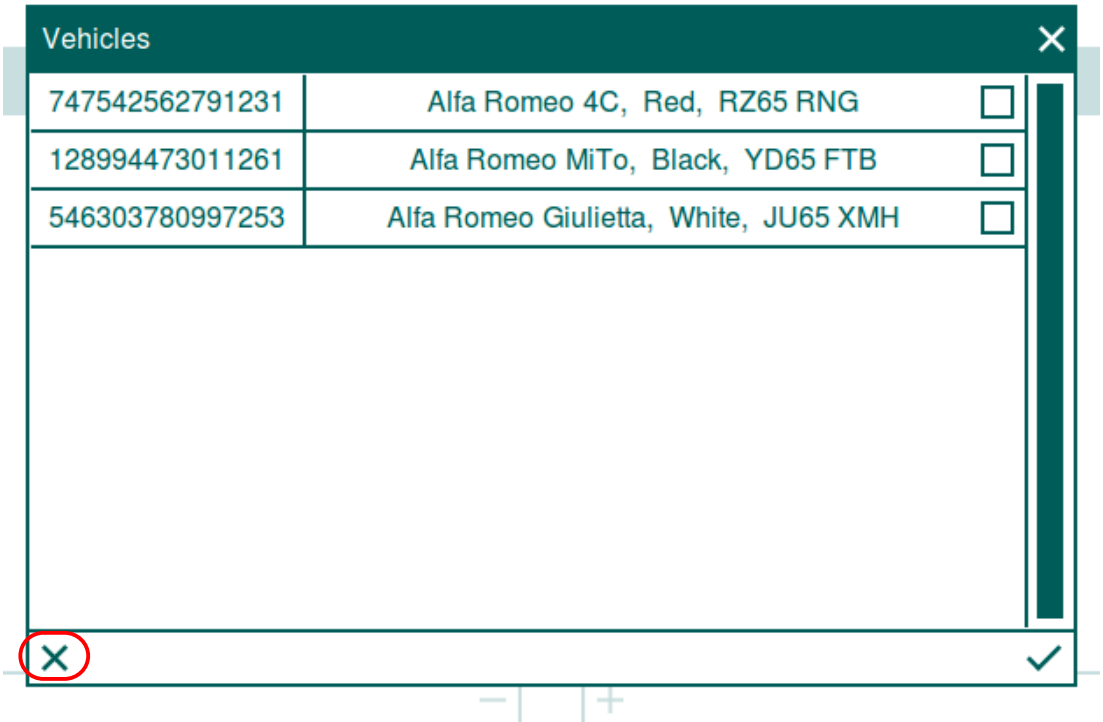
2.3.3. Verify that Manufacturer has no control over transferred asset

The manufacturer's ability to control the asset has now been removed.

1. Click the plus sign in the Vehicles window to verify that the manufacturer can no longer see the asset that you transferred.



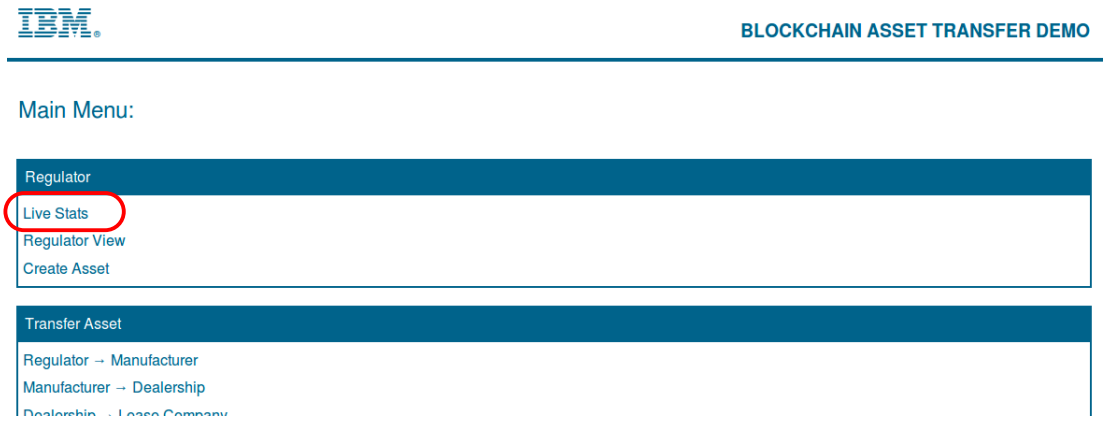
2. The manufacturer now controls only three assets; the transferred vehicle is no longer visible to the manufacturer. Click the X to close the window.



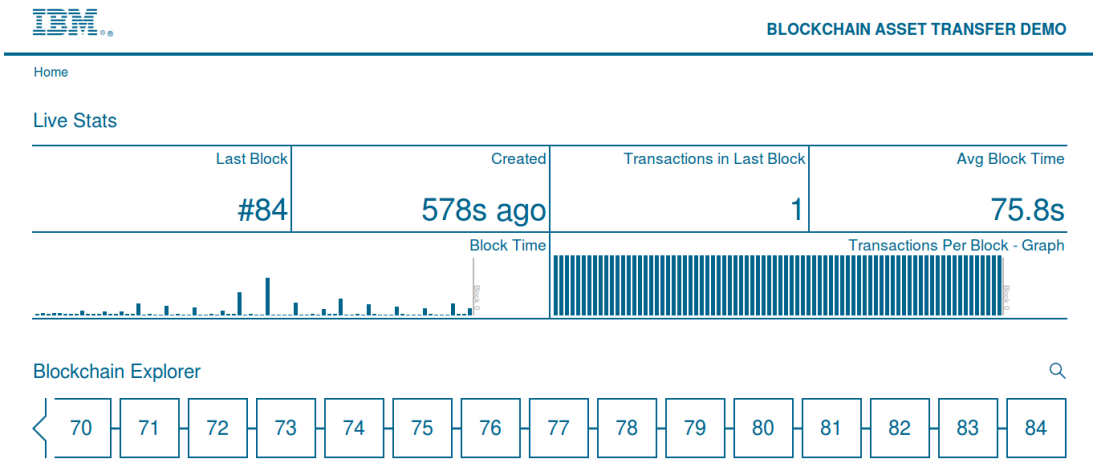
3. Click **Cancel** to return to the application main menu.

2.4. Scenario: View the blockchain activity

1. From the demo asset main menu, click **Live Stats**.



The blockchain statistics page shows the transfer activity as a vertical bar in the Transactions window.



- **Last Block:** specifies what the block number is of the last committed block.
- **Created:** explains how long ago since the last block was committed.
- **Transactions in Last Block:** explains how many transactions are in the last block.
- **Avg Block Time:** shows the average time between each block being committed.
- **Block Time:** a graph showing how much time occurred between each block. It also shows `Block 0` if the scale allows.
- **Transactions Per Block**: a graph that shows how many transactions were in each block. It also shows `Block 0` if the scale allows.
- **Blockchain Explorer**: allows you to look at a specific block's details in the blockchain. You will see a more detailed explanation in the next lab.

