

UNITED STATES
PATENT AND TRADEMARK OFFICEP.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov**ELECTRONIC ACKNOWLEDGEMENT RECEIPT**

APPLICATION # PCT/US25/55750	RECEIPT DATE / TIME 11/17/2025 03:47:59 PM Z ET	ATTORNEY DOCKET # 094744.0101
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Title of Invention

Systems and Methods for Digital Asset Management

Application Information

APPLICATION TYPE	International Application (PCT) for filing in the US receiving office	PATENT #	-
CONFIRMATION #	4559	FILED BY	Thao Ton
PATENT CENTER #	73192711	FILING DATE	-
CUSTOMER #	23640	APPLICANT NAME	Bored Counsel LLC
CORRESPONDENCE ADDRESS	Ali Dhanani - 66233, Baker Botts L.L.P. 910 Louisiana Street HOUSTON, TX 77002 US	AUTHORIZED BY	Ali Dhanani

Documents**TOTAL DOCUMENTS: 2**

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
0947440101.zip	-	-	98 KB
Pct101.pdf	5	PCT/RO/101 - Request form for new International Application - PCT EASY Format	58 KB
Fees.pdf	1	PCT/RO/101 Annex (fee calculation sheet)	44 KB

Digest

DOCUMENT MESSAGE DIGEST(SHA-512)

0947440101.zip	CA64F96DBC9350FE12AC0A0E7702AD7D97537E6E41306D5C 6706876CBBBD42CB5E51F401F771D34FA298613A41D54C2214 D50D14F5FCCE93EF979D4F14FBD8F4C
Pct101.pdf	8A1344B3F6D721935A9F6E0A8D222F52C743BBBC6FB43F72A 240FCF762C19B5B4D0F8327D446CF1C469239DF39F0E45CC5 F090F3910F5D34375256A32015FFB5
Fees.pdf	93E3A3881A2B7A75B450A0FEC09228FAAA0F5D3AFFB700ED 2E619E498C98C1DE32A798BD56D876D5EACAF1E54C79FECF BFF2B38FB318F527E4CB45FFFCF867AD

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

**ELECTRONIC ACKNOWLEDGEMENT RECEIPT**APPLICATION #
PCT/US25/55750RECEIPT DATE / TIME
11/17/2025 03:58:50 PM Z ETATTORNEY DOCKET #
094744-0101**Title of Invention**

SYSTEMS AND METHODS FOR DIGITAL ASSET MANAGEMENT

Application Information

APPLICATION TYPE	International Application (PCT) for filing in the US receiving office	PATENT #	-
CONFIRMATION #	4559	FILED BY	Thao Ton
PATENT CENTER #	73210705	FILING DATE	-
CUSTOMER #	23640	APPLICANT NAME	BORED COUNSEL LLC
CORRESPONDENCE ADDRESS	ALI DHANANI 910 LOUISIANA STREET HOUSTON, TX 77002 US	AUTHORIZED BY	Ali Dhanani

Documents**TOTAL DOCUMENTS: 4**

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
094744.0101 PCT Specification.pdf	42	-	270 KB
094744.0101 PCT Specification-SPEC.pdf	(1-35) 35	Specification	248 KB
094744.0101 PCT Specification-CLM.pdf	(36-41) 6	Claims	117 KB
094744.0101 PCT Specification-ABST.pdf	(42-42) 1	Abstract	102 KB
094744.0101 Formal Drawings.pdf	4	Drawings-only black and white line drawings	79 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
094744.0101 PCT Specification.pdf	76017CBA37A4D88237099465CB97E5EA660BE4E310A89EC95 2B5E5C397ED4371E01B24EBA0DF9A80ACA1618AF28BB706D 1CD64EE3B64D4390AE6CABFD190D1CF
094744.0101 PCT Specification-SPEC.pdf	354F6729A04B37863C7EA85A1EB4BA9A8602F4A120AC56BDB 598B653D9BCD9E3A9B2F24CB65D64285E1D0EED846AAD28D 0E1F388DBE75D6E5CC8D532E641A843
094744.0101 PCT Specification-CLM.pdf	A41687A9708A67EB36B3F3A598EBAC6430D3067B5EE52F141 7C2CA41666F9FA9999731A56D8A7C07652D9E5B51D601D3BF 42AFF3703993A08ED272523120957D
094744.0101 PCT Specification-ABST.pdf	5054828C7777B096A051CEA506408FE1A3F9A63A22A3B037F6 D3F432CF6276563F7532C68B15794FAAE2013947BF21D38423 EAA60977DB2EED0915E1B5E3C689
094744.0101 Formal Drawings.pdf	2EC6F1D6F0D833CFB4A2F891B923A13DB534A0EB8C2D283C E49245E09202E3D0D5F393E75D05CA17DD2014A609B2EC03A 6F676679D749BFC3F774B99894D2CFB

