CLAIMS

What is claimed is:

1. A computing device comprising:

a memory device; and

one or more processors in communication with the memory device, the one or more processors configured to execute a software stack to provide a fabric node of a plurality of fabric nodes of an overlay network implemented in an application layer differentiated from an internet protocol layer, the provided fabric node configured to:

obtain a request for digital content from a client,

obtain, from one or more of the plurality of fabric nodes, a plurality of content object parts of a content object representing, in the overlay network, at least a portion of the digital content,

generate digital output using:

raw data stored in the content object parts,

metadata stored in the content object parts, and

build instructions stored in the content object parts, and

provide the digital output to the client.

2. A non-transitory computer-readable medium storing program code to be executed by one or more processors, the program code comprising instructions configured to cause:

providing a fabric node of a plurality of fabric nodes of an overlay network implemented in an application layer differentiated from an internet protocol layer, the provided fabric node configured to:

obtain a request for digital content from a client,

obtain, from one or more of the plurality of fabric nodes, a plurality of content object parts of a content object representing, in the overlay network, at least a portion of the digital content,

generate digital output using:

raw data stored in the content object parts,

metadata stored in the content object parts, and

build instructions stored in the content object parts, and

~~provide the digital output to the client.~~

~~3. A method comprising:~~

~~providing a fabric node of a plurality of fabric nodes of an overlay network implemented in an application layer differentiated from an internet protocol layer;~~

~~receiving a request for digital content from a client;~~

~~obtaining, from one or more of the plurality of fabric nodes, a plurality of content object parts of a content object representing, in the overlay network, at least a portion of the digital content;~~

~~generating digital output using:~~

~~raw data stored in the content object parts,~~

~~metadata stored in the content object parts, and~~

~~build instructions stored in the content object parts; and~~

~~providing the digital output to the client.~~

~~4. An apparatus comprising:~~

~~means for providing a fabric node of a plurality of fabric nodes of an overlay network implemented in an application layer differentiated from an internet protocol layer;~~

~~means for processing a request for digital content from a client;~~

~~means for obtaining, from one or more of the plurality of fabric nodes, a plurality of content object parts of a content object representing, in the overlay network, at least a portion of the digital content;~~

~~means for generating digital output using:~~

~~raw data stored in the content object parts,~~

~~metadata stored in the content object parts, and~~

~~build instructions stored in the content object parts; and~~

~~means for providing the digital output to the client.~~

~~5~~1. A decentralized content-centric system comprising:

one or more memory devices; and

one or more processors in communication with the one or more memory devices, the one or more processors configured to execute ~~a~~ software ~~stack~~ to provide an overlay network implemented in an application layer differentiated from an internet protocol

layer, the overlay network configured to manage a plurality of content object parts representing digital content, each content object part comprising raw data, metadata, and build instructions, the overlay network comprising:

a data layer storing the raw data and the metadata of ~~one or more~~the content object parts,

a code layer storing the build instructions ~~associated with~~ of the ~~one or more~~ content object parts~~, the build instructions configured to be processed to generate, using the raw data and the metadata, digital content based on the one or more content object parts~~,

a contract layer storing a digital contract~~, the digital contract configured to be used in combination with the raw data and the metadata to further generate the digital content~~ associated with the content object parts, and

one or more interfaces;

the overlay network further configured to:

generate digital output by at least processing the build instructions stored in the code layer and the digital contract stored in the contract layer in relation to the raw data and the metadata stored in the data layer, and

~~a communications interface configured to~~ provide, using the one or more interfaces, the digital ~~content~~output to a ~~requesting~~ client.

~~6. A non-transitory computer-readable medium storing program code of a software stack to be executed by one or more processors, the program code comprising instructions configured to cause:~~

~~providing an overlay network implemented in an application layer differentiated from an internet protocol layer, the overlay network comprising:~~

~~a data layer storing raw data and metadata of one or more content object parts,~~

~~a code layer storing build instructions associated with the one or more content object parts, the build instructions configured to be processed to generate, using the raw data and the metadata, digital content based on the one or more content object parts, and~~

~~a contract layer storing a digital contract, the digital contract configured to be used in combination with the raw data and the metadata to further generate the digital content; and~~

providing the digital content to a requesting client.