2. Click **Home** to return to the application main menu.

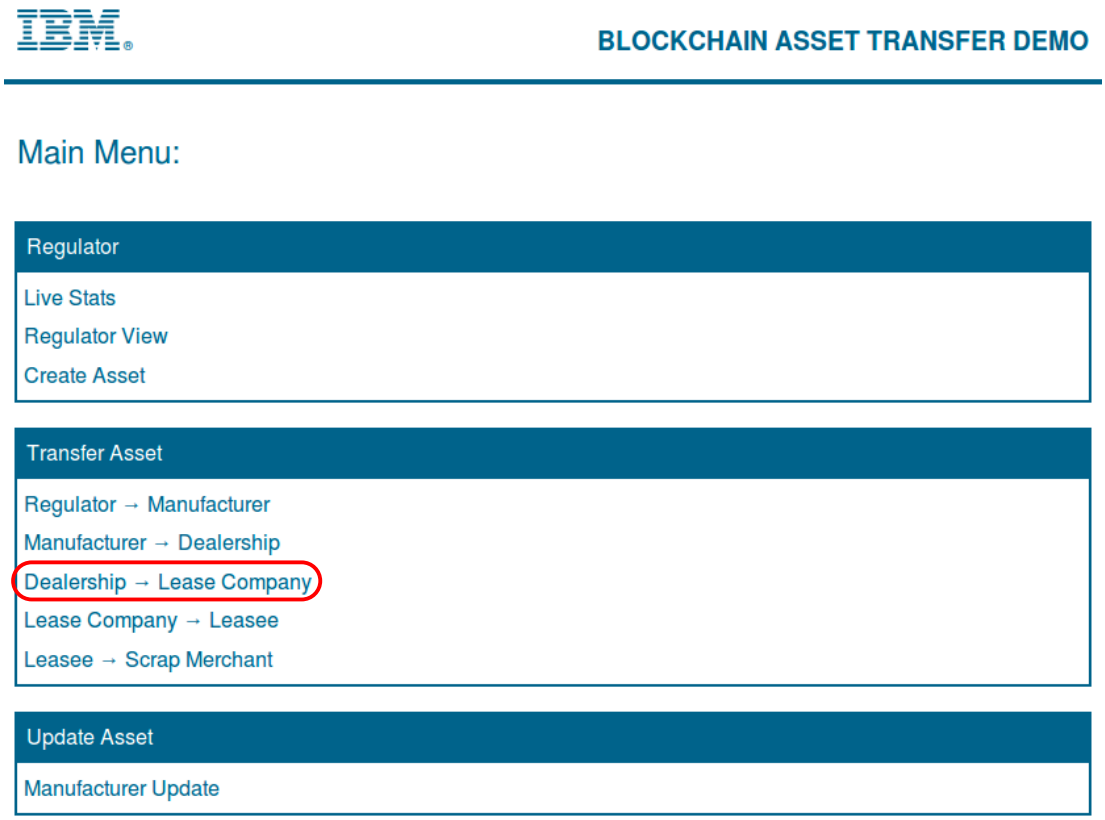
2.5. Scenario: Transfer: Dealership to Leasing Company

In this scenario, you act as the Dealer. First, verify that the asset that you transferred earlier is now available to you to transfer. Then, transfer the asset to the Leasing Company.

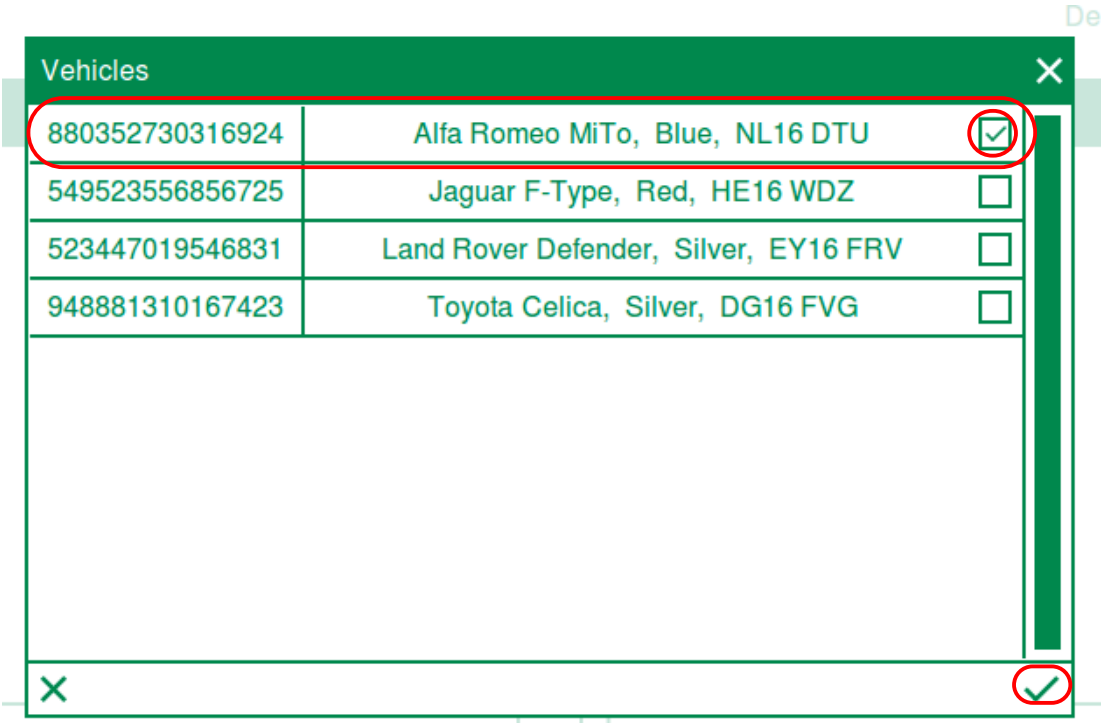
2.5.1. Verify the Dealership can now control the asset

In the previous section, you transferred the ownership of the vehicle 880352730316924 from the Alfa Romeo manufacturer to the dealership Beechvale Group. The vehicle now appears in the list of vehicles that Beechvale Group is able to control.