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ELECTRONIC PAYMENT RECEIPT

APPLICATION # PCT/US25/55750	RECEIPT DATE / TIME 11/17/2025 03:47:59 PM Z ET	ATTORNEY DOCKET # 094744.0101
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Title of Invention

Systems and Methods for Digital Asset Management

Application Information

APPLICATION TYPE	International Application (PCT) for filing in the US receiving office	PATENT #	-
CONFIRMATION #	4559	FILED BY	Thao Ton
PATENT CENTER #	73192711	AUTHORIZED BY	Ali Dhanani
CUSTOMER #	23640	FILING DATE	-
CORRESPONDENCE ADDRESS	Ali Dhanani - 66233, Baker Botts L.L.P. 910 Louisiana Street HOUSTON, TX 77002 US	APPLICANT NAME	Bored Counsel LLC

Payment Information

PAYMENT METHOD DA / 020384	PAYMENT TRANSACTION ID E2025AGF49299407	PAYMENT AUTHORIZED BY Thao Ton
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PRE-AUTHORIZED ACCOUNT 020384	PRE-AUTHORIZED CATEGORY 37 CFR 1.17(m) (Acceptance of an unintentionally delayed claim for priority); 37 CFR 1.445(a)(1), (a)(2), (a)(4) and (b) (International application filing, processing and search fees); PCT Rule 14; PCT Rule 15; PCT Rule 16
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FEE CODE	DESCRIPTION	ITEM PRICE(\$)	QUANTITY	ITEM TOTAL(\$)
2601	TRANSMITTAL FEE	114.00	1	114.00
1703	SUPPLEMENTAL FEE (FOR EACH PAGE OVER 30)	18.00	21	378.00
1710	INTERNATIONAL FILING FEE (FIRST 30 PAGES - FILED ELECTRONICALLY WITH EPCT OR PCT-EASY .ZIP FILE)	1362.00	1	1362.00
2602	SEARCH FEE - REGARDLESS OF	960.00	1	960.00

WHETHER THERE IS A
CORRESPONDING APPLICATION
(SEE 35 U.S.C. 361(D) AND PCT
RULE 16)

**TOTAL
AMOUNT: \$2,814.00**

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

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New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PCT REQUEST

(Original in Electronic Form)

0	For receiving Office use only	
0-1	International Application No.	
0-2	International Filing Date	
0-3	Name of receiving Office and "PCT International Application"	
0-4	Form PCT/RO/101 PCT Request	
0-4-1	Prepared Using	ePCT-Filing for data package download Version 4.15.022 MT/FOP 20251014/2.8
0-5	Petition	
	The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty	
0-6	Receiving Office (specified by the applicant)	United States Patent and Trademark Office (USPTO) (RO/US)
0-7	Applicant's or agent's file reference	094744-0101
I	Title of Invention	Systems and Methods for Digital Asset Management
II	Applicant	
II-1	This person is	Applicant only
II-2	Applicant for	All designated States
II-4	Name	BORED COUNSEL LLC
II-5	Address	5184 W Industrial Drive Hurricane, Utah 84737 United States of America
II-6	State of nationality	US
II-7	State of residence	US
II-10	e-mail	houston.foreign.patent@bakerbotts.com
II-10(a)	E-mail authorization The receiving Office, the International Searching Authority, the International Bureau and the International Preliminary Examining Authority are authorized to use this e-mail address, if the Office or Authority so wishes, to send notifications issued in respect of this international application:	Email (with PDF attachment)
III-1	Applicant and/or inventor	
III-1-1	This person is	Inventor only
III-1-3	Inventor for	All designated States
III-1-4	Name (LAST, First)	LEE, Ernest
III-1-5	Address	c/o Bored Legal 732 S 6th Street, #5624 Las Vegas, Nevada 89101 United States of America

PCT REQUEST

(Original in Electronic Form)

