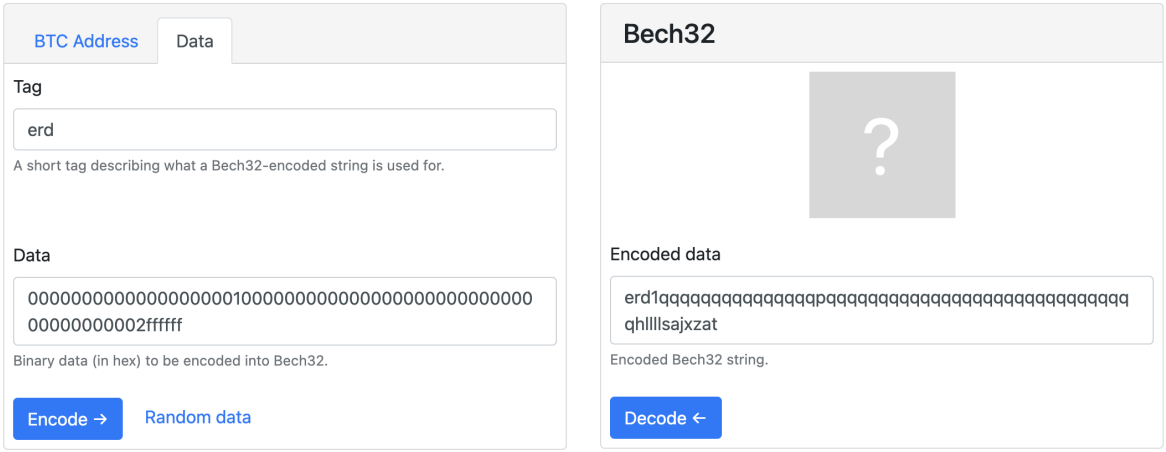
Before everything else, get started here ->
https://github.com/ElrondNetwork/elrond-specs/blob/main/sc-delegation-specs.md

A. Queries example

All queries should be sent through Postman to an own metachain observer with the POST function and inside the RAW formatting the following input described as below.

Path for VM-Query example: http://metachain_observer_ip_here:8080/vm-values/query
“scAddress” to query is the auto-generated address received after the SC creation request as for example after sending the createNewDelegationContract transaction the SC receipt will include an answer like “000000000000000000010000000000000000000000000000000002ffffff” where encoding it to bech32 will have final delegation address as follow erd1qqqqqqqqqqqqqqpqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqhlllsajxzat.



Tool for easy bech32 conversion: https://slowli.github.io/bech32-buffer/

Note that each erd1 address can only generate a single delegation contract.

Other useful tools:
Base64 decoder to hex -> https://base64.guru/converter/decode/hex
Hex decoder to decimals ->
https://www.rapidtables.com/convert/number/hex-to-decimal.html
Hex decoder to string -> https://www.convertstring.com/EncodeDecode/HexDecode

1. getNumNodes


```
{
   "scAddress": "erd1qqqqqqqqqqqqqqqpqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqhlllllsajxzat",
   "funcName": "getNumNodes"
}
```


Answer:
AQ== -> 01
Base64 -> hex -> decimals

2. getAllNodeStates


```
{
   "scAddress": "erd1qqqqqqqqqqqqqqqpqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqhlllllsajxzat",
   "funcName": "getAllNodeStates"
}
```


Answer:
"c3Rha2Vk", -> staked (base64 -> hex -> string)

"2f3ELBCne4lpKv37dqDPjDl5fDAYbZ2wOv7St7sd2Z9IIRSNAVega76wcrsVz1kPxTKWcG62LE
TaOjRxONG/GzEjaydOAIWq+xKl1lu//QjJ6CAFwkEUFDDb2Iso8pAT", ->
d9fdc42c10a77b89692afdfb76a0cf8c39797c30186d9db03afed2b7bb1dd99f4821148d0157a06b
beb072bb15cf590fc53296706eb62c44da3a347138d1bf1b31236b274e0085aafb12a5d65bbffd0
8c9e82005c241141430dbd88b28f29013 (base64 -> hex)