1. From the demo Main Menu click **Dealership > Lease Company**.

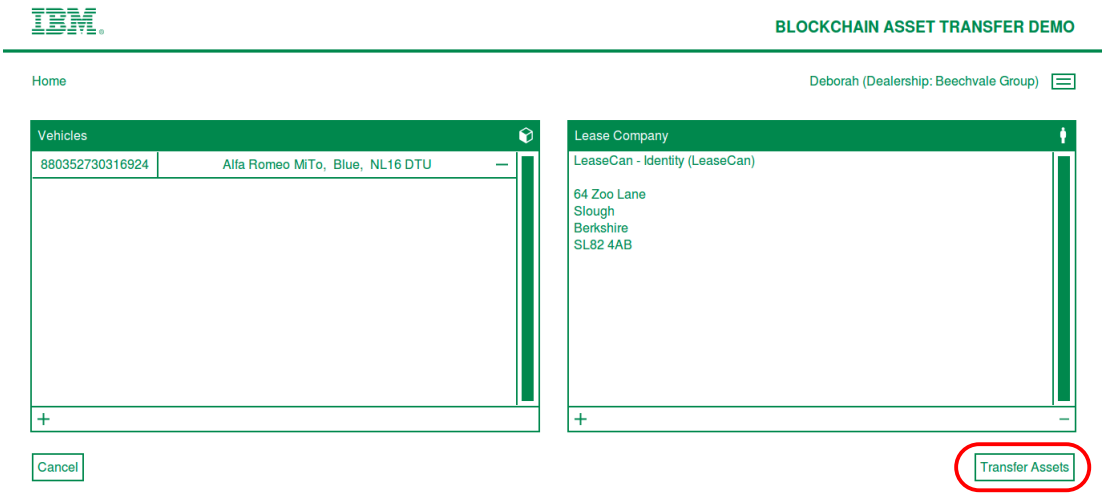


1. In the Dealership page, click the plus sign in the Vehicles window to show the list of vehicles controlled by the dealer. You should see that the vehicle 880352730316924 is now under the control of the Dealership. Select the vehicle 880352730316924 and click the checkmark at the bottom of the window.

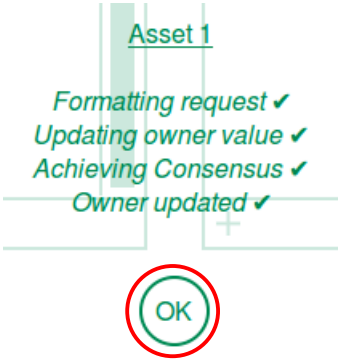


2. In the Lease Company window, click the plus sign and then select **LeaseCan** in the Lease Companies window.

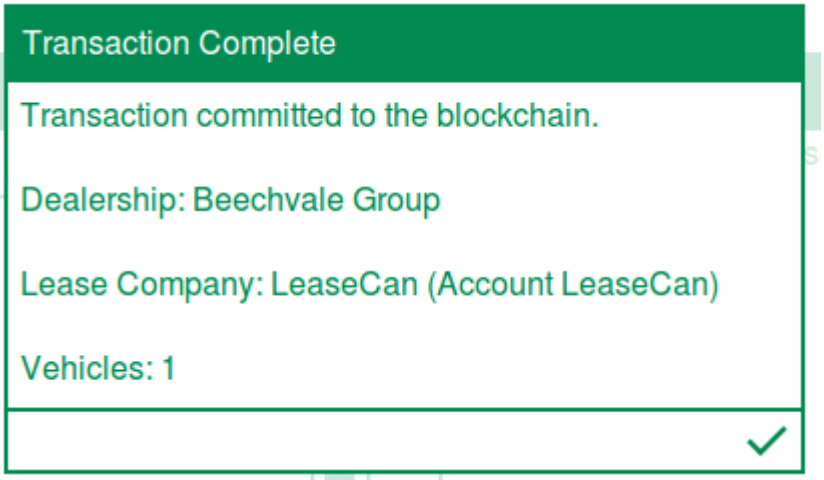
3. Verify that the Vehicle and Lease Company details are correct and then click **Transfer Assets**.



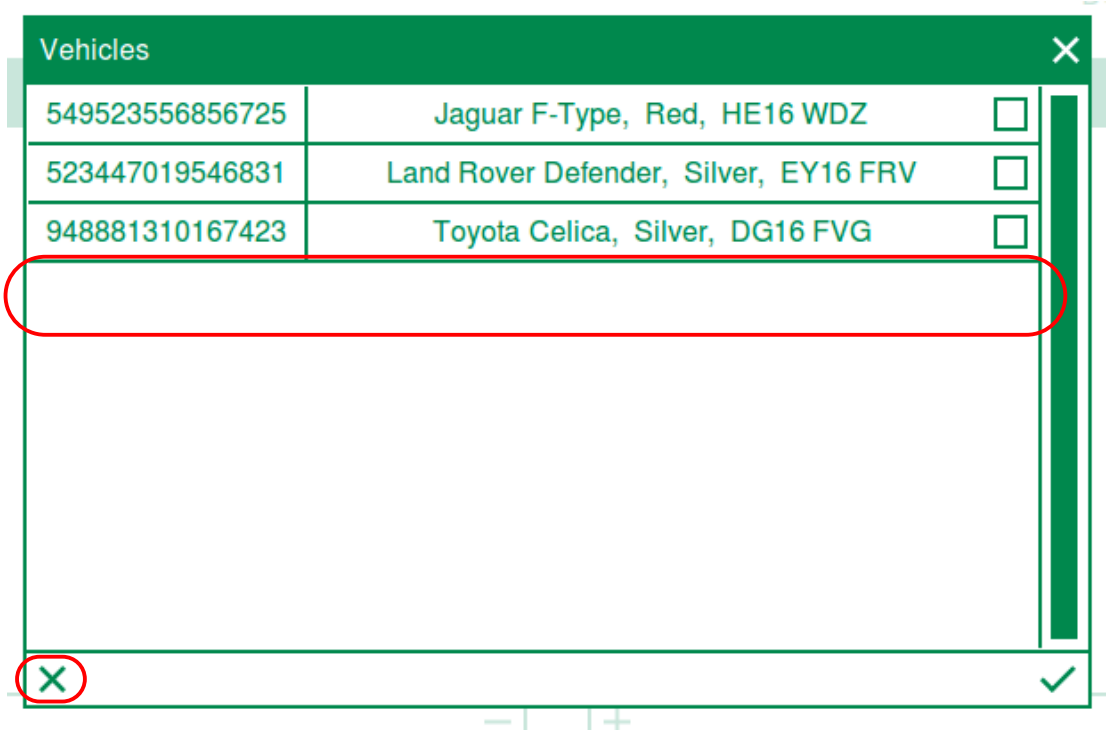
As with the previous transfer, the demo extracts the Contract details that are used to define the vehicle, updates the owner, waits for consensus to be achieved, and then confirms the update was successful as shown by the message “Owner Updated.”



4. Click **OK**.
5. Close the Transaction Complete message by clicking the checkmark.



4. Click the plus sign in the Vehicles window to verify that the asset is no longer available to the Beechvale Group dealership. You now see only three vehicles. The vehicle that you just transferred to the Lease Company should not appear.