III-2	Applicant and/or inventor	
III-2-1	This person is	Inventor only
III-2-3	Inventor for	All designated States
III-2-4	Name (LAST, First)	HABER, Aaron
III-2-5	Address	c/o Bored Legal 732 S 6th Street, #5624 Las Vegas, Nevada 89101 United States of America
IV-1	Agent or common representative; or address for correspondence	
	The person identified below is hereby/ has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:	Agent
IV-1-1	Name (LAST, First)	DHANANI, Ali
IV-1-2	Address	910 Louisiana Street Houston, Texas 77002 United States of America
IV-1-3	Telephone No.	+17132291108
IV-1-4	Facsimile No.	+17132292808
IV-1-5	e-mail	houston.foreign.patent@bakerbotts.com
IV-1-5(a)	E-mail authorization The receiving Office, the International Searching Authority, the International Bureau and the International Preliminary Examining Authority are authorized to use this e-mail address, if the Office or Authority so wishes, to send notifications issued in respect of this international application:	Email (with PDF attachment)
IV-1-6	Agent's registration No.	66,233
IV-2	Additional agent(s)	additional agent(s) with same address as first named agent
IV-2-1	Name(s)	BURGER, Michael(77,680)
V	DESIGNATIONS	
V-1	The filing of this request constitutes under Rule 4.9(a), the designation of all Contracting States bound by the PCT on the international filing date, for the grant of every kind of protection available and, where applicable, for the grant of both regional and national patents.	
VI-1	Priority Claim	NONE
VII-1	International Searching Authority Chosen	United States Patent and Trademark Office (USPTO) (ISA/US)

PCT REQUEST

(Original in Electronic Form)

VIII	Declarations	Number of declarations	
VIII-1	Declaration as to the identity of the inventor	1	
VIII-2	Declaration as to the applicant's entitlement, as at the international filing date, to apply for and be granted a patent	-	
VIII-3	Declaration as to the applicant's entitlement, as at the international filing date, to claim the priority of the earlier application	-	
VIII-4	Declaration of inventorship (only for the purposes of the designation of the United States of America)	-	
VIII-5	Declaration as to non-prejudicial disclosures or exceptions to lack of novelty	-	

PCT REQUEST

(Original in Electronic Form)

VIII-1-1	Declaration: Identity of the Inventor Declaration as to the identity of the inventor (Rules 4.17(i) and 51bis.1(a)(i))	In relation to this international application
	Name (LAST, First) Address	LEE, Ernest of c/o Bored Legal 732 S 6th Street, #5624 Las Vegas, Nevada 89101 United States of America is the inventor of the subject matter for which protection is sought by way of this international application
	Name (LAST, First) Address	HABER, Aaron of c/o Bored Legal 732 S 6th Street, #5624 Las Vegas, Nevada 89101 United States of America is the inventor of the subject matter for which protection is sought by way of this international application

PCT REQUEST

(Original in Electronic Form)

IX	Check list	Number of sheets	Electronic file(s) attached
IX-1	Request (including declaration sheets)	5	✓
IX-2	Description	35	✓
IX-3	Claims	6	✓
IX-4	Abstract	1	✓
IX-5	Drawings	4	✓
IX-6a	Sequence listing part of the description	-	-
IX-7	TOTAL	51	
	Accompanying Items	Paper document(s) attached	Electronic file(s) attached
IX-8	Fee calculation sheet	-	✓
IX-20	Figure of the drawings which should accompany the abstract	1	
IX-21	Language of filing of the international application	English	
X-1	Signature of applicant, agent or common representative	/Ali DHANANI, Reg. No. 66,233/	
X-1-1	Name (LAST, First)	DHANANI, Ali	
X-1-3	Capacity (if such capacity is not obvious from reading the request)	Agent	

FOR RECEIVING OFFICE USE ONLY

10-1	Date of actual receipt of the purported international application	
10-2	Drawings:	
10-2-1	Received	
10-2-2	Not received	
10-3	Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application	
10-4	Date of timely receipt of the required corrections under PCT Article 11(2)	
10-5	International Searching Authority	ISA/US
10-6	Transmittal of search copy delayed until search fee is paid	

FOR INTERNATIONAL BUREAU USE ONLY

11-1	Date of receipt of the record copy by the International Bureau	
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PCT (ANNEX - FEE CALCULATION SHEET)

(Original in Electronic Form)