"dW5TdGFrZWQ=", -> unStaked (base64 -> hex -> string)

"Jzv27eNAadPbbFb0VL19M4QUOEyPsxUuY43+SaVu8wFKNVAztsTS2ABhgdwEloIQCjLqAN6
qQG6A8T8nlxyeEQUsHKx2C7L2GlCtTsWPlpuVtPm8kK59S3PUdppbqzMC" ->
273bf6ede34069d3db6c56f454bd7d338414384c8fb3152e638dfe49a56ef3014a355033b6c4d2d
8006181dc049682100a32ea00deaa406e80f13f27971c9e11052c1cac760bb2f61a50ad4ec58f96
9b95b4f9bc90ae7d4b73d4769a5bab3302 (base64 -> hex)
]

3. **getUserUnBondable**


```
{
   "scAddress": "erd1qqqqqqqqqqqqqqqpqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqhlllllsajxzat",
   "funcName": "getUserUnBondable",
```

```
   "args":["cea1b052f83d9ed30db9eb678ad010737fb14504b74f10d83d4c5171d117ed94"]
}
```
*args = delegator address as bech32 decoded value to hex

Answer:
Base64 -> hex -> decimals

4. getUserActiveStake

```
{
   "scAddress": "erd1qqqqqqqqqqqqqqqpqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqhllllsajxzat",
   "funcName": "getUserActiveStake",
   "args": [
      "cea1b052f83d9ed30db9eb678ad010737fb14504b74f10d83d4c5171d117ed94"
   ]
}
```
*args = delegator address as bech32 decoded value to hex

Answer:
= Q8M8GTdWSAAA -> 1250000000000000000000
Base64 -> hex -> decimals

5. getUserUnDelegatedList

```
{
   "scAddress": "erd1qqqqqqqqqqqqqqqpqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqhllllsajxzat",
   "funcName": "getUserUnDelegatedList",
   "args":["cea1b052f83d9ed30db9eb678ad010737fb14504b74f10d83d4c5171d117ed94"]
}
```
*args = delegator address as bech32 decoded value to hex

Answer:

```
          "returnData": [
             "Q8M8GTdWSAAA", -> 1250 egld (base64 -> hex -> decimals)
             "4A==" (base64 -> hex -> decimals)
          ],
```

6. getUserUnStakedValue

```
{
   "scAddress": "erd1qqqqqqqqqqqqqqqpqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqhllllsajxzat",
```

```
  "funcName": "getUserUnStakedValue",
  "args": [
    "5c8ac368d821bc1721cc9ed98c05470b11e74ada1c58407b7750adf5962941e4"
  ]
}
```
*args = delegator address as bech32 decoded value to hex

Answer:
aFVSDYuFkPAAAA== ->
Base64 -> hex -> decimals

7. getTotalActiveStake

```
{
  "scAddress": "erd1qqqqqqqqqqqqqqqpqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqhllllsajxzat",
  "funcName": "getTotalActiveStake"
}
```

Answer:
aNzYhb30PYAAAA== -> 68dcd885bdf43d800000 -> 495200.000000000000000000
Base64 -> hex -> decimals

8. ***getTotalUnStaked***

```
{
  "scAddress": "erd1qqqqqqqqqqqqqqqpqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqhllllsajxzat",
  "funcName": "getTotalUnStaked"
}
```

Answer:
Base64 -> hex -> decimals

9. ***getNumUsers***

```
{
  "scAddress": "erd1qqqqqqqqqqqqqqqpqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqhllllsajxzat",
  "funcName": "getNumUsers"
}
```