5. Close this window and click **Cancel** to exit the Dealership's Transfer Assets page.

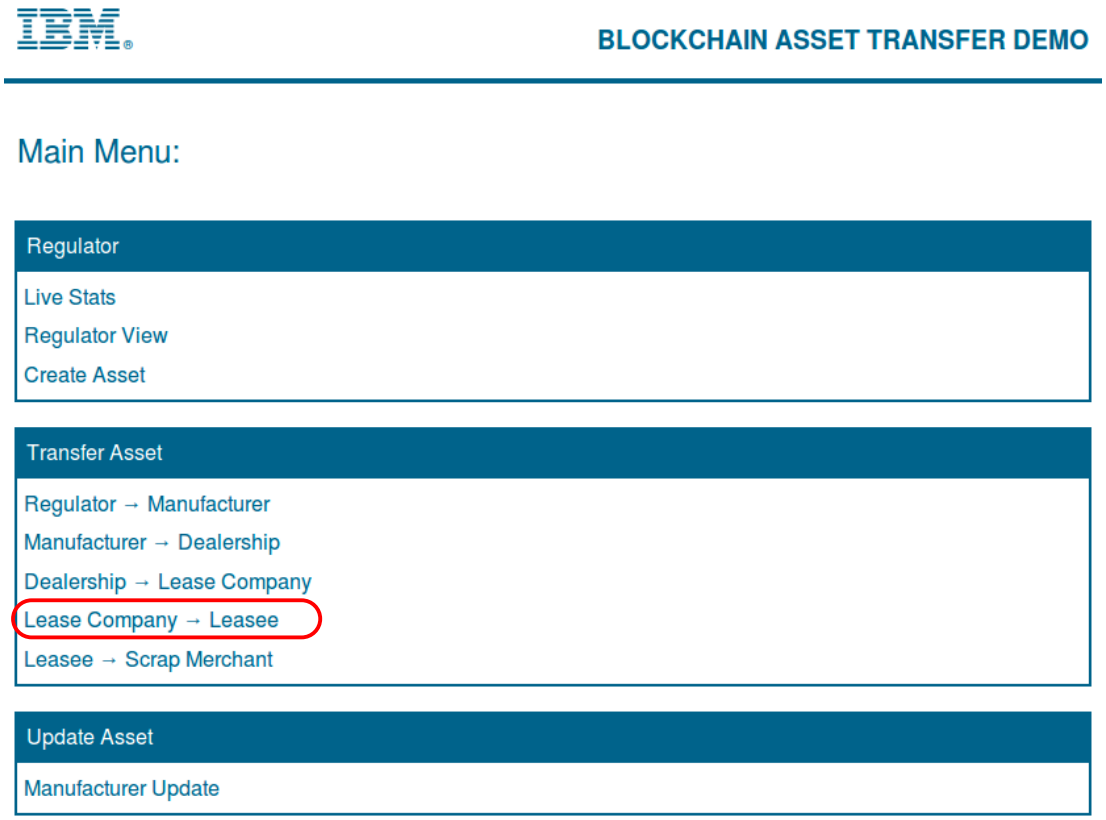
2.6. Scenario: Transfer: Lease Company to Lessee

In this scenario, you act as the Lease Company. First, verify that the asset you transferred earlier is now available to you acting as the Lease Company to transfer then you will transfer the asset to a Lessee.

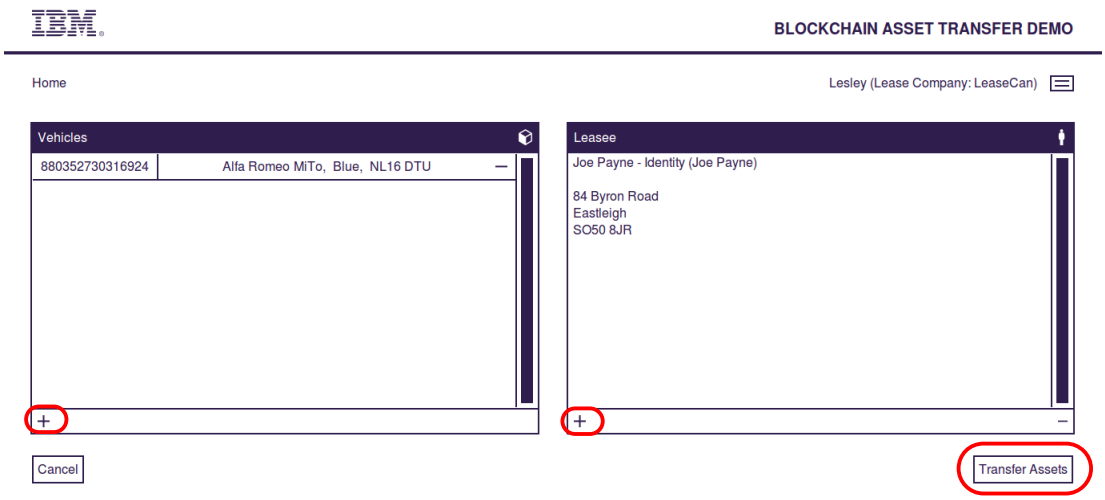
2.6.1. Verify the Lease Company can now control the asset

In the previous section, you transferred the ownership of the vehicle 880352730316924 from the Dealership Beechvale Group to the Lease Company LeaseCan. The vehicle now appears in the list of vehicles LeaseCan is able to control.

1. From the demo Main Menu, click **Lease Company > Leasee**.



2. Use the plus signs to prepare a transfer as shown. Click **Transfer Assets** when you're ready.



3. When consensus has been achieved, click **OK**.
4. Close the Transaction Complete message by clicking the checkmark.
5. Verify that the vehicle is no longer available to the Lease Company. Click the plus sign in the Vehicles window. The vehicle 880352730316924 should not appear in the list of vehicles.
6. Click **Cancel** to return to the application main menu.