(This sheet is not part of and does not count as a sheet of the international application)

0	For receiving Office use only		
0-1	International Application No.		
0-2	Date stamp of the receiving Office		
0-4	Form PCT/RO/101 (Annex) PCT Fee Calculation Sheet		
0-4-1	Prepared Using	ePCT-Filing for data package download Version 4.15.022 MT/FOP 20251014/2.8	
0-9	Applicant's or agent's file reference	094744-0101	
2	Applicant	BORED COUNSEL LLC	
12	Calculation of prescribed fees	Fee amount/multiplier	Total amounts (USD)
12-1	Transmittal fee T	↔	114
12-2-1	Search fee S	↔	960
12-2-2	International search to be carried out by	US	
12-3	International filing fee (first 30 sheets) i1	1603	
12-4	Remaining sheets	21	
12-5	Additional amount (X)	18	
12-6	Total additional amount i2	378	
12-7	i1 + i2 = i	1981	
12-12	Electronic Filing reduction (Image) R	-241	
12-13	Total International filing fee (i-R) I	↔	1740
12-17	Fee for restoration of priority rights RP		
	Number of requests for restoration of priority rights	0	
	Total amount of fees for restoration of priority rights		
12-19	TOTAL FEES PAYABLE (T+S+I+P+RP)	↔	2814
12-21	Mode of payment	Authorization to charge deposit or current account	
12-22	Deposit or current account instructions		
	The receiving Office	United States Patent and Trademark Office (USPTO) (RO/US)	
12-22-1	Authorization to charge the total fees indicated above	✓	
12-22-2	Authorization to charge any deficiency or credit any overpayment in the total fees indicated above	✓	
12-22-3	Authorization to charge the fee for priority document	✓	
12-23	Deposit or current account No.	020384	
12-24	Date	17 November 2025 (17.11.2025)	
12-25	Name and signature	Thao TON /Thao Ton/	

Systems and Methods for Digital Asset Management

TECHNICAL FIELD

[0001] The present disclosure relates generally to distributed ledger technologies and, more particularly, to techniques for managing digital assets on such networks.

BACKGROUND

[0002] This section is intended to introduce the reader to various aspects of art that may be related to various aspects of the present disclosure, which are described below. This discussion is believed to be helpful in providing the reader with background information to facilitate a better understanding of the various aspects of the present disclosure. Accordingly, it should be understood that these statements are to be read in this light, and not as admissions of prior art.

[0003] Distributed ledger technologies, including blockchain-based networks, may securely and verifiably record transactions and data across decentralized computing nodes without reliance on a centralized authority. In such networks, data may be organized into sequentially linked records, often referred to as blocks, that collectively form a shared ledger distributed among participating nodes. Each node may maintain a replicated copy of the ledger, ensuring consistency and redundancy across the network. In some cases, the networks can facilitate the creation and management of digital assets, including both fungible and non-fungible tokens (NFTs). NFTs are cryptographically unique data structures that may be recorded on the distributed ledgers. Unlike fungible tokens, which are interchangeable and identical, each NFT may be individually identifiable and associated with specific metadata, attributes, or linked resources. This uniqueness enables NFTs to represent ownership, authenticity, or other distinct rights associated with digital or physical assets. However, users may encounter challenges when attempting to manage or transfer NFTs across disparate distributed ledger networks.

SUMMARY OF PARTICULAR EMBODIMENTS

[0004] In some aspects, the techniques described herein relate to a method, including: receiving, from a user, configuration data defining one or more attributes of a non-fungible token (NFT) collection; deploying, based on the configuration data, a plurality of smart contracts on a

plurality of distributed ledger networks, wherein the plurality of smart contracts facilitates management of the NFT collection across the plurality of distributed ledger networks; parsing a first minting transaction on a first distributed ledger network of the plurality of distributed ledger networks to determine a first provisional token identification (ID), wherein the first minting transaction is executed via a first smart contract of the plurality of smart contracts; querying a database to determine whether the first provisional token ID is registered on at least one distributed ledger network of the plurality of distributed ledger networks; in response to determining that the first provisional token ID is unregistered: triggering validation of the first minting transaction to deploy an NFT of the NFT collection on the first distributed ledger network, wherein the NFT includes a validated token ID corresponding to the first provisional token ID; and designating, in the database, the validated token ID as registered to an owner of the NFT; parsing a second minting transaction on a second distributed ledger network of the plurality of distributed ledger networks to determine a second provisional token identification (ID), wherein the second minting transaction is executed via a second smart of the plurality of smart contracts, wherein the second provisional token ID matches the validated token ID; and blocking validation of the second minting transaction in response to determining that the second minting transaction was initiated by a non-owner of the NFT.

