

WHAT IS CLAIMED IS:

1. A system for securely communicating and storing information in a building system of a building, the system comprising:

a plurality of building devices communicably coupled via a network, wherein each of the plurality of building devices are configured to store a copy of a blockchain comprising a plurality of blocks linked sequentially, wherein the plurality of building devices comprise a first building device comprising a processing circuit, the processing circuit comprising one or more memory devices and one or more processors, the processing circuit configured to:

generate a first block comprising device data and send the first block to at least a portion of the plurality of building devices;

receive a second block from a second building device of the plurality of building devices;

solve the second block by determining a nonce value that causes a hash of data, the nonce value, and a previous hash of a newest block in the blockchain to meet a difficulty requirement;

add the solved block to the blockchain of the first building device as the newest block, wherein the blockchain of the first building device comprises one or more licensing blocks indicating license information for software of a respective one or more of the plurality of building devices; and

send the solved block to at least one of the plurality of building devices to be added as the newest block in the blockchain stored on at least one of the plurality of building devices, wherein the solved block comprises the different device data and the determined nonce value.

2. The system of claim 1, wherein the plurality of blocks comprise device data associated with a plurality of zones of the building associated with the building system;

wherein the blockchain further comprises, based on the plurality of blocks, a record of device data for the building.

3. The system of claim 1, wherein the processing circuit of the first building device and a processing circuit of the second building device are configured to determine an operating contract for the first building device and the second building device;

wherein the processing circuit of the first building device is configured to:
generate a block comprising the operating contract; and
send the block comprising the operating contract to the plurality of building devices to be solved and added to the blockchain.

4. The system of claim 1, wherein the first block generated by the processing circuit of the first building device further comprises a digital signature and a public key;

wherein the processing circuit of the first building device is configured to generate the digital signature for the first block with a private key and the device data;

wherein the second block further comprises a second public key and a second digital signature, wherein the processing circuit of the first building device is configured to verify authenticity of the second block with the different device data, the second digital signature, and the second public key.

5. The system of claim 1, wherein the processing circuit of the first building device is configured to periodically update the difficulty requirement based on a target time, wherein the target time is an amount of time for the plurality of building devices to solve a predefined number of blocks; wherein the target time is based on the plurality of building devices being building security devices, building lighting devices, and devices that affect an environmental change in the building.

6. The system of claim 1, wherein the system further comprises a licensing server comprising a processing circuit configured to: receive a purchase for a software license for the software for the first building device;

generate a block comprising the software license for the first building device in response to receiving the purchase for the software license for the first building device; and

send the block comprising the software license for the first building device to the plurality of building devices to be added to the blockchain stored on the plurality of building devices.

7. The system of claim 6, wherein the processing circuit of the first building device is configured to identify the software license based on the blockchain.

8. The system of claim 7, wherein the processing circuit of the first building device is further configured to perform, in response to identifying the software license, at least one of:

identifying the second building device licensed for the software based on the blockchain and send a request message to the second building device for the software; and sending the request message for the software to the licensing server.

9. The system of claim 8, wherein the second building device comprises a processing circuit configured to:

receive the request message from the first building device;

determine that the first building device is licensed for the software based on the blockchain indicating that the first building device is licensed for the software; and

send the software to the first building device in response to determining that the blockchain indicates that the first building device is licensed for the software.

10. The system of claim 1, wherein the processing circuit of the first building device is configured to:

- generate an access request for device data of the second building device; and send the access request for the device data to the second building device;

- wherein the second building device comprises a processing circuit configured to:

 - receive the access request from the first building device;

 - generate a block authorizing the first building device to request the device data of the second building device; and

 - send the block authorizing the first building device to request the device data of the second building device to the plurality of building devices to be solved and added to the blockchain stored on the plurality of building devices;

- wherein the processing circuit of the first building device is further configured to send a request for the device data to the second building device in response to determining that the first building device is authorized to receive the device data.

11. The system of claim 10, wherein the processing circuit of the first building device is configured to:

- identify one of the plurality of building devices that have access to the device data based on the blockchain;

- send a second request for the device data to the identified building device; and receive the device data from the identified building device;

- wherein the identified building device comprises a processing circuit configured to:

 - receive the second request for the device data from the first building device;

 - determine that the first building device has access to the device data based on the blockchain; and

send the device data to the first building device in response to determining that the first building device has access to the device data of the second building device.

12. A method for securely communicating and storing information among a plurality of building devices in a building system of a building, the method comprising:

generating, by a first building device, a first block comprising device data, wherein the first building device is one of the plurality of building devices;

sending, by the first building device, the first block to at least a portion of the plurality of building devices;

receiving, by the first building device, a second block from a second building device of the plurality of building devices;

solving, by the first building device, the second block by determining a nonce value that causes hashing data, the nonce value, and a previous hash of a newest block in a blockchain to meet a difficulty requirement, wherein each of the plurality of building devices are configured to store the blockchain that comprises a plurality of blocks linked sequentially;

adding, by the first building device, the solved block to the blockchain of the first building device as the newest block, wherein the blockchain of the first building device comprises one or more licensing blocks indicating license information for software of a respective one or more of the plurality of building devices;

sending, by the first building device, the solved block to each of the plurality of building devices to be added to the blockchain stored on at least one of the plurality of building devices to be added as the newest block, wherein the solved block comprises the different device data and the determined nonce value.

13. The method of claim 12, wherein the plurality of blocks comprise device data associated with a plurality of zones of the building associated with the building system;

wherein the blockchain further comprises, based on the plurality of blocks, a record of device data for the building;

wherein the plurality of blocks further comprise licensing information for the plurality of building devices;

wherein the blockchain further comprises, based on the plurality of blocks comprising the licensing information, a record of licensing information for the plurality of building devices.

