

Azure Blockchain Service

And here we are in another chapter on our ARM Templates learning path. This time we gonna deploy a simple Web App Service with a GitHub Repository Account linked.

But let's understand a bit better how all this will work.

What is Azure Blockchain Service?

Azure Blockchain Service is a fully managed ledger service that enables users the ability to grow and operate blockchain networks at scale in Azure. By providing unified control for both infrastructure management as well as blockchain network governance, Azure Blockchain Service provides:

- Simple network deployment and operations
- Built-in consortium management
- Develop smart contracts with familiar development tools

Azure Blockchain Service is designed to support multiple ledger protocols. Currently, it provides support for the Ethereum Quorum ledger using the IBFT consensus mechanism.

These capabilities require almost no administration and all are provided at no additional cost. You can focus on app development and business logic rather than allocating time and resources to managing virtual machines and infrastructure. In addition, you can continue to develop your application with the open-source tools and platform of your choice to deliver your solutions without having to learn new skills.

Concepts

Azure Blockchain Service Consortium

Using Azure Blockchain Service, you can create private consortium blockchain networks where each blockchain network can be limited to specific participants in the network. Only participants in the private consortium blockchain network can view and interact with the blockchain. Consortium networks in Azure Blockchain Service can contain two types of member participant roles:

- **Administrator** - Privileged participants who can take consortium management actions and can participate in blockchain transactions.
- **User** - Participants who cannot take any consortium management action but can participate in blockchain transactions.

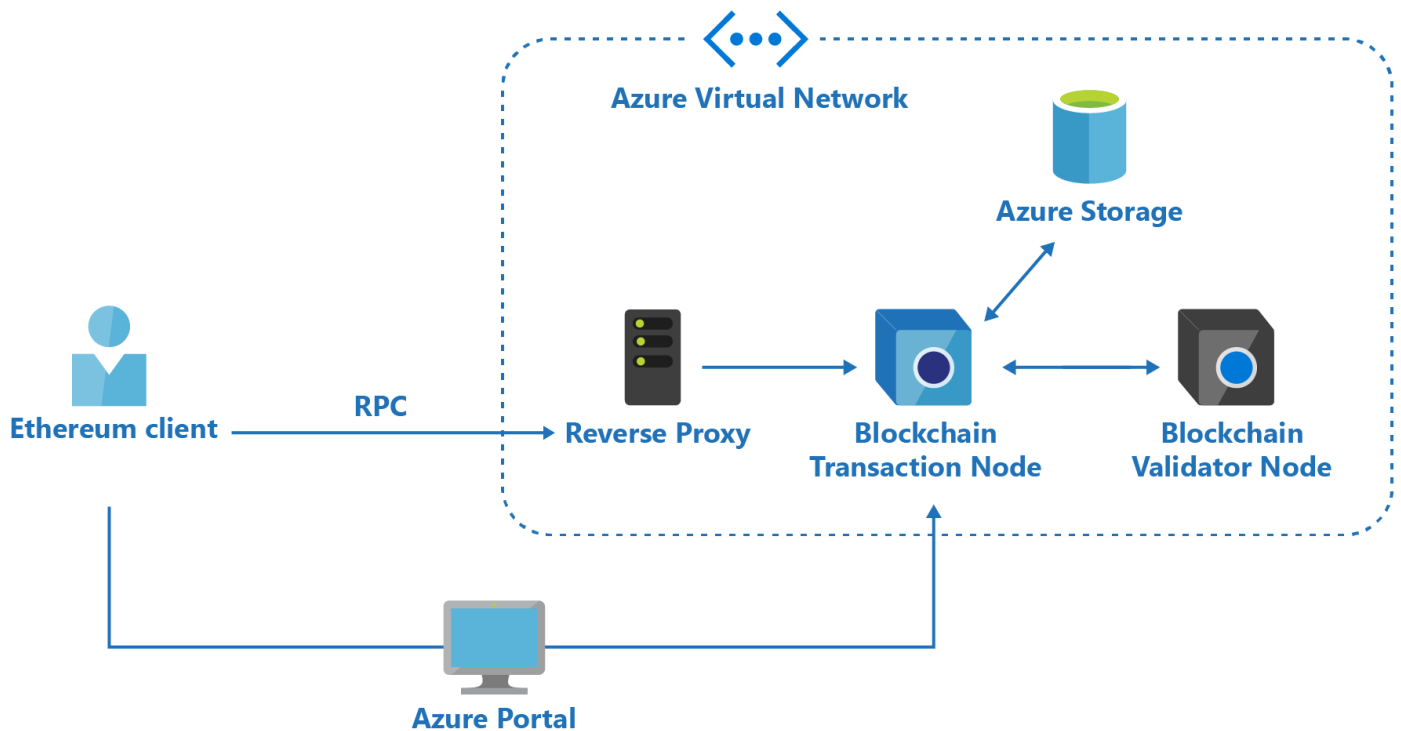
Consortium networks can be a mix of participant roles and can have an arbitrary number of each role type. There must be at least one administrator.

Azure Blockchain Service security

Azure Blockchain Service uses several Azure capabilities to keep your data secure and available. Data is secured using isolation, encryption, and authentication.

Isolation

Azure Blockchain Service resources are isolated in a private virtual network. Each transaction and validation node is a virtual machine (VM). VMs in one virtual network cannot communicate directly to VMs in a different virtual network. Isolation ensures communication remains private within the virtual network.

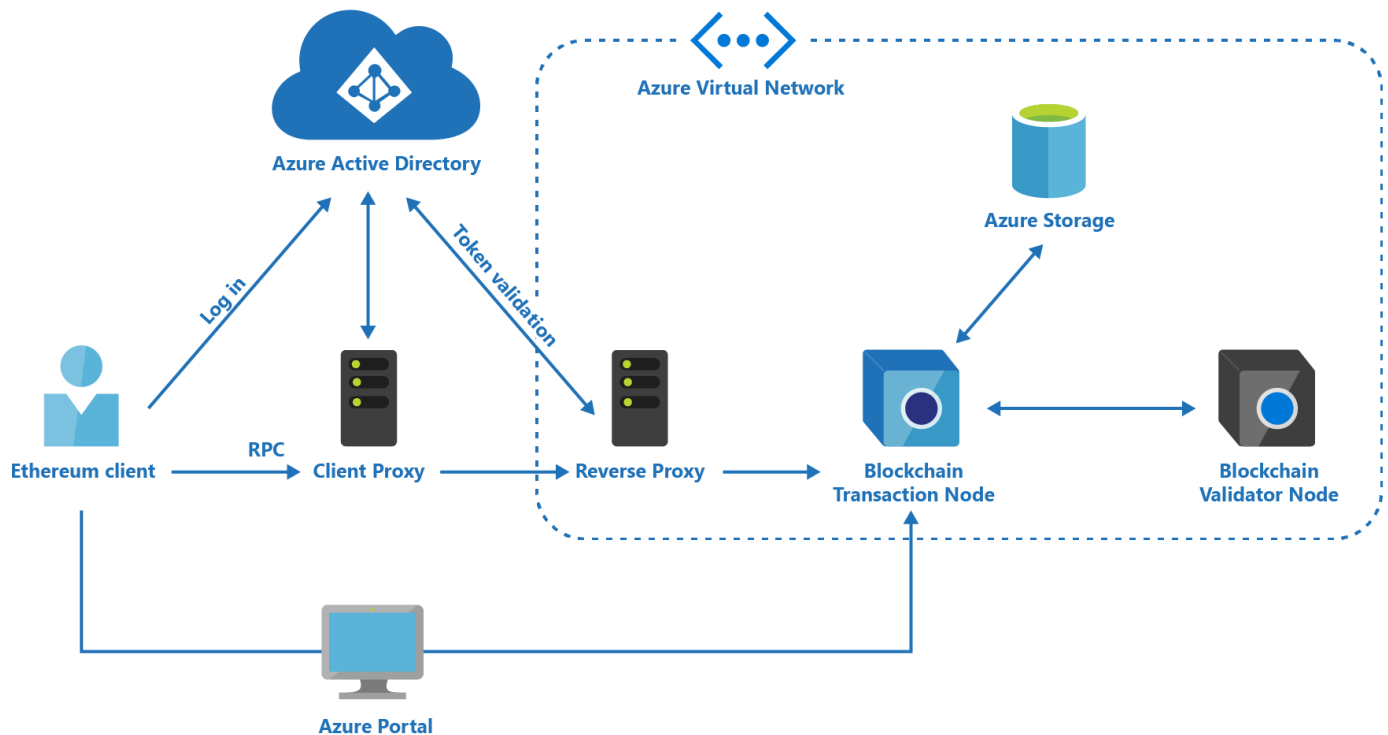


Encryption

User data is stored in Azure storage. User data is encrypted in motion and at rest for security and confidentiality. For more information, see: [Azure Storage security guide](#).