Answer:
Ag== -> 02
Base64 -> Hex -> decimals

10. getTotalCumulatedRewards


```
{
   "scAddress": "erd1qqqqqqqqqqqqqqqpqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqhlllsajxzat",
   "funcName": "getTotalCumulatedRewards",
   "caller": "erd1qqqqqqqqqqqqqqqpqqqqqqqqlllllllllllllllllllllllllsr9gav8"
}
```


*caller remains the same here

Answer::
BFDa57kXVrxm -> 79613200144941890662 -> 573199281504383658428002
Base64 -> hex -> decimals

11. getClaimableRewards


```
{
   "scAddress": "erd1qqqqqqqqqqqqqqqpqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqhlllsajxzat",
   "funcName": "getClaimableRewards",
   "args": [
      "cea1b052f83d9ed30db9eb678ad010737fb14504b74f10d83d4c5171d117ed94"
   ]
}
```


*args = delegator address as bech32 decoded value to hex

Answer:
Ft9RZzF7Dyc= -> 1648125492294520615
Base64 -> hex -> decimals

12. getTotalUnStakedFromNodes


```
{
   "scAddress": "erd1qqqqqqqqqqqqqqqpqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqhlllsajxzat",
   "funcName": "getTotalUnStakedFromNodes"
}
```


Answer:
Base64 -> hex -> decimals

13. **getTotalUnBondedFromNodes**


```
{
   "scAddress": "erd1qqqqqqqqqqqqqqqpqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqhlllsajxzat",
   "funcName": "getTotalUnBondedFromNodes"
}
```


Answer:
Base64 -> hex -> decimals

14. Or 7. getContractConfig

```
{
   "scAddress": "erd1qqqqqqqqqqqqqqqpqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqhllllsajxzat",
   "funcName": "getContractConfig"
}
```

Answer:

```
          "returnData": [
             "gKzHUD288mzScNX6nEmkGm4CHneMdrrPhJyPET9iGA8=", -> base64 -> hex -> bech32 encode (owner address)
             null (serviceFee)
             "", (MaxDelegationCap)
             "Q8M8GTdWSAAA", -> base64 -> hex -> decimals = 1250 egld (InitialOwnerFunds)
             "dHJ1ZQ==", -> base64 -> hex -> string = true (automaticActivation)
             "ZmFsc2U=", -> base64 -> hex -> string = false (withDelegationCap)
             "dHJ1ZQ==", -> base64 -> hex -> string = true (changeableServiceFee)
             "AuU=", -> base64 -> hex -> decimals = 741 (CreatedNonce)
             "+g==" -> base 64 -> hex -> decimals = 250 (UnBondPeriod)
          ],
```

15.. getAllContractAddresses *delegation manager tab

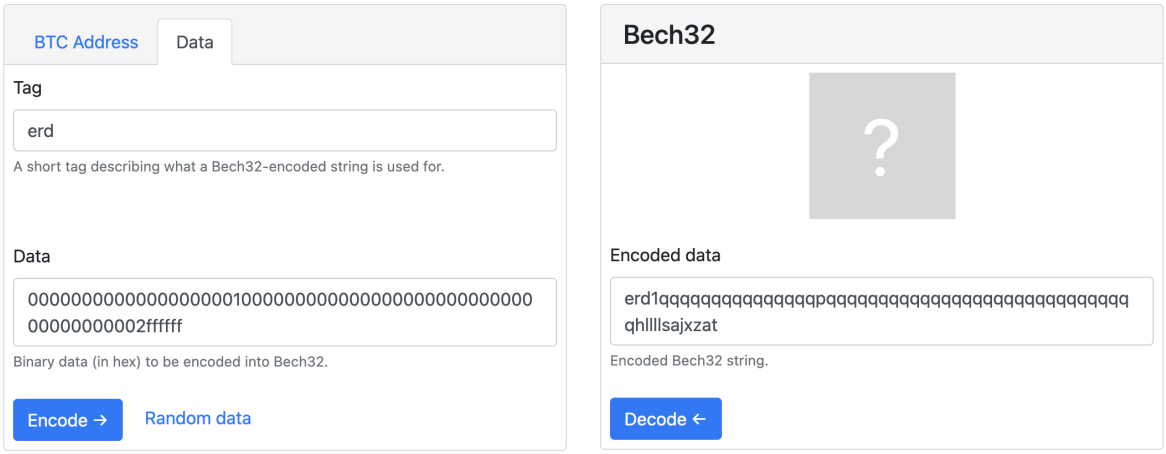
```
{
   "scAddress": "erd1qqqqqqqqqqqqqqqpqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqyllslmq6y6",
   "funcName": "getAllContractAddresses"
}
```