[0005] In some aspects, the techniques described herein relate to a method, further including, in response to determining that the second minting transaction was initiated by the owner: locking the NFT on the first distributed ledger network to block application of the NFT on the first distributed ledger network; and triggering validation of the second minting transaction to deploy the NFT on the second distributed ledger network.

[0006] In some aspects, the techniques described herein relate to a method, further including updating the database to mark the NFT as inactive on the first distributed ledger network and active on the second distributed ledger network.

[0007] In some aspects, the techniques described herein relate to a method, further including: receiving a request from the owner to transfer the NFT from the second distributed ledger network to the first distributed ledger network; and in response to the request: unlocking the NFT on the first distributed ledger network to enable application of the NFT on the first distributed ledger

network; and locking the NFT on the second distributed ledger network to block application of the NFT on the second distributed ledger network.

[0008] In some aspects, the techniques described herein relate to a method, further including updating the database to mark the NFT as active on the first distributed ledger network and inactive on the second distributed ledger network.

[0009] In some aspects, the techniques described herein relate to a method, further including: in response to determining that the first provisional token ID is registered on the at least one distributed ledger network as a validated NFT: querying the database to determine a registered owner associated the validated NFT; and in response to determining that the registered owner initiated the first minting transaction; locking the validated NFT on the at least one distributed ledger network to block application of the validated NFT on the at least one distributed ledger network; and triggering the validation of the first minting transaction to deploy the NFT on the first distributed ledger network.

[0010] In some aspects, the techniques described herein relate to a method, further including blocking validation of the first minting transaction in response to determining that the first minting transaction was not initiated by the registered owner.

[0011] In some aspects, the techniques described herein relate to a method, wherein defining the one or more attributes of the NFT collection further includes designating the plurality of distributed ledger networks configured to host the NFT collection.

[0012] In some aspects, the techniques described herein relate to a method, wherein defining the one or more attributes of the NFT collection further includes designating token metadata schema, minting policy parameters, royalty payout logic, ownership restrictions, transfer restrictions, programmable utility parameters, license grant terms, access control parameters, or a combination thereof.

[0013] In some aspects, the techniques described herein relate to a system, including: one or more processors; and one or more computer-readable non-transitory storage media coupled to the one or more of processors and including instructions operable when executed by the one or more processors to cause the system to: receive, from a client device, configuration data defining attributes of a non-fungible token (NFT) collection; generate, based on the configuration data, a factory smart contract, wherein the factory smart contract includes executable code configured to

deploy a plurality of smart contracts on a plurality of distributed ledger networks, wherein the plurality of smart contracts is configured to enable a user to initiate one or more operations associated with the NFT collection; execute the factory smart contract to deploy a first smart contract on a first distributed ledger network of the plurality of distributed ledger networks and to deploy a second smart contract on a second distributed ledger network of the plurality of distributed ledger networks; parse a first minting transaction executed via the first smart contract to determine a first provisional token identification (ID); query a database to determine whether the first provisional token ID is registered on at least one distributed ledger network of the plurality of distributed ledger networks; and in response to determining that the first provisional token ID is unregistered: trigger validation of the first minting transaction to deploy an NFT of the NFT collection on the first distributed ledger network, wherein the NFT includes a validated token ID corresponding to the first provisional token ID; and designating, in the database, the validated token ID as registered to an owner of the NFT.

[0014] In some aspects, the techniques described herein relate to a system, wherein the one or more processors are further operable when executing the instructions to: parse a second minting transaction executed via the second smart contract to determine a second provisional token identification (ID), wherein the second provisional token ID matches the validated token ID; and block validation of the second minting transaction in response to a determination that the second minting transaction was initiated by a non-owner of the NFT.

[0015] In some aspects, the techniques described herein relate to a system, wherein the one or more processors are further operable when executing the instructions to, in response to a determination that the second minting transaction was initiated by the owner: lock the NFT on the first distributed ledger network to block application of the NFT on the first distributed ledger network; and trigger validation of the second minting transaction to deploy the NFT on the second distributed ledger network.