Authentication

Transactions can be sent to blockchain nodes via an RPC endpoint. Clients communicate with a transaction node using a reverse proxy server that handles user authentication and encrypts data over SSL.



Keys and Ethereum accounts

When provisioning an Azure Blockchain Service member, an Ethereum account, public, and private key pair are generated. The private key is used to send transactions to the blockchain. The Ethereum account is the last 20 bytes of the public key's hash. The Ethereum account is also called a wallet.

Now that you got a good idea of how the service works, let's dig on the template file.

The Template

Don't let the size of the template scares you. The structure is very intuitive and once that you get the gist of it, you gonna see how easier your life will be regarding creating resources on Azure.

Those are the parameters on the template, nevertheless, there are just three parameters we will need to insert. The parameters we will manipulate and inform are:

Parameter	Suggested value	Description
blockchainMemberName	<i>yourname-organization</i> i.e.: krisnatagoras- mseducation	Blockchain member name.
memberPassword	Complex password	"Password for the BlockChain Administrator. The password must be at least 12 characters long and have a lower case, upper characters, digit and a special character (Regex match)
Location	One of these Locations	"eastus", "southeastasia", "westeurope", "northeurope", "westus2", "japaneast"

Deployment

There are a few ways to deploy this template. You can use [PowerShell](#), [Azure CLI](#), [Azure Portal](#) or your favorite SDK.

For this task, we gonna deploy using Visual Code and the portal and a little surprise for you at the end. :D

For Azure CLI I choose to use the Visual Code with Azure CLI extensions, if you like, you can find more information [here](#). But bare in mind that you don't need to use the Visual Code, you can stick with the old good always present **Command Line** on Windows or any **bash terminal**.

Using Azure CLI with Visual Code

type on the terminal windows: **az login**

The screenshot shows the Visual Studio Code editor with two tabs: `azuredeploy.json` and `azuredeploy.parameters.json`. The `azuredeploy.json` file is open, displaying a JSON schema for an Azure deployment template. The schema includes parameters for `siteName`, `repoURL`, `branch`, and `location`. The `branch` parameter is currently selected, showing its default value as `master`. Below the editor, the `TERMINAL` panel is active, showing the output of the `az login` command. The terminal output indicates that the user has successfully logged in and provides information about the current subscription.

```
1 {
2   "$schema": "https://schema.management.azure.com/schemas/2015-01-01/deploymentTemplate.json#",
3   "contentVersion": "1.0.0.0",
4   "parameters": {
5     "siteName": {
6       "type": "string",
7       "metadata": {
8         "description": "The name of the web app that you wish to create."
9       }
10    },
11    "repoURL": {
12      "type": "string",
13      "metadata": {
14        "description": "The URL for the GitHub repository that contains the project to deploy."
15      }
16    },
17    "branch": {
18      "type": "string",
19      "defaultValue": "master",
20      "metadata": {
21        "description": "The branch of the GitHub repository to use."
22      }
23    },
24    "location": {
25      "type": "string",
26      "defaultValue": "[resourceGroup().location]",
27      "metadata": {
28        "description": "Location for all resources."
29      }
30    }
31  }
32 }
```

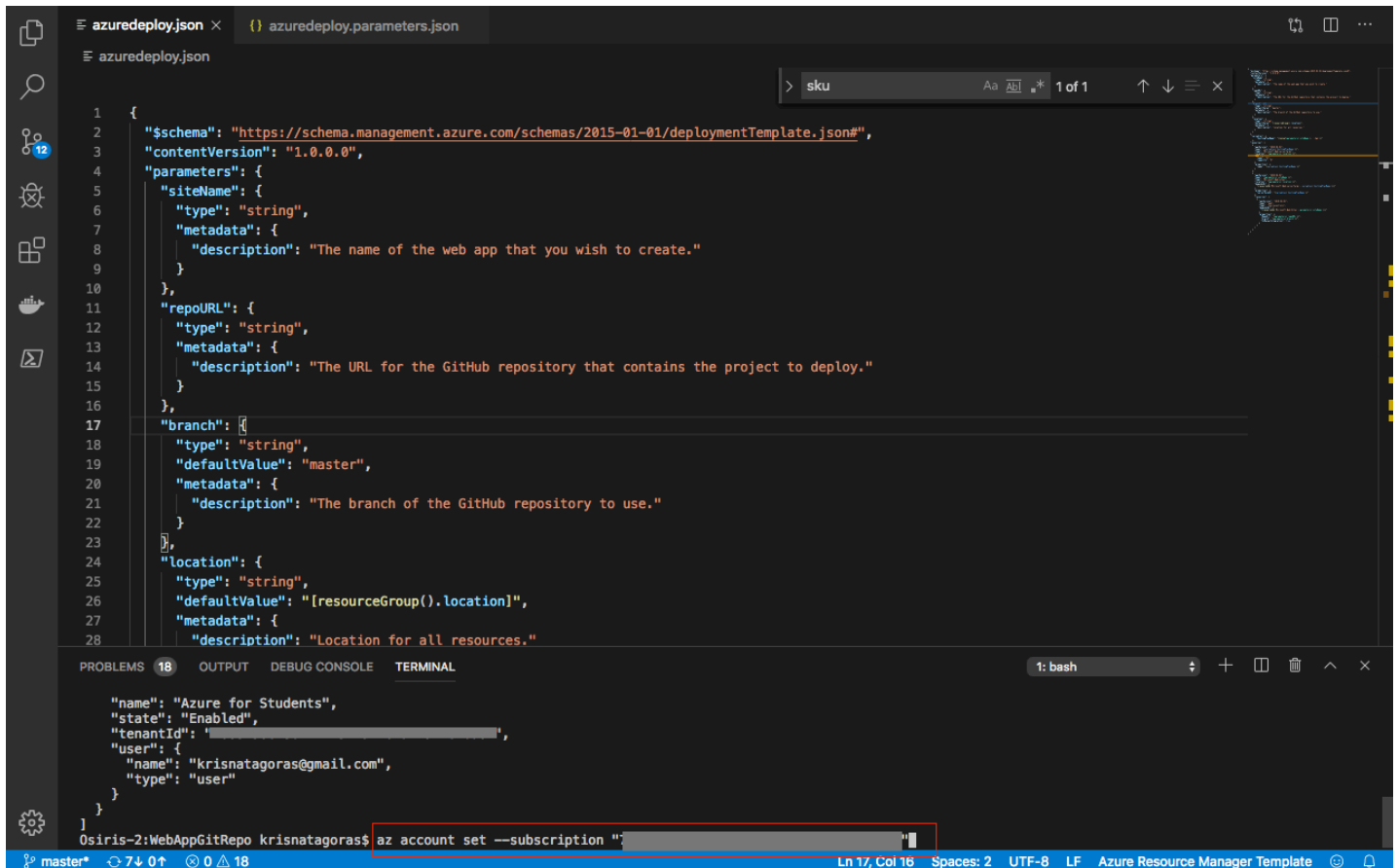
```
Osiris-2:WebAppGitRepo krisnatagorass$ az login
Note, we have launched a browser for you to login. For old experience with device code, use "az login --use-device-code"
You have logged in. Now let us find all the subscriptions to which you have access...
[
  {
    "cloudName": "AzureCloud",
    "id": "xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx",
    "isDefault": false,
    "name": "Free Trial",
    "state": "Enabled",
  }
]
```

You gonna be redirected to the Azure Portal where you can use your credentials to login into.

After login, you gonna have your credentials.