14. The method of claim 12, further comprising: determining, by the first building device and the second building device, an operating contract for the first building device and the second building device; generating, by the first building device, a block comprising the operating contract; and sending, by the first building device, the block comprising the operating contract to the plurality of building devices to be added to the blockchain stored on the plurality of building devices.

15. The method of claim 12, wherein the first block further comprises a digital signature and a public key, wherein the method further comprises generating, by the first building device, the digital signature for the first block with a private key and the device data;

wherein the second block further comprises a second public key and a second digital signature, wherein the method further comprises verifying, by the first building device, authenticity of the second block with the different device data, the second digital signature, and the second public key.

16. The method of claim 12, further comprising periodically updating, by the first building device, the difficulty requirement based on a target time, wherein the target time is an amount of time for the plurality of building devices to solve a predefined amount of blocks;

wherein the target time is based on the plurality of building devices being building security devices, building lighting devices, and devices that affect an environmental change in the building.

17. The method of claim 12, wherein the method further comprises:

receiving, by a license server, a purchase for a software license for the software for the first building device;

generating, by the license server, a block comprising the software license for the first building device in response to receiving the purchase for the software license for the first building device;

sending, by the license server, the block comprising the software license for the first building device to the plurality of building devices to be solved and added to the blockchain stored on the plurality of building devices;

identifying, by the first building device, the software license based on the blockchain; and sending, by the first building device, a request message for the software to the license server.

18. The method of claim 12, the method further comprising:

generating, by the first building device, an access request for device data of the second building device;

sending, by the first building device, the access request for the device data to the second building device;

receiving, by the second building device, the access request from the first building device;

generating, by the second building device, a block authorizing the first building device to request the device data of the second building device;

sending, by the first building device, the block to the plurality of building devices to be solved and added to the blockchain stored on the plurality of building devices; and

sending, by the first building device, a request for the device data to the second building device.

19. The method of claim 18, the method further comprising:

identifying, by the first building device, one of the plurality of building devices that have access to the device data based on the blockchain;

sending, by the first building device, a second request for the device data to the identified building device;

receiving, by the identified building device, the second request for the device data from the first building device;

determining, by the identified building device, that the first building device has access to the device data based on the blockchain;

sending, by the identified building device, the device data to the first building device in response to determining that the first building device has access to the device data of the second building device; and

receiving, by the first building device, the device data from the one of the plurality of building devices.

20. A system for securely communicating and storing information in a building system of a building, the system comprising:

a plurality of building devices communicably coupled via a network, wherein each of the plurality of building devices are configured to store a copy of a blockchain comprising a plurality of blocks linked sequentially, wherein the plurality of building devices comprise a first building device comprising a processing circuit, the processing circuit comprising one or more memory devices and one or more processors, the processing circuit configured to:

generate a first block comprising device data, a public key, and a digital signature, wherein the digital signature is generated based on the device data and a private key;

send the first block to at least a portion of the plurality of building devices;

receive a second block from a second building device, wherein the second block comprises different device data, a second public key, and a second digital signature;

verify authenticity of the second block with the different device data, the second digital signature, and the second public key;

solve the second block by determining a nonce value that causes hashing the different device data, the nonce value, and a previous hash of a newest block in the blockchain to meet a difficulty requirement;

add the solved block to the blockchain of the first building device as the newest block, wherein the blockchain of the first building device comprises one or more licensing blocks indicating license information for software of a respective one or more of the plurality of building devices; and

send the solved block to the plurality of building devices to be added by each of the plurality of building devices as the newest block in the blockchain stored on each of the plurality of building devices, wherein the solved block comprises the different device data and the determined nonce value.

21. The system of claim 20, wherein the plurality of blocks comprise device data associated with a plurality of zones of the building associated with the building system; wherein the blockchain further comprises, based on the plurality of blocks, a record of device data for the building;

wherein the plurality of blocks further comprise licensing information for the plurality of building devices;

wherein the blockchain further comprises, based on the plurality of blocks comprising the licensing information, a record of licensing information for the plurality of building devices.

22. The system of claim 20, wherein the processing circuit of the first building device is configured to periodically update the difficulty requirement based on a target time,

wherein the target time is an amount of time for the plurality of building devices to solve a predefined amount of blocks;

wherein the target time is based on the plurality of building devices being building security devices, building lighting devices, and devices that affect an environmental change in the building.

23. The system of claim 20, wherein the processing circuit of the first building device and a processing circuit of the second building device of the plurality of building devices are configured to determine an operating contract for the first building device and the second building device; and

wherein the processing circuit of the first building device is configured to generate a block comprising the operating contract; and

send the block comprising the operating contract to the plurality of building devices to be solved and added to the blockchain stored on the plurality of building devices.

24. The system of claim 20, wherein the system further comprises a licensing server comprising a processing circuit configured to:

receive a purchase for a software license for the software for the first building device; generate a block comprising the software license for the first building device in response to receiving the purchase for the software license for the first building device; and

send the block comprising the software license for the first building device to the plurality of building devices to be solved and added to the blockchain stored on the plurality of building devices;

wherein the processing circuit of the first building device is configured to identify the software license based on the blockchain;

wherein the processing circuit of the first building device is further configured to perform at least one of:

identify the second building device licensed for the software based on the blockchain and send a request message to the second building device for the software; and

send the request message for the software to the licensing server; wherein a processing circuit of the second building device is configured to: receive the request message from the first building device;

determine that the first building device is licensed for the software based on the blockchain indicating that the first building device is licensed for the software; and

send the software to the first building device in response to determining that the blockchain indicates that the first building device is licensed for the software.