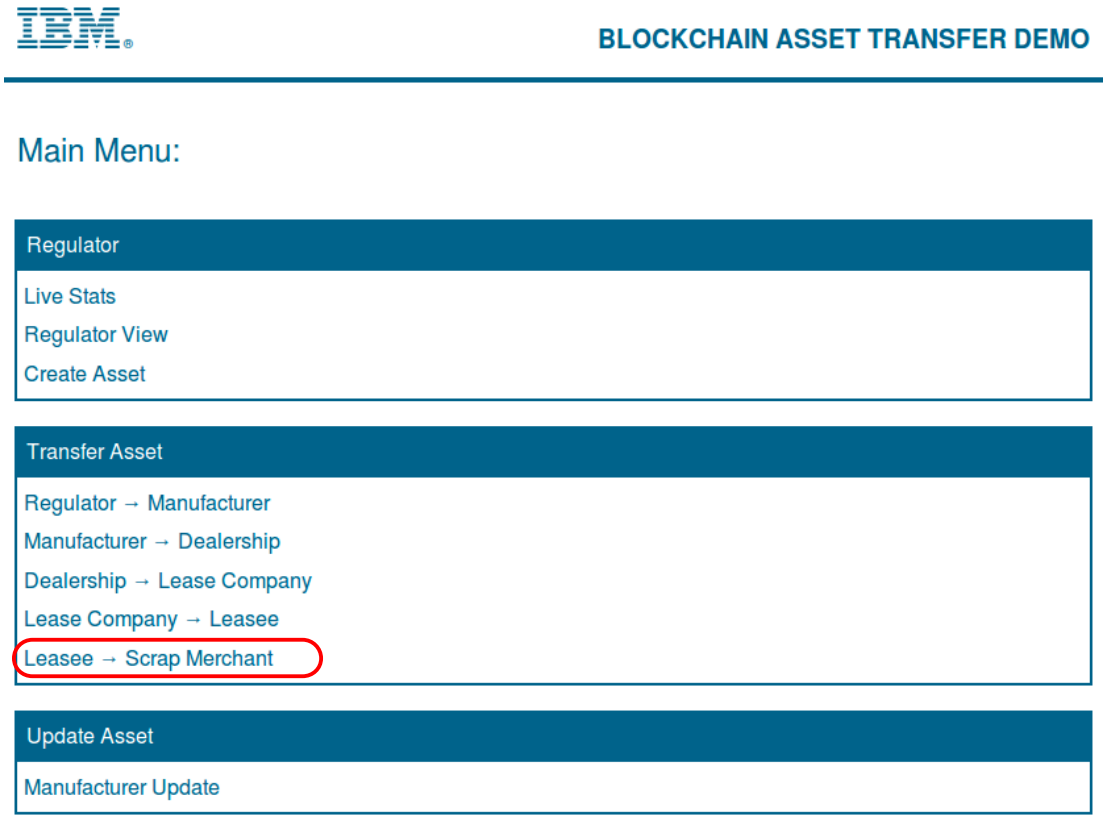
2.7. Scenario: Transfer: Lessee to Scrap Merchant

In this scenario, you act as the Lessee (individual). First, verify that the asset you transferred earlier is now available to you acting as the Lessee to transfer. Then, transfer the asset to a Scrap Merchant.

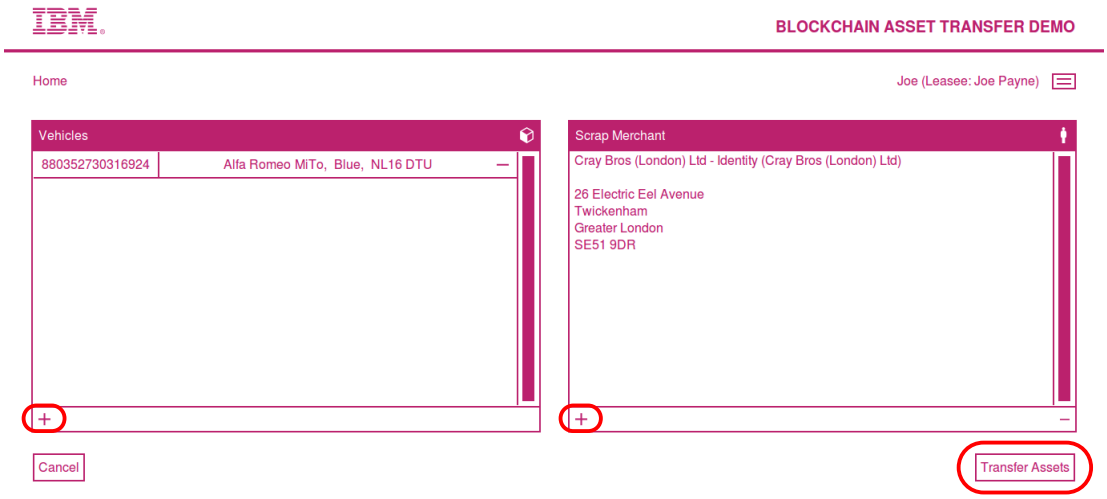
2.7.1. Verify the Lessee can now control the asset

In the previous section, you transferred the ownership of the vehicle 880352730316924 from the Lease Company LeaseCan to the individual Joe Payne. The vehicle now appears in the list of vehicles that Joe is able to control.

1. From the demo Main Menu, click **Leasee > Scrap Merchant**.



2. Use the plus signs to prepare a transfer. Click **Transfer Assets** when you're ready.



3. When consensus has been achieved, click **OK**.
4. Close the Transaction Complete message by clicking the checkmark.
5. Verify that the vehicle is no longer available to Joe Payne. Click the plus sign in the Vehicles window. The vehicle 880352730316924 should not appear in the list of vehicles.
6. Click **Cancel** to return to the application main menu.

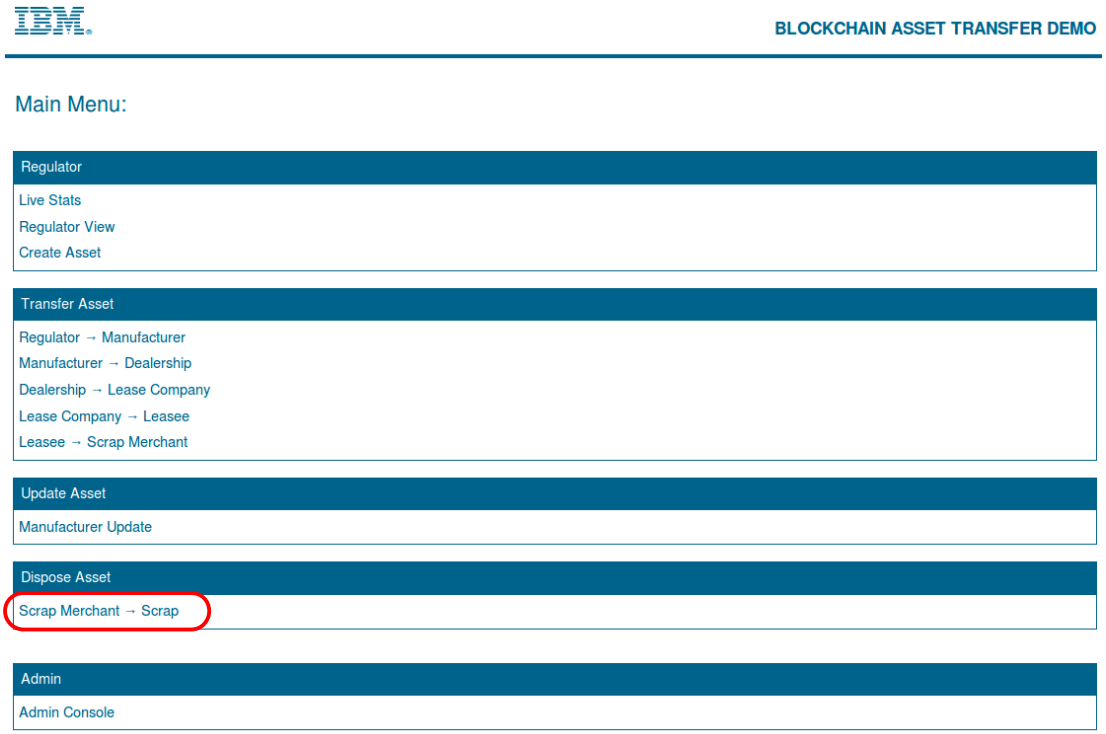
2.8. Scenario: Asset disposal: Scrap Merchant

In this scenario, you act as the Scrap Merchant (individual) and dispose of the asset. First, verify that the asset you transferred earlier is now available to you acting as the Scrap Merchant. Then, dispose of the asset.