[0016] In some aspects, the techniques described herein relate to a system, wherein the one or more processors are further operable when executing the instructions to update the database to mark the NFT as inactive on the first distributed ledger network and active on the second distributed ledger network.

[0017] In some aspects, the techniques described herein relate to a system, wherein the one or more processors are further operable when executing the instructions to: receive a request from the owner to transfer the NFT from the second distributed ledger network to the first distributed ledger network; and in response to the request: unlock the NFT on the first distributed ledger network to enable application of the NFT on the first distributed ledger network; and lock the NFT on the second distributed ledger network to block application of the NFT on the second distributed ledger network.

[0018] In some aspects, the techniques described herein relate to a system, wherein the one or more processors are further operable when executing the instructions to update the database to mark the NFT as active on the first distributed ledger network and inactive on the second distributed ledger network.

[0019] In some aspects, the techniques described herein relate to a system, wherein the one or more processors are further operable when executing the instructions to, in response to a determination that the first provisional token ID is registered on the at least one distributed ledger network as a validated NFT: query the database to determine a registered owner associated the validated NFT; and in response to a determination that the registered owner initiated the first minting transaction; lock the validated NFT on the at least one distributed ledger network to block application of the validated NFT on the at least one distributed ledger network; and trigger the validation of the first minting transaction to deploy the NFT on the first distributed ledger network.

[0020] In some aspects, the techniques described herein relate to a system, wherein the one or more processors are further operable when executing the instructions to block validation of the first minting transaction in response to a determination that the first minting transaction was not initiated by the registered owner.

[0021] In some aspects, the techniques described herein relate to a system, wherein the plurality of distributed ledger networks includes Ethereum, Solana, Cardano, ApeChain, Abstract, Polygon, Binance Smart Chain (BSC), Avalanche, Arbitrum, Optimism, Base, or a combination thereof.

[0022] In some aspects, the techniques described herein relate to a method, including: receiving, from a user, configuration data defining one or more divit rules for a non-fungible token (NFT) collection; generating, via a processing circuitry, a smart contract including executable code

configured to deploy the NFT collection having the one or more divit rules on a plurality of distributed ledger networks; executing the smart contract to deploy the NFT collection on the plurality of distributed ledger networks; evaluating, for one or more NFT holders in the NFT collection, a divit eligibility status for a distribution cycle, wherein the divit eligibility status is based on an adherence of the one or more NFT holders to the one or more divit rules; and providing divit distributions to the one or more NFT holders based on the divit eligibility status.

[0023] In some aspects, the techniques described herein relate to a method, wherein providing the divit distributions further includes providing a first divit distribution on a first distributed ledger network of the plurality of distributed ledger networks and providing a second divit distribution on a second distributed ledger network of the plurality of distributed ledger networks, wherein the first distributed ledger network is different from the second distributed ledger network.

[0024] The embodiments disclosed herein are only examples, and the scope of this disclosure is not limited to them. Particular embodiments may include all, some, or none of the components, elements, features, functions, operations, or steps of the embodiments disclosed herein. Embodiments disclosed in the attached claims are directed to a method, a system, and a method, wherein any feature mentioned in one claim category, (e.g., method), can be claimed in another claim category, (e.g., system), as well. The dependencies or references back in the attached claims are chosen for formal reasons only. However, any subject matter resulting from a deliberate reference back to any previous claims (in particular multiple dependencies) can be claimed as well, so that any combination of claims and the features thereof are disclosed and can be claimed regardless of the dependencies chosen in the attached claims. The subject-matter which can be claimed includes not only the combinations of features as set out in the attached claims but also any other combination of features in the claims, wherein each feature mentioned in the claims can be combined with any other feature or combination of other features in the claims. Furthermore, any of the embodiments and features described or depicted herein can be claimed in a separate claim and/or in any combination with any embodiment or feature described or depicted herein or with any of the features of the attached claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0025] FIG. 1 is a schematic of an embodiment of decentralized environment having a digital asset management system, in accordance with an aspect of the present disclosure;

[0026] FIG. 2 is flow diagram of an embodiment of a method of operating a digital asset management system, in accordance with an aspect of the present disclosure;

[0027] FIG. 3 is flow diagram of an embodiment of a method of operating a digital asset management system, in accordance with an aspect of the present disclosure;

[0028] FIG. 4 is a schematic of an embodiment of a distributed ledger network operable via a digital asset management system, in accordance with an aspect of the present disclosure; and

[0029] FIG. 5 is a schematic of an embodiment of a digital asset management system, in accordance with an aspect of the present disclosure.