In order to set the right subscription, you can use the following command:

az account set --subscription "< your subscription id >"



```
1 {
2   "$schema": "https://schema.management.azure.com/schemas/2015-01-01/deploymentTemplate.json#",
3   "contentVersion": "1.0.0.0",
4   "parameters": {
5     "siteName": {
6       "type": "string",
7       "metadata": {
8         "description": "The name of the web app that you wish to create."
9       }
10    },
11    "repoURL": {
12      "type": "string",
13      "metadata": {
14        "description": "The URL for the GitHub repository that contains the project to deploy."
15      }
16    },
17    "branch": {
18      "type": "string",
19      "defaultValue": "master",
20      "metadata": {
21        "description": "The branch of the GitHub repository to use."
22      }
23    },
24    "location": {
25      "type": "string",
26      "defaultValue": "[resourceGroup().location]",
27      "metadata": {
28        "description": "Location for all resources."
29      }
30    }
31  }
32 }
```

```
Osiris-2:WebAppGitRepo krisnatagoras$ az account set --subscription "
```

Resource Group

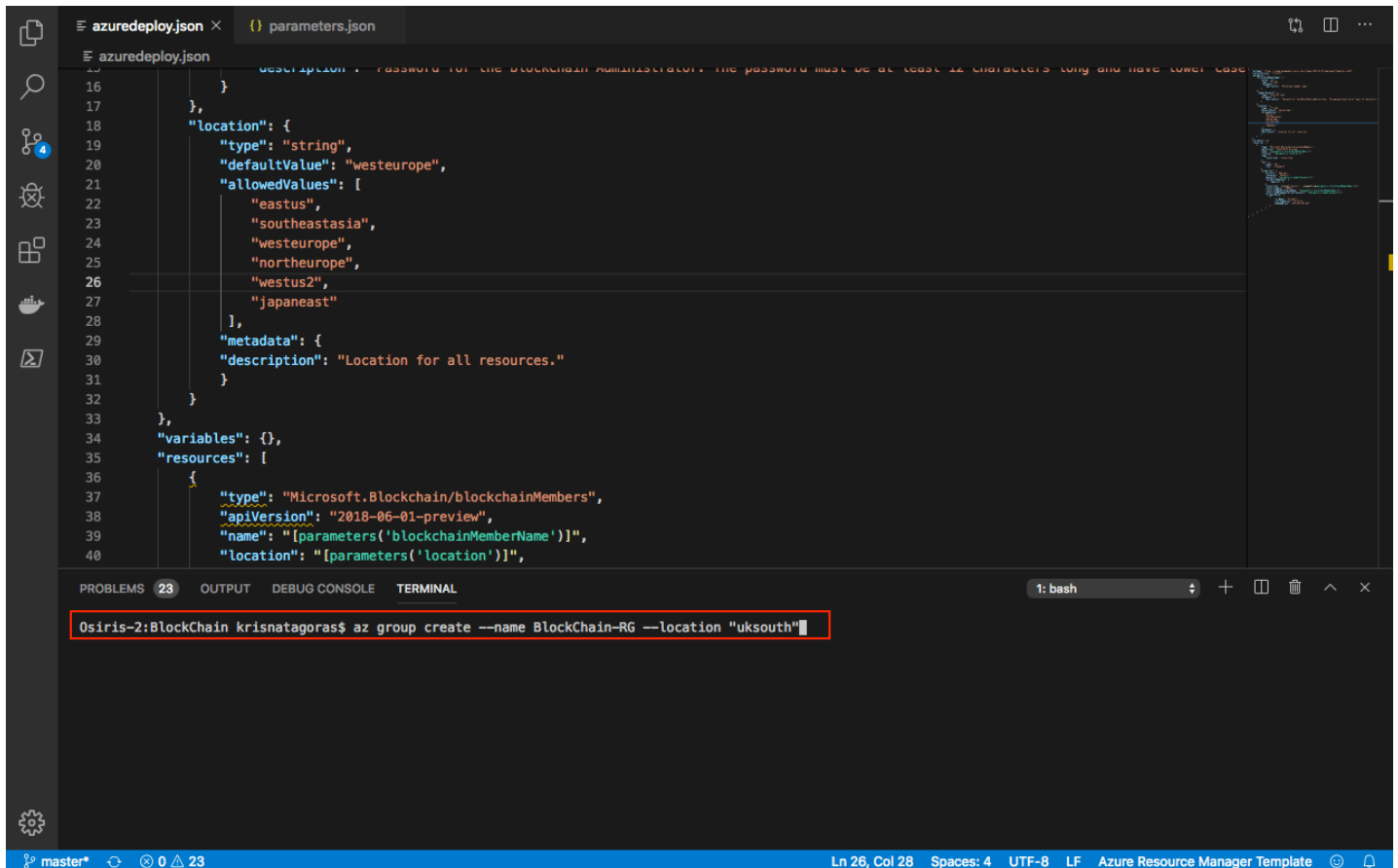
After you logged in, we gonna need to create a Resource Group for our deployment. If you haven't yet created a Resource Group, we gonna do that now! But what is a Resource Group, one might ask. Bare with me! A Resource Group is a container that holds related resources for an Azure solution. The resource group includes those resources that you want to manage as a group. Simply saying, it's like a folder that contains files. Simple as that ;-)

To create a Resource Group, you need a name and the location for your Resource Group.

For a list of locations, type: **az account list-locations**

To create the Resource group, just type the command:

az group create --name Blockchain-RG --location < yourlocation >



The screenshot shows the Visual Studio Code editor with two files open: `azuredeploy.json` and `parameters.json`. The `azuredeploy.json` file contains an ARM template for creating a Blockchain resource group. The template includes a `location` parameter with a default value of `westeurope` and a list of allowed values: `eastus`, `southeastasia`, `westeurope`, `northeurope`, `westus2`, and `japaneast`. The `resources` section defines a resource of type `Microsoft.Blockchain/blockchainMembers` with the name `[parameters('blockchainMemberName')]` and location `[parameters('location')]`.

The terminal window at the bottom shows the command `az group create --name BlockChain-RG --location "uksouth"` being executed in a bash shell. The command is highlighted with a red box.

```
16      },
17    },
18    "location": {
19      "type": "string",
20      "defaultValue": "westeurope",
21      "allowedValues": [
22        "eastus",
23        "southeastasia",
24        "westeurope",
25        "northeurope",
26        "westus2",
27        "japaneast"
28      ],
29      "metadata": {
30        "description": "Location for all resources."
31      }
32    },
33  },
34  "variables": {},
35  "resources": [
36    {
37      "type": "Microsoft.Blockchain/blockchainMembers",
38      "apiVersion": "2018-06-01-preview",
39      "name": "[parameters('blockchainMemberName')]",
40      "location": "[parameters('location')]",
```

PROBLEMS (23) OUTPUT DEBUG CONSOLE TERMINAL 1: bash

Osiris-2:BlockChain krisnatagoras\$ az group create --name BlockChain-RG --location "uksouth"

master* 0 23 Ln 26, Col 28 Spaces: 4 UTF-8 LF Azure Resource Manager Template

Super simple, right? Now that we have our **Resource Group** created, let's deploy our BlockChain Service.

az group deployment create --name "name of your deployment" --resource-group "BlockChain-RG" --template-file "./azuredeploy.json"

```
az group deployment create --name "BlockChain" --resource-group "BlockChain-RG" --template-file "./azuredeploy.json"
```