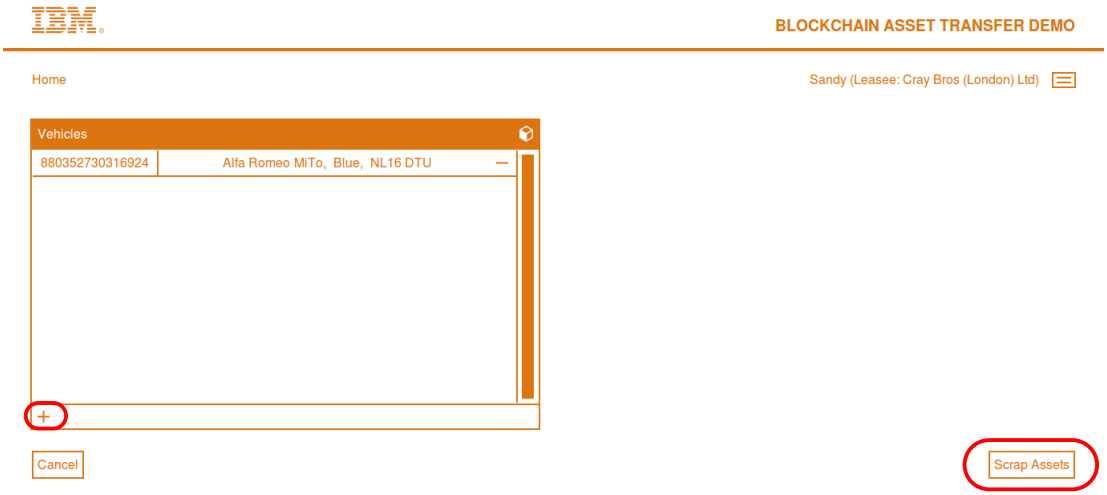
2.8.1. Verify the Scrap Merchant can control the asset

In the previous section, you transferred the ownership of the vehicle 8803527303169234 from Joe Payne to the Scrap Merchant. The vehicle now appears in the list of vehicles that the Scrap Merchant is able to control.

1. From the demo Main Menu, click **Scrap Merchant > Scrap**.



2. Use the plus sign to prepare for the disposal of the asset. Click **Scrap Assets** when you're ready. There is no destination for this page.



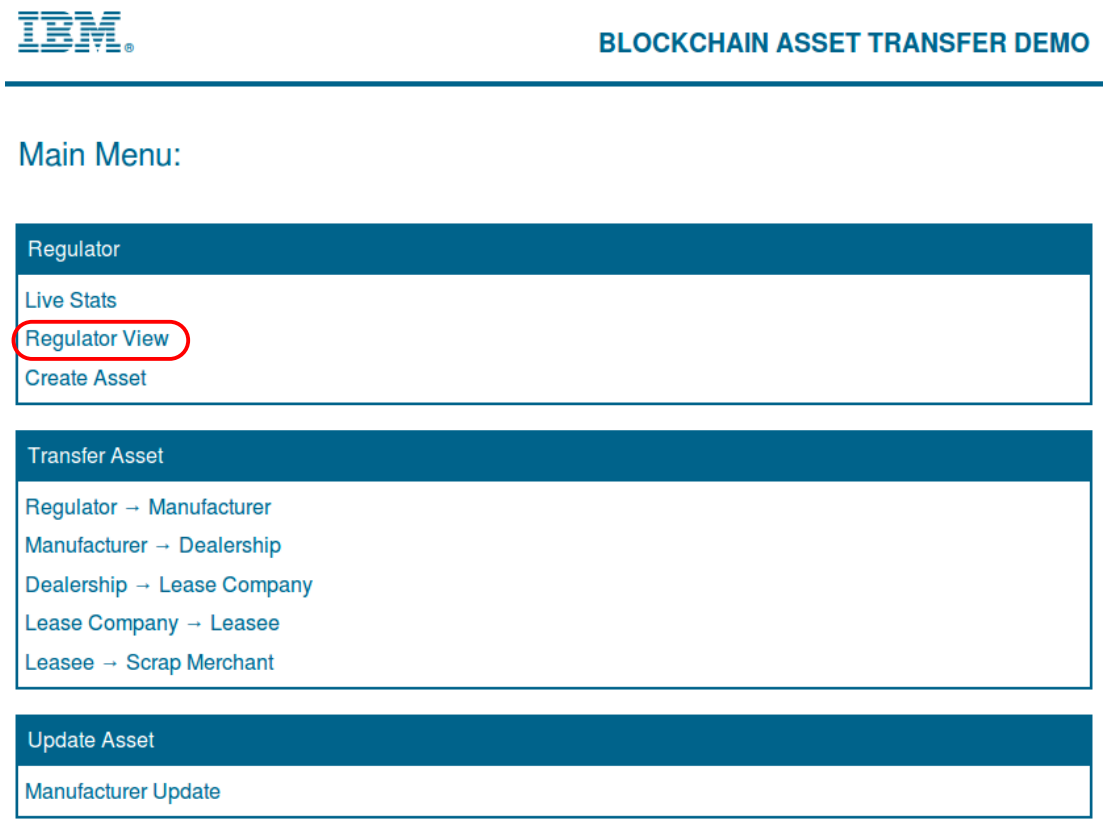
3. When consensus has been achieved, click **OK**.
4. Close the Transaction Complete message by clicking the checkmark.
5. Verify that the vehicle is no longer available to the scrap merchant. Click the plus sign in the Vehicles windows. The vehicle 880352730316924 should not appear in the list of vehicles.
6. Click **Cancel** to return to the application main menu.