7. The computing device of claim 1, the provided fabric node further configured to store a content object part in the memory device.

8. The computing device of claims 1 or 7, the provided fabric node further configured to provide an executable digital contract configured to be processed in combination with the raw data, the metadata and the build instructions to generate the digital output.

9. The computing device of claim 8, wherein the digital contract is stored with associated identifiers of different versions of a contract object part in a ledger.

10. The computing device of claims 8 or 9, the provided fabric node further configured to:

generate a version proof for the content object part using a hash tree,

verify the version proof, and

store the version proof in association with the digital contract in the ledger.

11. The computing device of any one of claims 1 and 7-10, wherein the raw data, metadata and build instructions are configured to be processed to generate the digital output using just-in-time (JIT) processing.

12. The computing device of claim 11, wherein the digital contract is configured to record the JIT processing.

13. The computing device of any one of claims 1 and 7-12, wherein a translation layer is situated between the application layer and the internet protocol layer, the translation layer configured to provide communications between the application layer and the internet protocol layer.

~~14. The system of claim 5, wherein each content object part is identified by a respective hash generated by performing a one-way hash operation on content data of the content object part.~~

~~15~~2. The system of claim~~s 5 or 14~~1, the contract layer configured to control one or more of a plurality of trustless security operations associated with a ledger, the trustless security operations comprising one or more of: encryption of content, proxy re-encryption of content, or content access authorization associated with one or more content transactions recorded in the ledger.

~~16~~3. The system of claim ~~15~~2, wherein the ledger is a blockchain of the overlay network~~, the blockchain implemented in the software stack~~.

~~17. The system of any one of claims 5 and 14-16, wherein the digital contract is a blockchain smart contract.~~

~~18~~4. The system of ~~any one of~~ claim~~s~~ ~~5~~2 ~~and 14-17~~, wherein the digital contract is ~~further~~ configured to record operations on the ~~one or more~~ content object parts as respective transactions.

~~19~~5. The system of claim ~~18~~4, wherein a transaction identifies one or more of: an address of an entity requesting an operation, an identifier of ~~the one or more~~a content object part~~s~~, or transaction data.

~~20~~6. The system of ~~any one of~~ claim~~s~~ 1~~5 and 14-19~~, wherein the software ~~stack~~ is executed by each of a plurality of processors to provide a plurality of fabric nodes of the overlay network, each fabric node configured to communicate with other fabric nodes to receive, manage and output digital content to provide a decentralized framework.

~~21. An apparatus comprising:~~

~~means for providing an overlay network implemented in an application layer differentiated from an internet protocol layer, the means for providing the overlay network comprising:~~

~~means for storing raw data and metadata of one or more content object parts,~~

~~means for storing build instructions associated with the one or more content object parts, the build instructions configured to be processed to generate, using the raw data and the metadata, digital content based on the one or more content object parts, and~~

~~means for storing a digital contract, the digital contract configured to be used in combination with the raw data and the metadata to further generate the digital content; and~~

~~means for providing the digital content to a requesting client.~~

7. A computing device of a decentralized content-centric system, the computing device comprising:

a memory device; and

one or more processors in communication with the memory device, the one or more processors configured to execute software to provide a fabric node of a plurality of fabric nodes of an overlay network implemented in an application layer differentiated from an internet protocol layer, the overlay network configured to manage a plurality of content object parts representing digital content, each content object part comprising raw data, metadata, and build instructions, the provided fabric node configured to:

obtain, from a client, a request for digital content,

obtain, from one or more of the plurality fabric nodes, the content object parts,

generate digital output by at least processing a digital contract associated with the content object parts and the build instructions stored in the content object parts in relation to the raw data and the metadata stored in the content object parts, and

provide the digital output to the client.