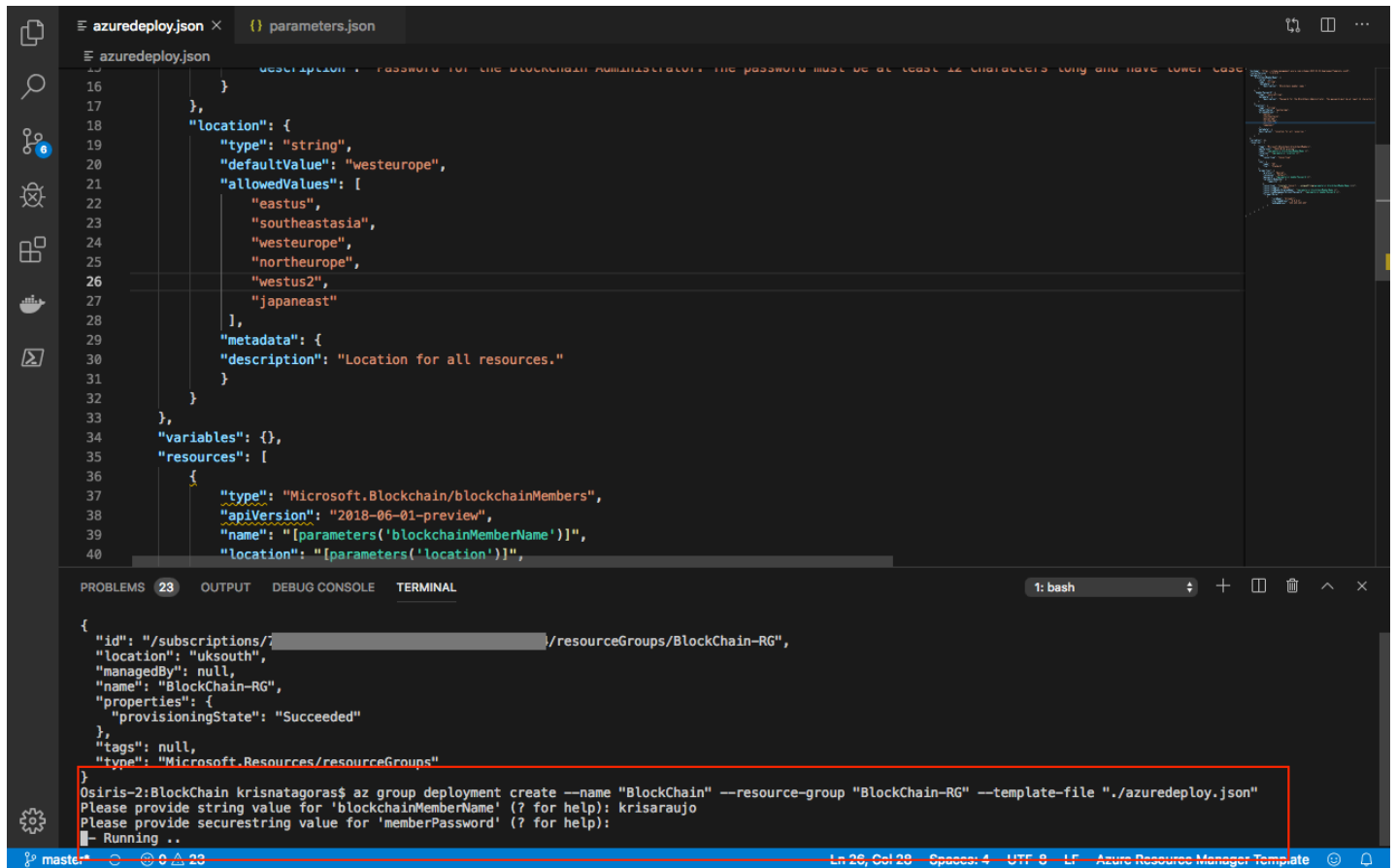
The terminal output shows the deployment attempt and the error message: "Please provide string value for 'blockchainMemberName' (? for help): krisaraujo".

You gonna need to insert the parameters information:

```
az group deployment create --name "BlockChain" --resource-group "BlockChain-RG" --template-file "./azuredeploy.json"
```

The terminal output shows the deployment attempt and the success message: "Running ..".

As you can see, it's running.



The screenshot shows the Visual Studio Code editor with two files open: `azuredeploy.json` and `parameters.json`. The `azuredeploy.json` file contains an ARM template for deploying a Blockchain resource group. The terminal window at the bottom shows the command `az group deployment create --name "BlockChain" --resource-group "BlockChain-RG" --template-file "./azuredeploy.json"` being executed. The output shows the deployment succeeded, with the provisioning state set to "Succeeded".

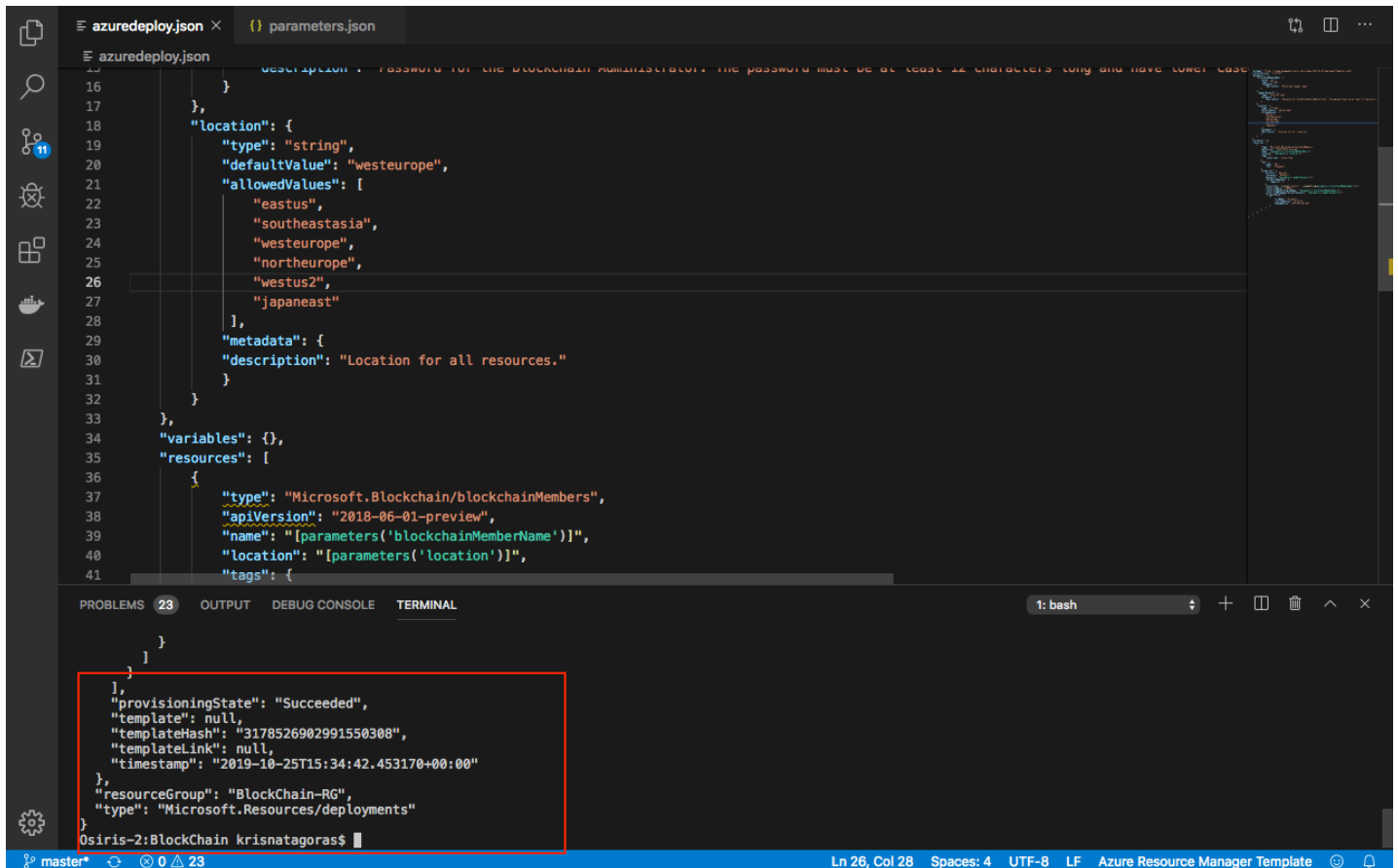
```
16      },
17    },
18    "location": {
19      "type": "string",
20      "defaultValue": "westeurope",
21      "allowedValues": [
22        "eastus",
23        "southeastasia",
24        "westeurope",
25        "northeurope",
26        "westus2",
27        "japaneast"
28      ],
29      "metadata": {
30        "description": "Location for all resources."
31      }
32    },
33  },
34  "variables": {},
35  "resources": [
36    {
37      "type": "Microsoft.Blockchain/blockchainMembers",
38      "apiVersion": "2018-06-01-preview",
39      "name": "[parameters('blockchainMemberName')]",
40      "location": "[parameters('location')]",
```

```
{
  "id": "/subscriptions/[redacted]/resourceGroups/BlockChain-RG",
  "location": "uksouth",
  "managedBy": null,
  "name": "BlockChain-RG",
  "properties": {
    "provisioningState": "Succeeded"
  },
  "tags": null,
  "type": "Microsoft.Resources/resourceGroups"
}
```

```
Osiris-2:BlockChain krisnatagoras$ az group deployment create --name "BlockChain" --resource-group "BlockChain-RG" --template-file "./azuredeploy.json"
Please provide string value for 'blockchainMemberName' (? for help): krisaraujo
Please provide securestring value for 'memberPassword' (? for help):
- Running ..
```

Go grab a cup of coffee, have some fresh air and I'm sure that before you come back you gonna have your BlockChain Service will be deployed.