A. Transaction interaction examples

The default Delegation Manager address is erd1qqqqqqqqqqqqqqqpqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqyllslmq6y6, therefore the initial SC issuing request will be to this address.

The result received after the SC creation request as for example after sending the createNewDelegationContract transaction the SC receipt will include an answer like “00000000000000000010000000000000000000000000000002ffffff” where encoding it to bech32 will have final delegation address as follow

erd1qqqqqqqqqqqqqqqpqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqhlllllsajxzat.



Tool for easy bech32 conversion: https://slowli.github.io/bech32-buffer/

Note that each erd1 address can only generate a single delegation contract.

Process to get started.
I. createNewDelegationContract
II. setAutomaticActivation
III. addNodes **see notes**
IV. delegate

1. createNewDelegationContract *delegation manager tab

Send to: erd1qqqqqqqqqqqqqqqpqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqylllslmq6y6
Min-Value: 1250 eGLD
Gas: 60 mil
Data:
createNewDelegationContract@00@00

The two parameters should be adjusted @ @
1. total delegation cap as big.Int - if 0 - it means no delegation cap
2. service fee
For both values see below

All steps will be sent to created SC on step **createNewDelegationContract** where the first contract generated will be
erd1qqqqqqqqqqqqqqqpqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqhlllllsajxzat

2. setAutomaticActivation

Send to: erd1qqqqqqqqqqqqqqqpqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqhlllllsajxzat
Value: 0
Gas: 6 Mil
Data:
setAutomaticActivation@74727565

**@74727565 = true

3. changeServiceFee

Send to: erd1qqqqqqqqqqqqqqqpqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqhlllllsajxzat
Value: 0
Gas: 6 Mil
Data:
changeServiceFee@0EA1

*** where 0EA1 = 37.45% = 3745 (big number) => decimal to hex signed 2's complement = 0EA1

4. modifyTotalDelegationCap

Send to: erd1qqqqqqqqqqqqqqqpqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqhlllllsajxzat
Value: 0
Gas: 6 Mil
Data:
modifyTotalDelegationCap@ // ask here ??

***new delegation cap - big.Int to bytes
***Cannot make total delegation cap lower than (view function = **getTotalActiveStake)**

5. addNodes

Send to: erd1qqqqqqqqqqqqqqqpqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqhlllllsajxzat

Value: 0
Gas: 6 Mil
Data:
addNodes@d9fdc42c10a77b89692afdfb76a0cf8c39797c30186d9db03afed2b7bb1dd99f4821148d0157a06bbeb072bb15cf590fc53296706eb62c44da3a347138d1bf1b31236b274e0085aafb12a5d65bbffd08c9e82005c241141430dbd88b28f29013@abc123

*****Where first @blsKey in hex, and 2nd @ is signature tha BLS signature of the generated SC address not the SC owner*****

6. removeNodes

Send to: erd1qqqqqqqqqqqqqqqpqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqhlllllsajxzat
Value: 0
Gas: 12 Mil
Data:
removeNodes@d9fdc42c10a77b89692afdfb76a0cf8c39797c30186d9db03afed2b7bb1dd99f4821148d0157a06bbeb072bb15cf590fc53296706eb62c44da3a347138d1bf1b31236b274e0085aafb12a5d65bbffd08c9e82005c241141430dbd88b28f29013