8. The computing device of claim 7, the provided fabric node further configured to store a content object part in the memory device.

9. The computing device of claim 7, the provided fabric node further configured to provide the digital contract as a blockchain smart contract.

10. The computing device of claim 9, wherein the digital contract is stored with associated identifiers of different versions of a contract object part in a ledger.

11. The computing device of claim 10, the provided fabric node further configured to:

generate a version proof for the content object part using a hash tree,

verify the version proof, and

store the version proof in association with the digital contract in the ledger.

12. The computing device of claim 7, wherein the raw data, metadata and build instructions are configured to be processed to generate the digital output using just-in-time (JIT) processing.

13. The computing device of claim 12, wherein the digital contract is configured to record the JIT processing.

14. The computing device of claim 7, wherein a translation layer is situated between the application layer and the internet protocol layer, the translation layer configured to provide communications between the application layer and the internet protocol layer.

15. A non-transitory computer-readable medium storing program code of software to be implemented using one or more memory devices and to be executed by one or more processors in communication with the one or more memory devices, the program code comprising instructions configured to cause:

providing an overlay network implemented in an application layer differentiated from an internet protocol layer, the overlay network configured to manage a plurality of content object parts representing digital content, each content object part comprising raw data, metadata, and build instructions, the overlay network comprising:

a data layer storing the raw data and the metadata of the content object parts,

a code layer storing the build instructions of the content object parts, and

a contract layer storing a digital contract associated with the content object parts;

generating digital output by at least processing the build instructions stored in the code layer and the digital contract stored in the contract layer in relation to the raw data and the metadata stored in the data layer; and

providing the digital output to a requesting client.

16. The non-transitory computer-readable medium of claim 15, the contract layer configured to control one or more of a plurality of trustless security operations associated with a ledger, the trustless security operations comprising one or more of: encryption of content, proxy re-encryption of content, or content access authorization associated with one or more content transactions recorded in the ledger.

17. The non-transitory computer-readable medium of claim 16, wherein the ledger is a blockchain of the overlay network.

18. The non-transitory computer-readable medium of claim 15, wherein the digital contract is configured to record operations on the content object parts as respective transactions.

19. The non-transitory computer-readable medium of claim 18, wherein a transaction identifies one or more of: an address of an entity requesting an operation, an identifier of a content object part, or transaction data.

20. A non-transitory computer-readable medium storing program code of software to be implemented using one or more memory devices and to be executed by one or more processors in communication with the one or more memory devices, the program code comprising instructions configured to cause:

providing a fabric node of a plurality of fabric nodes of an overlay network implemented in an application layer differentiated from an internet protocol layer, the overlay network configured to manage a plurality of content object parts representing digital content, each content object part comprising raw data, metadata, and build instructions, the provided fabric node configured to:

obtain, from a client, a request for digital content,

obtain, from one or more of the plurality fabric nodes, the content object parts,

generate digital output by at least processing a digital contract associated with the content object parts and the build instructions stored in the content object parts in relation to the raw data and the metadata stored in the content object parts; and

providing the digital output to the client.

21. The non-transitory computer-readable medium of claim 20, the provided fabric node further configured to store a content object part in the one or more memory devices.

22. The non-transitory computer-readable medium of claim 20, the provided fabric node further configured to provide the digital contract as a blockchain smart contract.

23. The non-transitory computer-readable medium of claim 22, wherein the digital contract is stored with associated identifiers of different versions of a contract object part in a ledger.

24. The non-transitory computer-readable medium of claim 23, the provided fabric node further configured to:

generate a version proof for the content object part using a hash tree,

verify the version proof, and

store the version proof in association with the digital contract in the ledger.

25. The non-transitory computer-readable medium of claim 20, wherein the raw data, metadata and build instructions are configured to be processed to generate the digital output using just-in-time (JIT) processing.

26. The non-transitory computer-readable medium of claim 25, wherein the digital contract is configured to record the JIT processing.