And there we go, our deploy is Succeeded:



```
16      },
17    },
18    "location": {
19      "type": "string",
20      "defaultValue": "westeurope",
21      "allowedValues": [
22        "eastus",
23        "southeastasia",
24        "westeurope",
25        "northeurope",
26        "westus2",
27        "japaneast"
28      ],
29      "metadata": {
30        "description": "Location for all resources."
31      }
32    },
33  },
34  "variables": {},
35  "resources": [
36    {
37      "type": "Microsoft.Blockchain/blockchainMembers",
38      "apiVersion": "2018-06-01-preview",
39      "name": "[parameters('blockchainMemberName')]",
40      "location": "[parameters('location')]",
41      "tags": {
42        "provisioningState": "Succeeded",
43        "template": null,
44        "templateHash": "3178526902991550308",
45        "templateLink": null,
46        "timestamp": "2019-10-25T15:34:42.453170+00:00"
47      },
48      "resourceGroup": "BlockChain-RG",
49      "type": "Microsoft.Resources/deployments"
50    }
51  ]
52}
```

PROBLEMS (23) OUTPUT DEBUG CONSOLE TERMINAL

1: bash

0siris-2:BlockChain krisnatagoras\$

Ln 26, Col 28 Spaces: 4 UTF-8 LF Azure Resource Manager Template

Let's go and check the resource at the [Azure Portal](#).

On the portal, go to Resource Groups. On this blade, you can see the Resource Group we've created.

Microsoft Azure

Home > Resource groups

Resource groups

Default Directory

+ Add Edit columns Refresh Export to CSV Assign tags Feedback

Filter by name... Subscription == Azure for Students Location == all Add filter No grouping

Showing 1 to 5 of 5 records.

<input type="checkbox"/>	Name ↑↓	Subscription ↑↓	Location ↑↓	
<input type="checkbox"/>	BlockChain-RG	Azure for Students	UK South	...
<input type="checkbox"/>	cloud-shell-storage-west europe	Azure for Students	West Europe	...
<input type="checkbox"/>	MachineLearning-RG	Azure for Students	UK South	...
<input type="checkbox"/>	MyResourceGroup	Azure for Students	UK South	...
<input type="checkbox"/>	NetworkWatcherRG	Azure for Students	UK South	...

< Previous Page 1 of 1 Next >

Go the Resource Group, find the Resource group you've created. Click on the Resource Group and there it's our resources **Resources**:

- Azure Blockchain Service

Microsoft Azure portal screenshot showing the **BlockChain-RG** resource group overview. The left sidebar lists navigation options like Home, Dashboard, All services, and Favorites. The main content area displays the resource group details, including the subscription (Azure for Students), tags, and a table of resources. The table shows one resource: **krisaraujo**, which is an **Azure Blockchain Service** located in **West Europe**. The table has columns for Name, Type, and Location. The resource is highlighted with a red box.

Name	Type	Location
krisaraujo	Azure Blockchain Service	West Europe

Click on the **Azure Blockchain Service** with your name, and on the next page, you have an overview of the service.

Microsoft Azure portal screenshot showing the **krisaraujo** Azure Blockchain Service overview. The left sidebar lists navigation options. The main content area displays the service details, including the resource group (BlockChain-RG), status (Available), location (West Europe), subscription (Azure for Students), and subscription ID. The details are organized into sections: Overview, Settings, Blockchain, and Monitoring. The Overview section is highlighted with a red box.

Property	Value
Resource group	BlockChain-RG
Status	Available
Location	West Europe
Subscription	Azure for Students
Subscription ID	[Redacted]
Member name	krisaraujo
Protocol	Quorum
Pricing Tier	Standard (2 vCores, 3 nodes)
Consortium	Consort-k47z5nxy67pc
RootContract address	[Redacted]
Member account	[Redacted]

Consortium
Invite or remove members from the consortium.
[Start >](#)

Let your voice be heard
Give feedback on Azure Blockchain Service.
[Go >](#)

Blockchain Development Kit
Sample code and accelerators to get you started.
[Go >](#)

Show data for last: [1 hour](#) [6 hours](#) [12 hours](#) [1 day](#) [7 days](#) [30 days](#)

And that is just the tip of the iceberg. Now you can start to develop applications for your Blockchain Service.

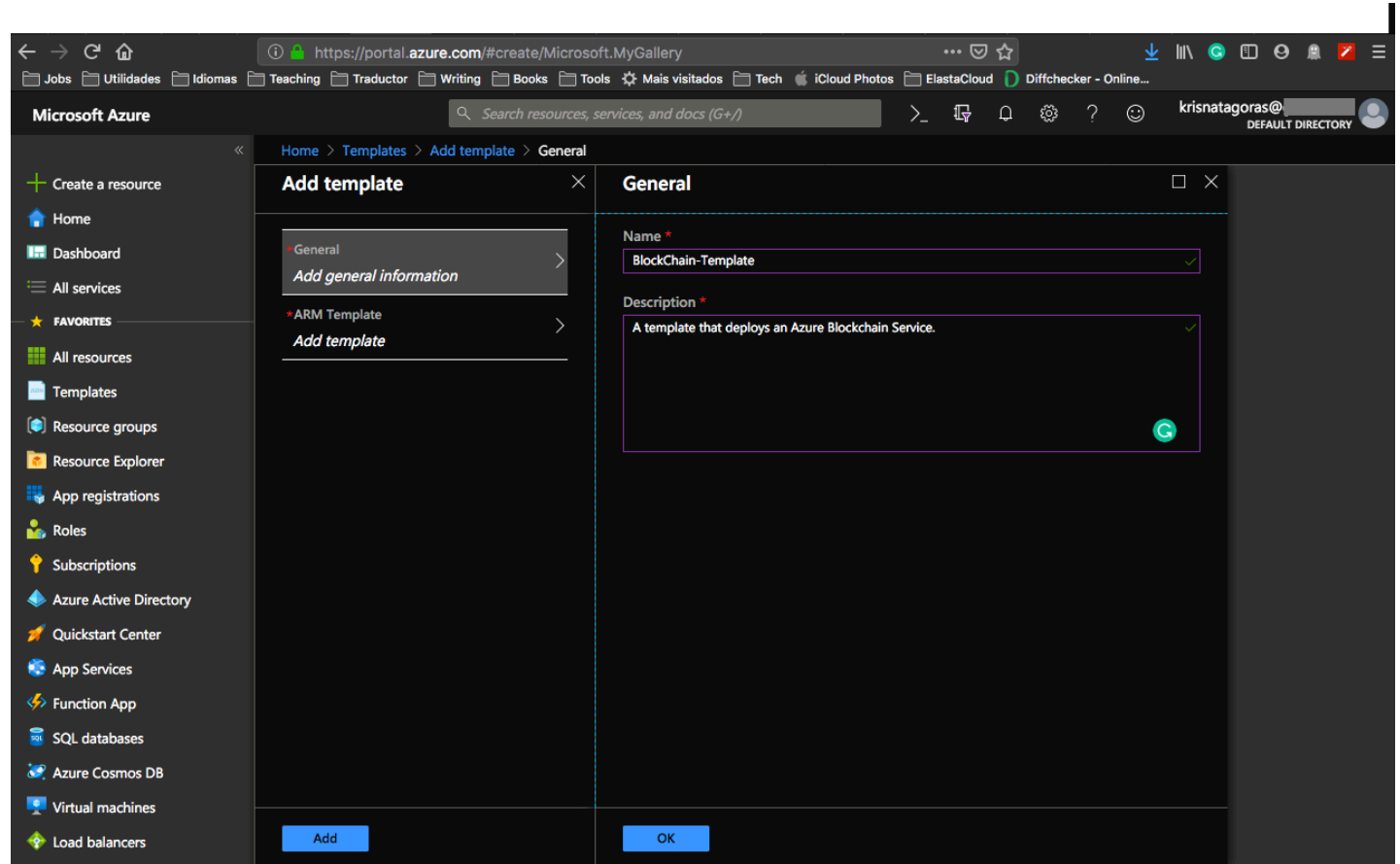
Most important, don't forget to have fun!

Using the Portal

At the Portal, in All Services look for **Templates**, you can favorite this service.