2.9. Scenario: Verify transaction activity by using the Regulator view

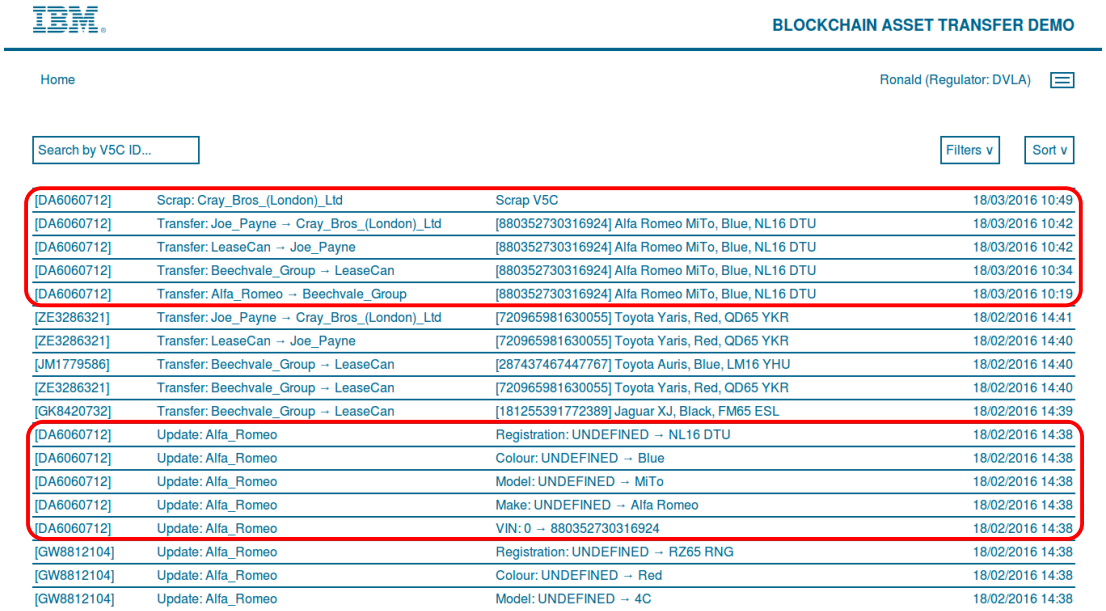
In this scenario, you act as the Regulator and view the asset transfer and disposal activity that you performed in previous steps.

The Regulator view has unrestricted access to all activities on the blockchain.

1. From the demo Main Menu, click **Regulator View**. Wait for the view to gather the activity from the blockchain.



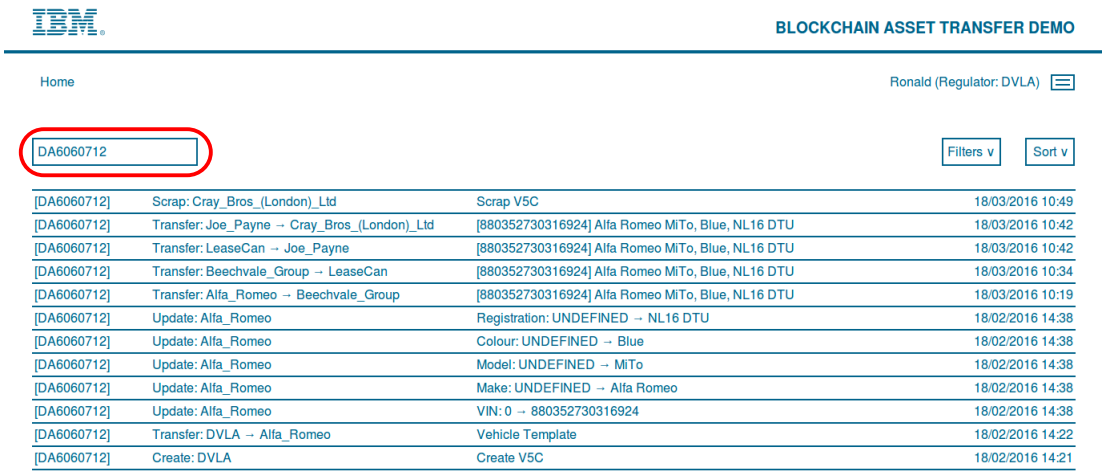
2. When the list of transactions is shown on the page, you see the activity in chronological order with the most recent activity at the top of the list of transactions.



The Regulator can see *all* blockchain transactions. The entire history of the vehicle can be seen in this view.

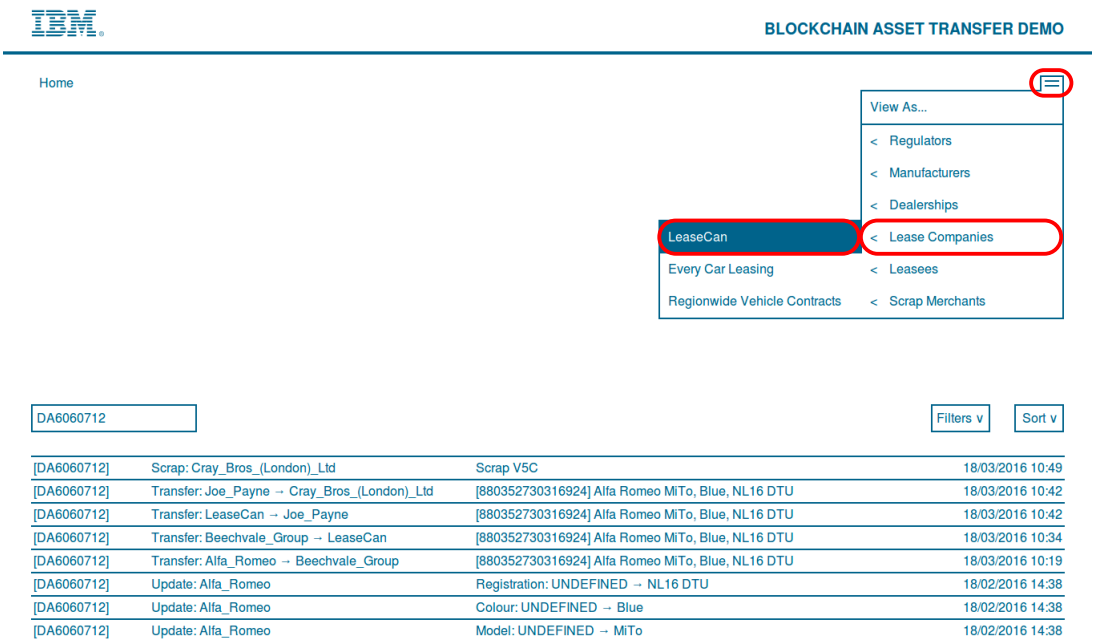
In your copy of the car leasing application, the V5C ID will be different from the one shown in the figure.

3. Copy the V5C ID from your Regulator report into the search box to show only records from the Alfa Romeo that was transferred in this lab.