***Where value after @ is BLS key in hex

7. stakeNodes

Send to: erd1qqqqqqqqqqqqqqqpqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqhlllllsajxzat
Value: 0
Gas: 12 Mil
Data:
stakeNodes@d9fdc42c10a77b89692afdfb76a0cf8c39797c30186d9db03afed2b7bb1dd99f4821148d0157a06bbeb072bb15cf590fc53296706eb62c44da3a347138d1bf1b31236b274e0085aafb12a5d65bbffd08c9e82005c241141430dbd88b28f29013

***Where value after @ is BLS key in hex

8. reStakeUnStakedNodes

Send to: erd1qqqqqqqqqqqqqqqpqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqhlllllsajxzat
Value: 0
Gas: 12 Mil
Data:

reStakeUnStakedNodes@d9fdc42c10a77b89692afdfb76a0cf8c39797c30186d9db03afed2b7bb1dd99f4821148d0157a06bbeb072bb15cf590fc53296706eb62c44da3a347138d1bf1b31236b274e0085aafb12a5d65bbffd08c9e82005c241141430dbd88b28f29013

***Where value after @ is BLS key in hex

9. unStakeNodes

Send to: erd1qqqqqqqqqqqqqqqpqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqhllllsajxzat
Value: 0
Gas: 12 Mil
Data:
unStakeNodes@d9fdc42c10a77b89692afdfb76a0cf8c39797c30186d9db03afed2b7bb1dd99f4821148d0157a06bbeb072bb15cf590fc53296706eb62c44da3a347138d1bf1b31236b274e0085aafb12a5d65bbffd08c9e82005c241141430dbd88b28f29013

***Where value after @ is BLS key in hex

10. unBondNodes

Send to: erd1qqqqqqqqqqqqqqqpqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqhllllsajxzat
Value: 0
Gas: 12 Mil
Data:
unBondNodes@d9fdc42c10a77b89692afdfb76a0cf8c39797c30186d9db03afed2b7bb1dd99f4821148d0157a06bbeb072bb15cf590fc53296706eb62c44da3a347138d1bf1b31236b274e0085aafb12a5d65bbffd08c9e82005c241141430dbd88b28f29013

***Where value after @ is BLS key in hex

11. unJailNodes

Send to: erd1qqqqqqqqqqqqqqqpqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqhllllsajxzat
Value: 2.5 eGLD
Gas: 12 Mil
Data:
unJailNodes@d9fdc42c10a77b89692afdfb76a0cf8c39797c30186d9db03afed2b7bb1dd99f4821148d0157a06bbeb072bb15cf590fc53296706eb62c44da3a347138d1bf1b31236b274e0085aafb12a5d65bbffd08c9e82005c241141430dbd88b28f29013

***Where value after @ is BLS key in hex

12. delegate

Send to: erd1qqqqqqqqqqqqqqqpqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqhllllsajxzat
Min-Value: 10 eGLD
Gas: 12 Mil
Data:
delegate

13. unDelegate

Send to: erd1qqqqqqqqqqqqqqqpqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqhllllsajxzat
Value: 0
Gas: 12 Mil
Data:
unDelegate@43c33c193756480000

***where is the value to undelegate as for example:
43c33c193756480000 = 125000000000000000000
Hex < decimals

14. Withdraw

Send to: erd1qqqqqqqqqqqqqqqpqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqhllllsajxzat
Value: 0
Gas: 12 Mil
Data:
withdraw

15. claimRewards

Send to: erd1qqqqqqqqqqqqqqqpqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqhllllsajxzat
Value: 0
Gas: 6 Mil
Data:
claimRewards

16. reDelegateRewards

Send to: erd1qqqqqqqqqqqqqqqpqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqhllllsajxzat
Value: 0
Gas: 12 Mil
Data:
reDelegateRewards