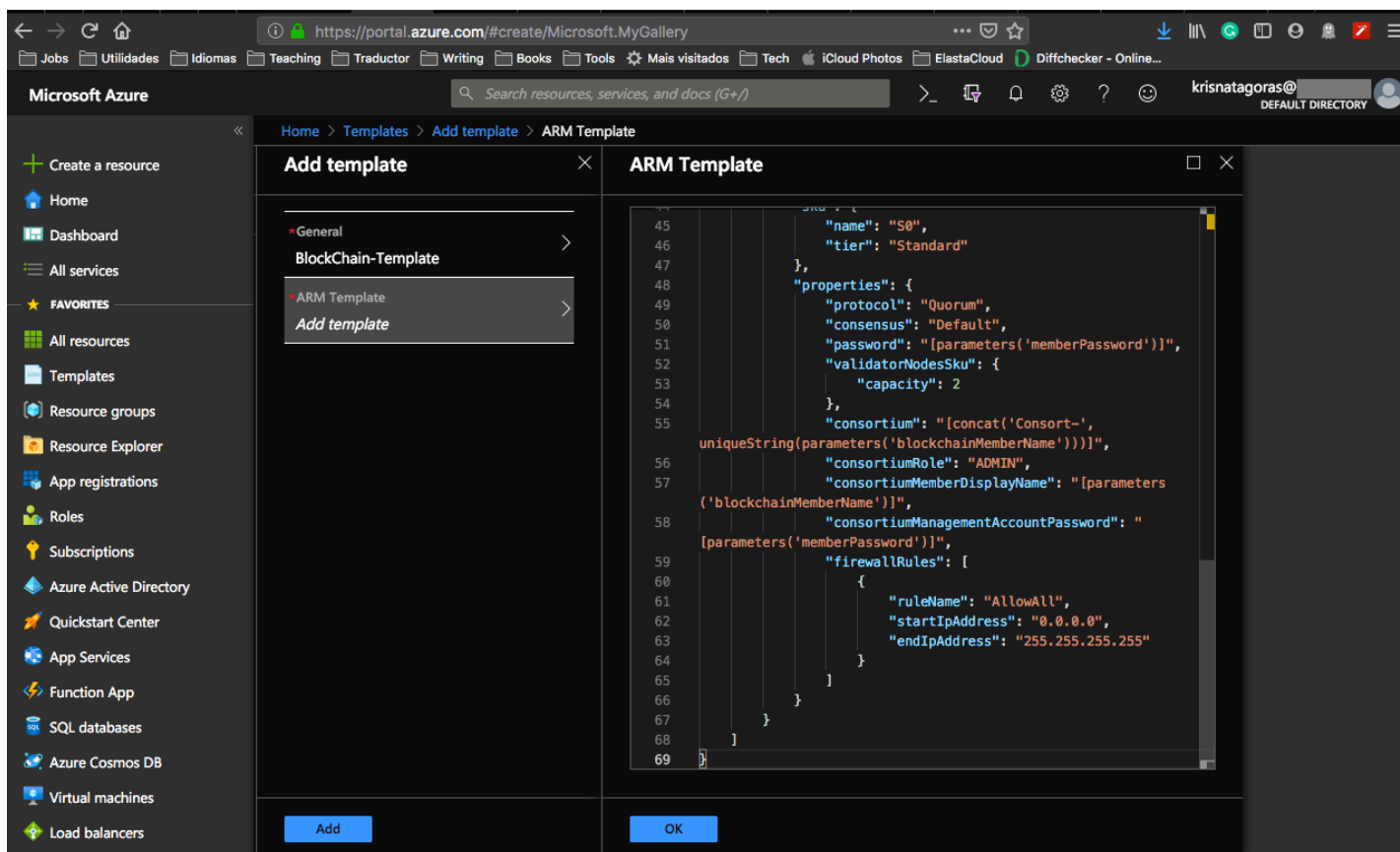
Click in **Add** to add your template:

On General, type a name and a description for your template, and click on [OK].

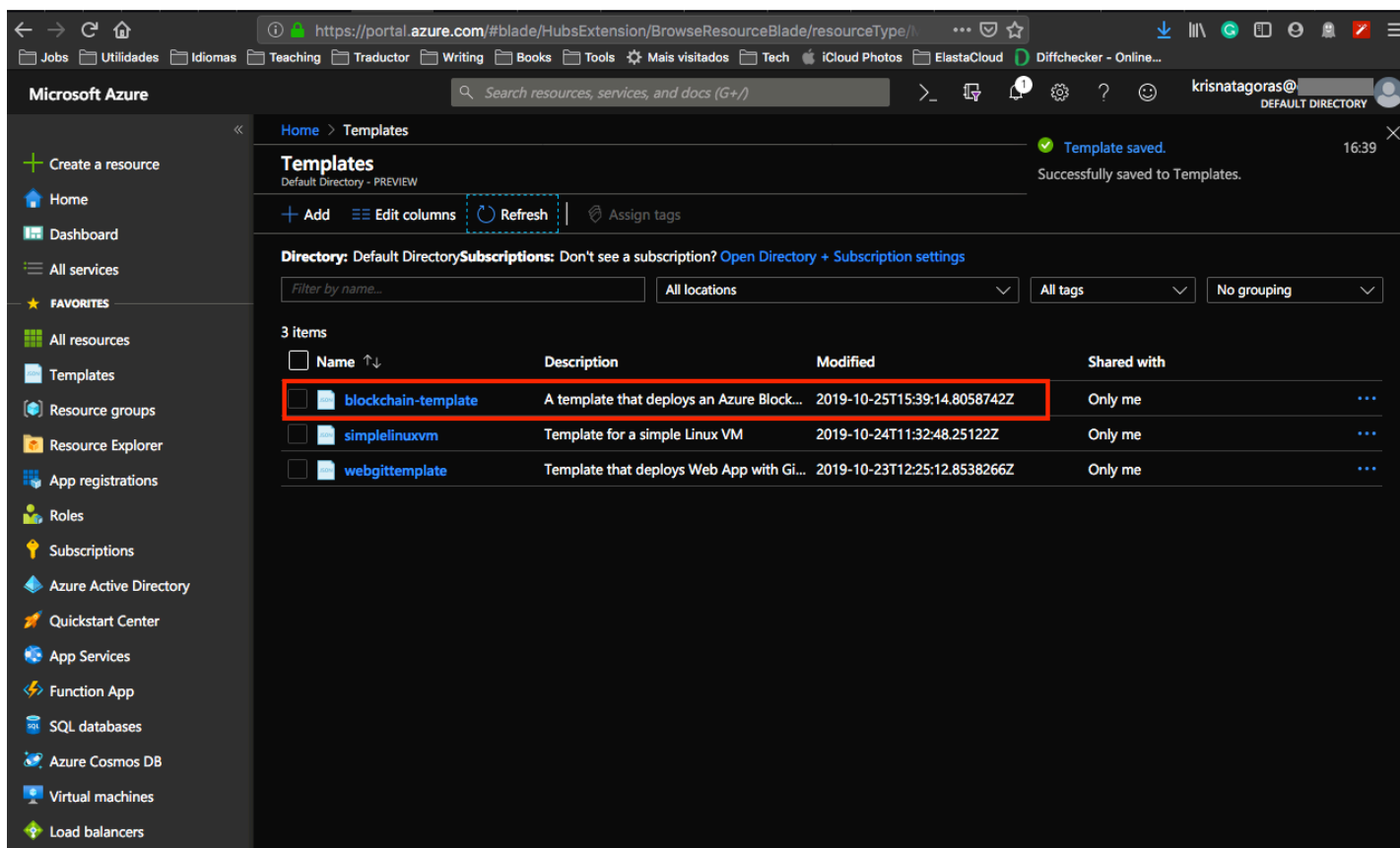


The screenshot shows the Microsoft Azure Portal interface. The browser address bar displays <https://portal.azure.com/#create/Microsoft.MyGallery>. The left sidebar contains the 'Microsoft Azure' navigation menu with options like 'Create a resource', 'Home', 'Dashboard', 'All services', and 'FAVORITES'. The main content area shows the 'Add template' dialog box. The 'General' tab is selected, displaying the 'Name' field with the value 'BlockChain-Template' and the 'Description' field with the text 'A template that deploys an Azure Blockchain Service.' Both fields have green checkmarks indicating they are valid. The 'ARM Template' tab is also visible, showing the 'Add template' button. The 'Add' button is located at the bottom left of the dialog box, and the 'OK' button is at the bottom right.