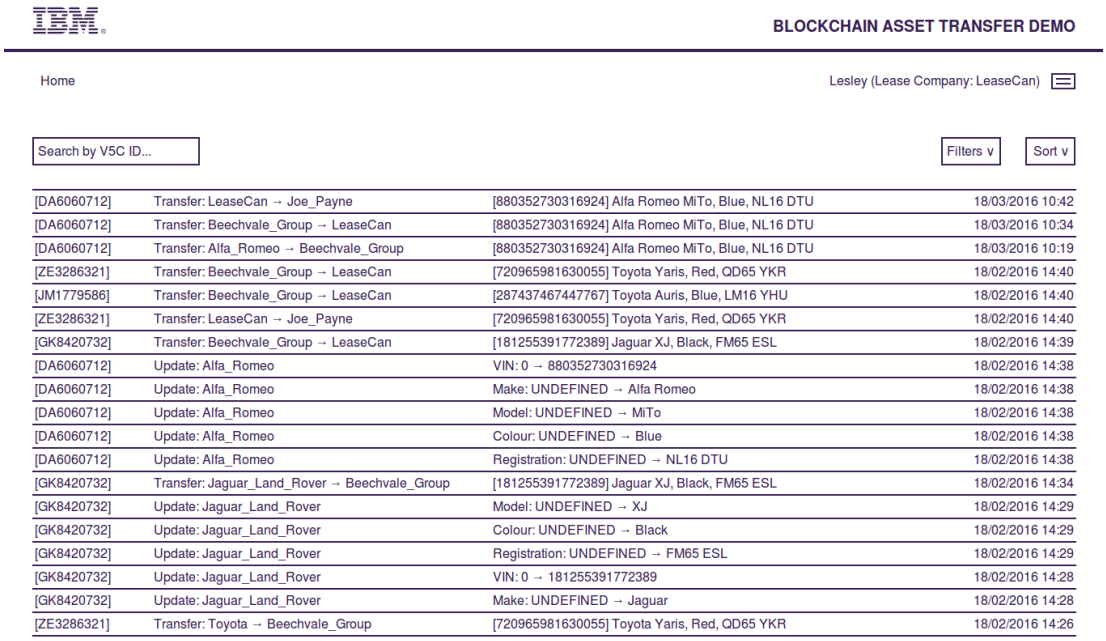


Other users can see only part of the lifecycle of the vehicle. They are able to see what happened to the vehicle before their ownership and while they owned it, but they cannot see what happened to the vehicle after they transferred it.

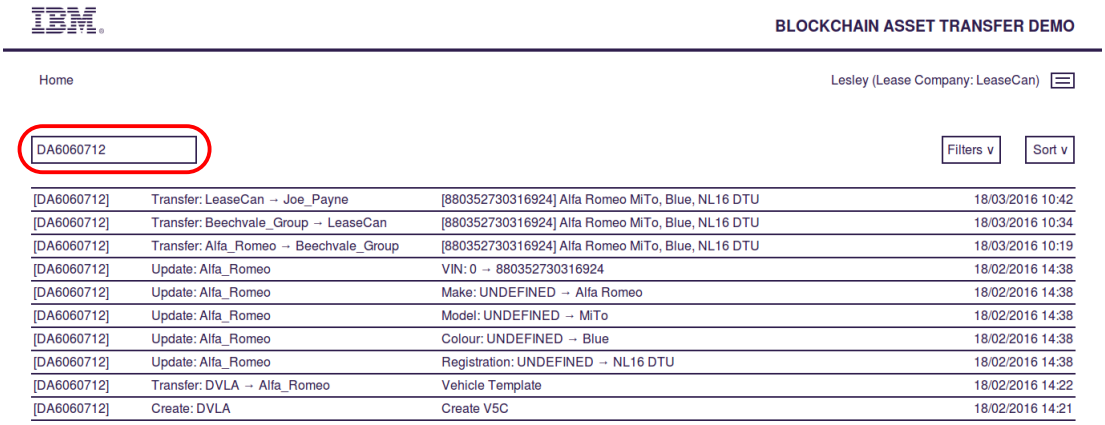
4. Click the three lines in the top right corner of the page to view the ledger as another user. In the drop-down menu, hover over **Lease Companies** and then click **LeaseCan**.



The table has now changed and although the user can see the car, he or she can't see what happened after it was transferred to Joe Payne.



4. Copy the V5C ID from your Regulator report again into the search box to show only records from the Alfa Romeo that was transferred in this lab.



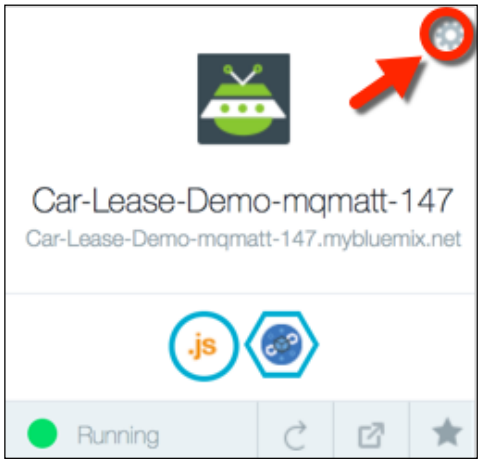
As you can see, the user can see the entire lifecycle of the car from before he or she owned it until they transferred it.

If you are planning to continue to the next lab, you will need to use this application, so do not follow the next step, “Supplemental: Remove the sample application.”

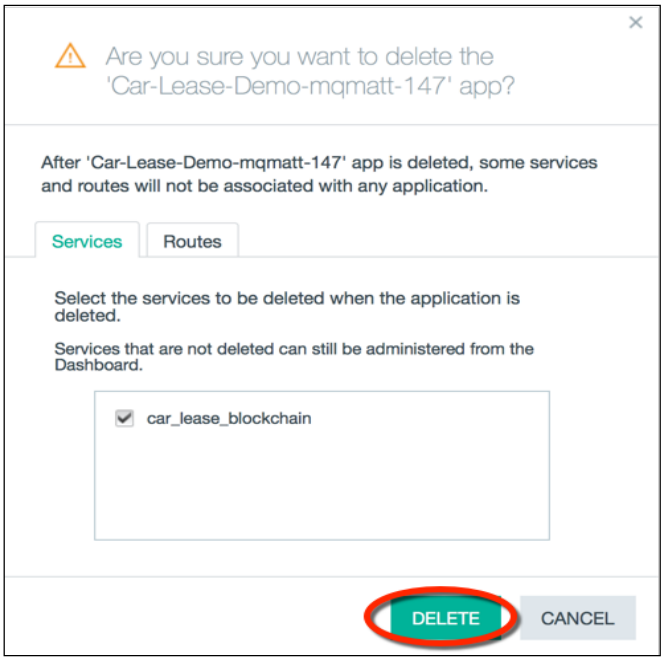
Supplemental: Remove the sample application

If the blockchain service that you created crashes, here's how you can stop and remove it.

1. Click **Dashboard** to return to the Bluemix dashboard.
2. Click the settings icon in the upper-right corner of the car lease demo application.



3. Select **Delete App** from the menu.
4. Ensure that the car_lease_blockchain service is also selected for deletion and click **Delete**.



Wait for the items to stop and be deleted. After this is done, both the application and the associated service will no longer be visible in the Bluemix dashboard.