

WHAT IS CLAIMED IS:

1. A computer-implemented method comprising:

receiving, by a smart contract service provider comprising a trusted computation
5 execution environment (TEE) from a client associated with a target blockchain network,
a request for operating cross-chain data of one or more blockchain networks different
from the target blockchain network, the request for operating cross-chain data comprises
smart contract computational logics for operating the cross-chain data, wherein the smart
contract service provider is off the target blockchain network and able to perform the
10 smart contract computational logics independently of the target blockchain network;

sending, by the smart contract service provider to a data visiting service provider,
a request for the cross-chain data;

receiving, by the smart contract service provider, the cross-chain data from the
data visiting service provider;

15 generating, by the TEE, a result using the cross-chain data, wherein the result is
generated by the TEE executing the smart contract computational logics using the cross-
chain data; and

returning, by the smart contract service provider, the result to the client.

20 2. The computer-implemented method of claim 1, wherein the cross-chain data of
the one or more blockchain networks further comprise target cross-chain data obtained
from the target blockchain network and private cross-chain data obtained from a private
blockchain network.

25 3. The computer-implemented method of claim 1 or 2, wherein the smart contract
computational logics for operating the cross-chain data are self-designed by the client.

4. The computer-implemented method of claim 1, wherein the one or more
blockchain networks comprise a consortium blockchain network.

5. The computer-implemented method of claim 1 or 2, further comprising proving, by the smart contract service provider to the client, that the TEE comprises a virtual machine operable to execute the smart contract computational logics in the request for operating cross-chain data.

5 6. The computer-implemented method of claim 1, further comprising:
prior to receiving a request for operating cross-chain data from the client, proving, by the smart contract service provider to the client, that the smart contract service provider includes the TEE.

10 7. The computer-implemented method of claim 1, further comprising:
proving, by the smart contract service provider to the data visiting service provider, that the smart contract service provider includes the TEE; and
verifying, by the smart contract service provider, that the data visiting service
15 provider includes a TEE.

8. The computer-implemented method of claim 1, further comprising:
uploading, by the smart contract service provider, the result to the target
blockchain network.

20 9. The computer-implemented method of claim 8, further comprising:
prior to uploading the result to the target blockchain network, proving, by the smart contract service provider to the target blockchain network, that the smart contract service provider includes the TEE.

25 10. The computer-implemented method of claim 1, wherein the smart contract service provider comprises a cloud-based server.

11. The computer-implemented method of claim 1, wherein the result is signed by the
30 TEE using a private key.

12. The computer-implemented method of claim 1, wherein the cross-chain data are obtained from two or more blockchain networks.

13. A computer-implemented method comprising:

5 generating, by a client associated with a target blockchain network, a request for operating cross-chain data of one or more blockchain networks different from the target blockchain network, wherein the request for operating cross-chain data comprises smart contract computational logics for operating the cross-chain data;

10 sending, from the client, the request for operating cross-chain data to a smart contract service provider comprising a trusted computation execution environment (TEE), wherein the smart contract service provider is off the target blockchain network and able to perform the smart contract computational logics independently of the target blockchain network; and

15 receiving, by the client, a result from the smart contract service provider, wherein the result is generated by the TEE executing the smart contract computational logics and using the cross-chain data obtained by the smart contract service provider.

14. The computer-implemented method of claim 13, further comprising, sending, by the client, the received result to the target blockchain network.

20 15. The computer-implemented method of claim 13, further comprising: prior to sending the request for operating cross-chain data to the smart contract service provider, verifying, by the client, that the smart contract service provider includes the TEE.

25 16. The computer-implemented method of claim 15, further comprising: verifying, by the client, that the TEE comprises a virtual machine operable to execute the smart contract computational logics in the request for operating the cross-chain data.

30 17. The computer-implemented method of claim 13, further comprising:

designing, by the client, the smart contract computational logics for operating the cross-chain data.

18. The computer-implemented method of claim 13, wherein the client comprises a software development kit (SDK).

19. The computer-implemented method of claim 13, wherein the result is signed by the TEE using a private key, the method further comprising decrypting, by the client, the received result using a public key corresponding to the private key.

20. The computer-implemented method of claim 13, further comprising:
prior to sending the request for operating cross-chain data to the smart contract service provider, encrypting, by the client, the request for operating cross-chain data.

21. The computer-implemented method of claim 13, wherein the cross-chain data are obtained from two or more blockchain networks.

22. A non-transitory computer-readable storage medium coupled to one or more computers and configured with instructions executable by the one or more computers to perform the method of any one of claims 1 to 12.

23. A non-transitory computer-readable storage medium coupled to one or more computers and configured with instructions executable by the one or more computers to perform the method of any one of claims 13 to 21.

24. A system for providing smart contract service, comprising:
an interface configured to receive, from a client associated with a target blockchain network, a request for operating cross-chain data of one or more blockchain networks different from the target blockchain network, the request for operating cross-chain data comprising smart contract computational logics for operating the cross-chain

data, wherein the system is off the target blockchain network and able to perform the smart contract computational logics independently of the target blockchain network; and

a trusted computation execution environment (TEE), wherein the TEE comprises:

one or more computers; and

5 one or more computer-readable memories coupled to the one or more computers and configured with instructions executable by the one or more computers to perform the method of any one of claims 1 to 12.

25. A client system, comprising:

10 one or more computers; and

 one or more computer-readable memories coupled to the one or more computers and configured with instructions executable by the one or more computers to perform the method of any one of claims 13 to 21.

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