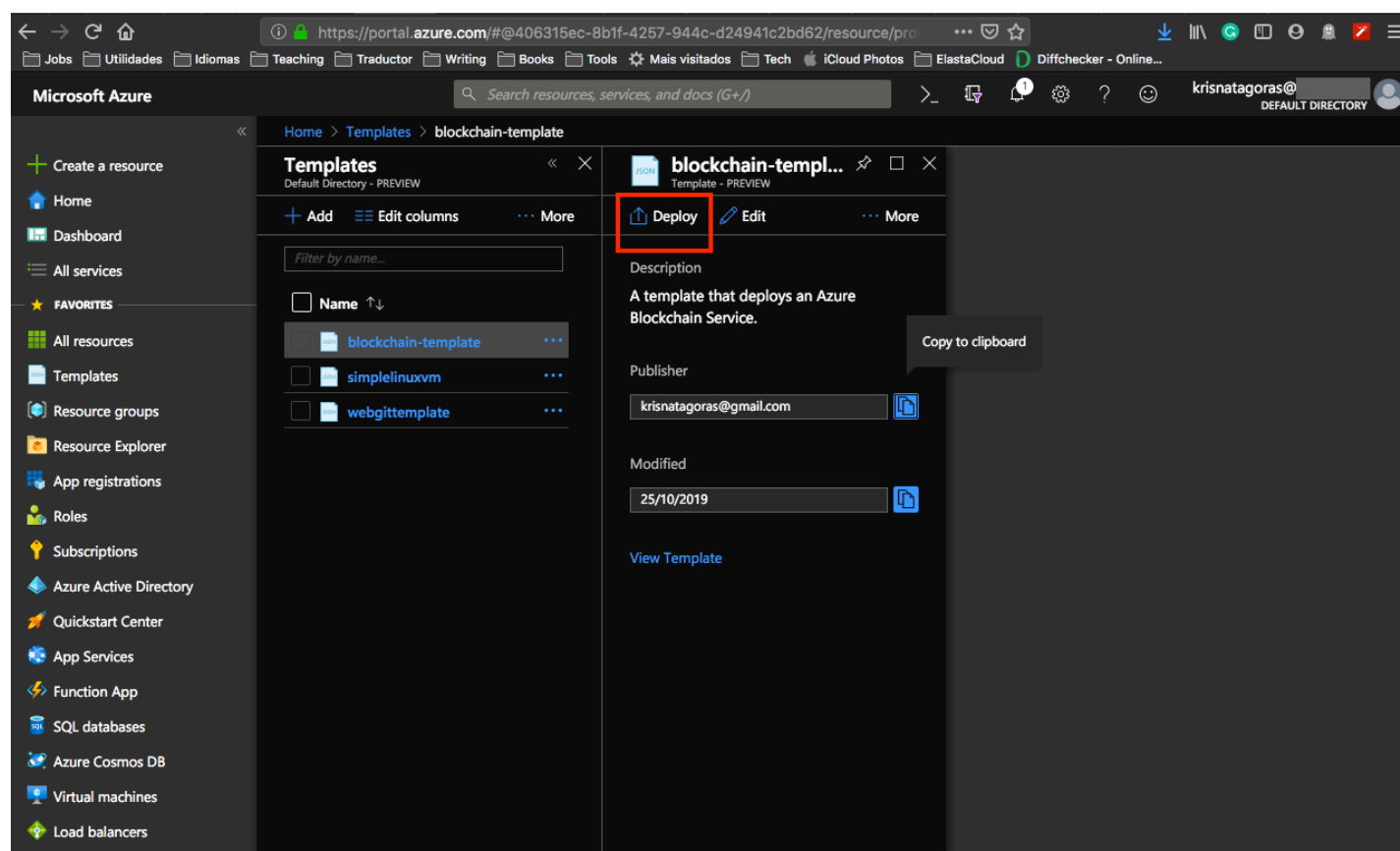
On ARM Template, replace the contents of the template with your template, and click on [OK].



Click on the refresh button and there is your template:

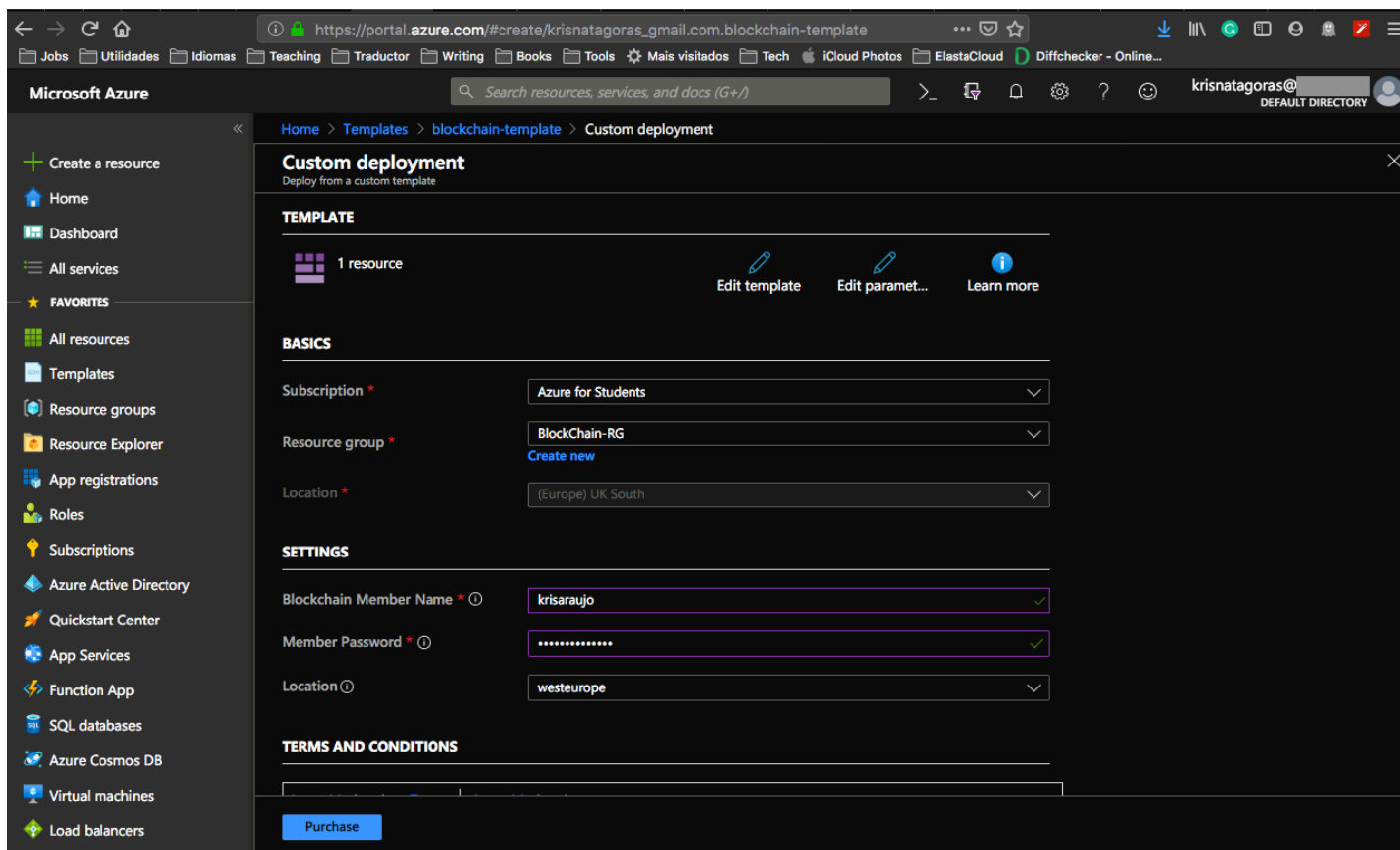


Open the template and click in [Deploy]

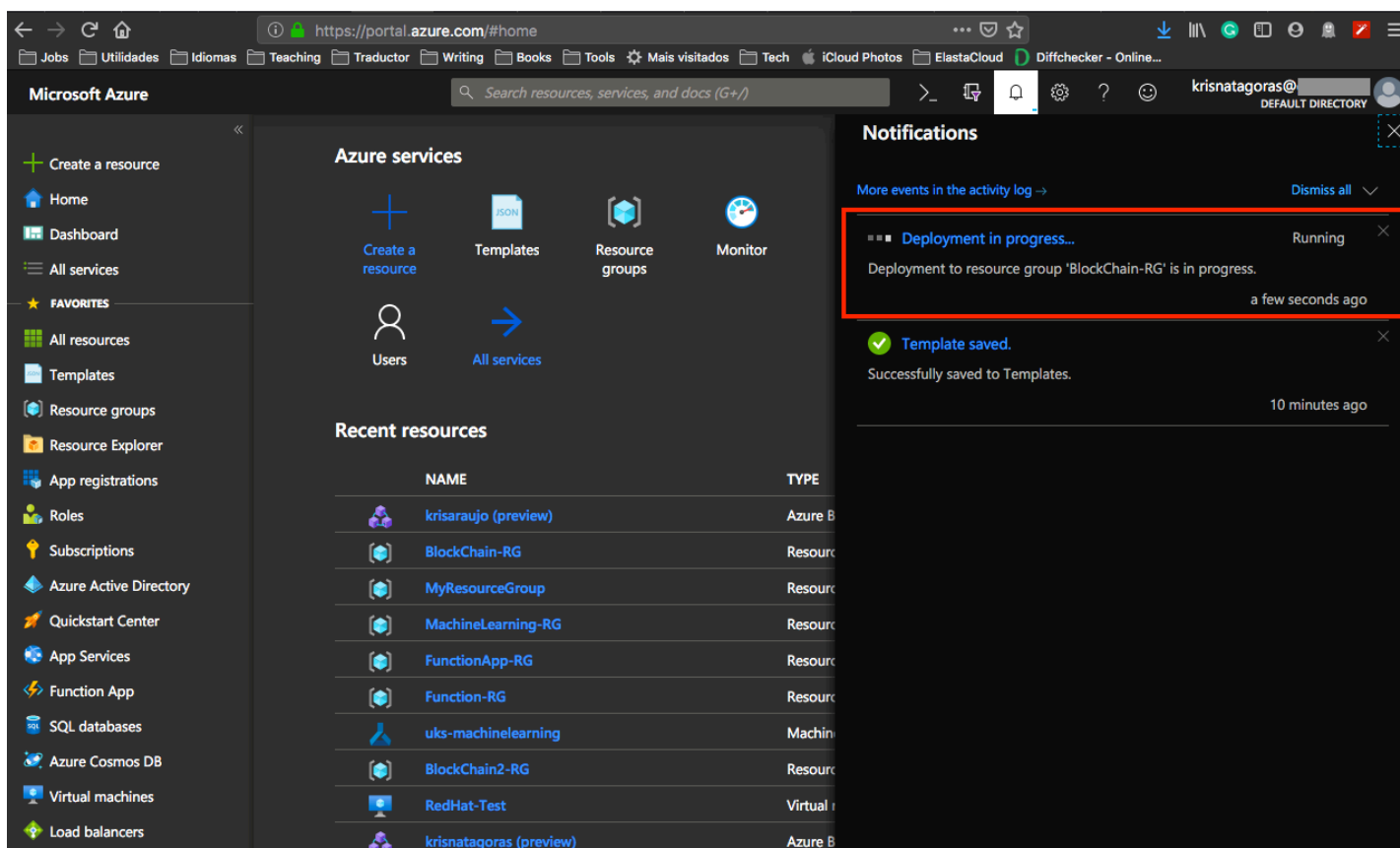


On the screen Custom Deployment, insert the information that you must be already familiar with.

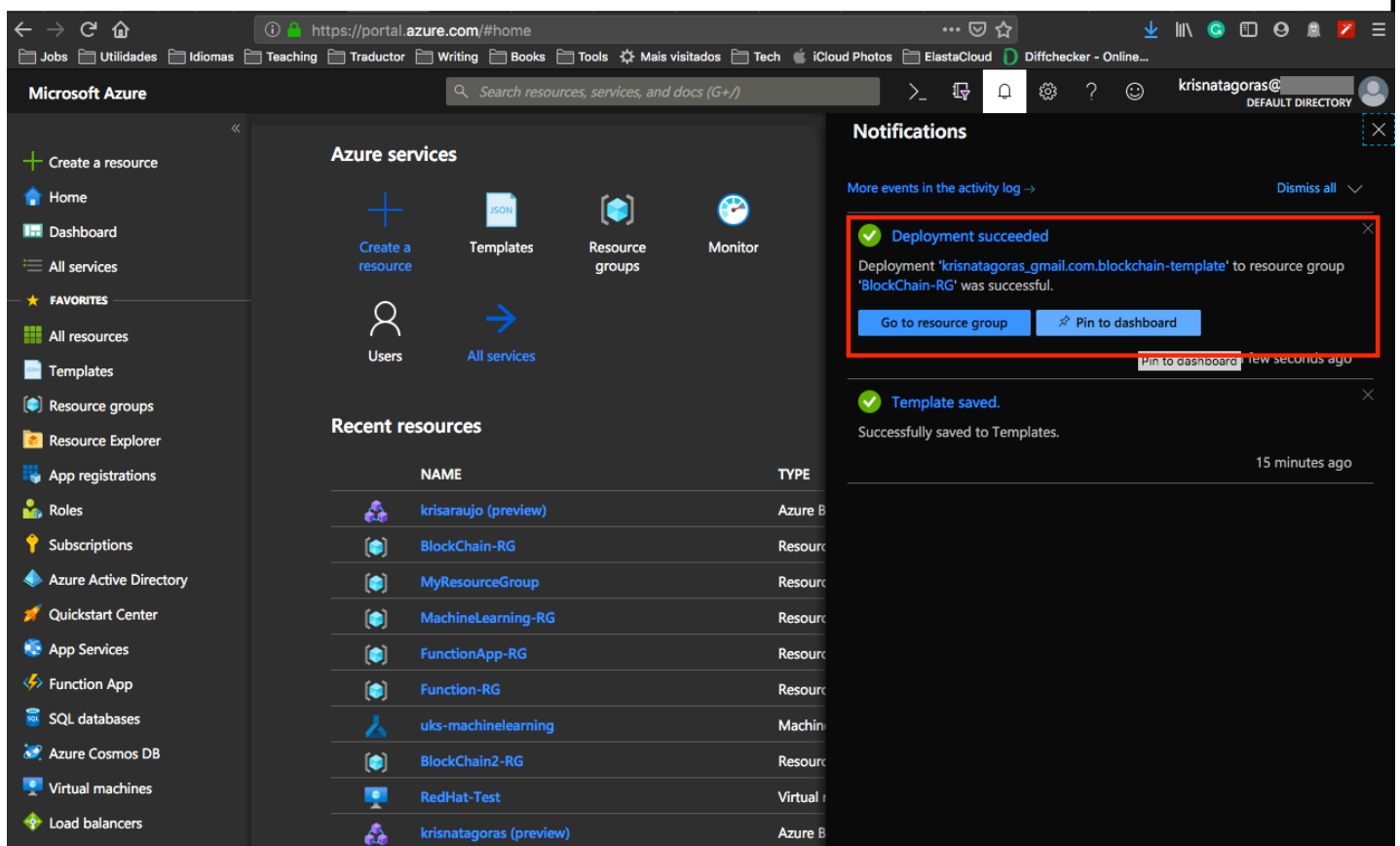
Select [I agree] and click on [Purchase].



As you can see, it's deploying.



After a couple of minutes, voilà, you have your BlockChain Service deployed.



Go to the Resource. Repeat the test you have done before and enjoy your coding.

p.s.: Pretty easy to create resources on Azure, right? But if you are the sort of IT guy that always looks for automating things on the extreme :D Surprise, surprise!. Just click on the button below and it will automatically deploy the VM on your Azure Portal.



Important disclaimer: Azure charge you for the resources you are using, and you don't want to finish all your credits at once, right? So, for not running out of credit, don't forget to stop the Web App at the portal or even delete the Resource Group you create to avoid any unnecessary charges.

How to shutdown your resources:

Using the portal:

On the portal, open your Resource Group, if you will not use the BlockChain Service anymore, you can just click on the [Delete] Button.

Microsoft Azure

Home > BlockChain-RG

BlockChain-RG

Resource group

Search (Cmd+/)

+ Add Edit columns **Delete resource group** Refresh Move Export to CSV More

Subscription (change) Azure for Students Deployments 2 Succeeded

Subscription ID

Tags (change) Click here to add tags

Filter by name... Type == all Location == all Add filter No grouping

Showing 1 to 1 of 1 records. Show hidden types

Name	Type	Location
krisaraujo	Azure Blockchain Service	West Europe

< Previous Page 1 of 1 Next >