DESCRIPTION OF EXAMPLE EMBODIMENTS

[0030] Technical advantages of certain embodiments of this disclosure may include one or more of the following. This disclosure describes systems and methods that provide technical advantages that include, but are not limited to, improved management of non-fungible tokens (NFTs) across disparate distributed ledger networks, such as blockchain systems implementing distinct consensus mechanisms, transaction validation protocols, operating algorithms, smart contract architectures, and computing node configurations. The disclosed systems and methods enhance computer functionality by enabling NFTs associated with a collection or project to be minted on and transferred across heterogeneous distributed ledger networks, while maintaining secure and verifiable ownership of the NFTs. In particular, the techniques described herein support cross-chain token minting and intra-project NFT transfers between networks without relying on conventional bridging mechanisms. This approach may reduce computational overhead, conserve network resources, and enhance the efficiency of token ownership tracking.

[0031] For example, to transfer NFTs between distributed ledger networks using typical token wrapping processes, a token native to a source blockchain may first be escrowed within a smart contract deployed on that source network. Subsequently, a corresponding wrapped token is minted on a destination blockchain. To return the asset to the source blockchain, the wrapped token on the destination network is burned (i.e., permanently destroyed), and the original token is released from escrow, restoring its availability on the source network. Each burn event may constitute an irreversible on-chain transaction that consumes network resources and incurs transaction fees, which may increase the overall cost of cross-chain transfers. Additionally, the destruction and subsequent re-minting of tokens during each transfer may obscure the continuity of token histories

and identifiers, which may limit the utility of the wrapped asset in applications that rely on persistent on-chain records. The disclosed systems and methods address these limitations by, for example, eliminating the need for burn-and-reissue cycles, thereby providing a more efficient and secure mechanism for maintaining continuous ownership and activity status of NFTs across diverse distributed ledger environments.

[0032] Additional technical advantages of the disclosed systems and methods may include facilitating the automated distribution of benefits (e.g., divits) associated with the ownership, possession, or licensing of NFTs in a project, regardless of the distributed ledger network on which the NFTs are deployed. Such benefits may include royalty payments, usage rights, or access to digital applications. The disclosed techniques enable NFT owners to receive benefit distributions on a blockchain network of their choosing, even if the NFT project originated on (e.g., was minted in part or in full on) a different network. For example, royalties may be distributed in connection with licensing, sales, or continued ownership of NFTs. However, conventional systems may struggle to track and distribute such benefits when NFTs are transferred across heterogeneous blockchain networks.

[0033] The present disclosure addresses these limitations by introducing systems and methods for tracking, controlling, and adjusting benefit distributions (e.g., divit distributions), such as royalty payments, for NFTs held across multiple distributed ledger networks. For example, an NFT owner may hold multiple tokens from a single project, distributed across distinct blockchain platforms, and still receive, for each active instance of the NFT, the appropriate benefit that may be prescribed by the project. The disclosed techniques may ensure that eligibility for benefit distributions remains tied to the NFT and its owner, even when the NFT is moved between chains. This capability may incentivize continued ownership in a project by allowing users to select their preferred blockchain environment for holding an NFT, without forfeiting access to associated benefits of being a member in the NFT project or collection.

[0034] Other technical advantages will be readily apparent to one skilled in the art from the following figures, descriptions, and claims. Moreover, while specific advantages have been enumerated above, various embodiments may include all, some, or none of the enumerated advantages.

[0035] Turning now to the drawings, **FIG. 1** is a schematic of an embodiment of a decentralized environment 100 (e.g., a computing system), which includes a digital asset management system 102 configured to execute the techniques discussed herein. In the illustrated embodiment, the decentralized environment 100 includes a first distributed ledger network 104 (e.g., a first blockchain network), a second distributed ledger network 106 (e.g., a second blockchain network), and a third distributed ledger network 108 (e.g., a third blockchain network), collectively referred to herein as distributed ledger networks 110. Each distributed ledger network 110 may represent an independent computational environment configured to support distributed consensus, execute smart contracts, and maintain a shared, verifiable record of state transitions or transactions among a plurality of participants. In certain embodiments, the distributed ledger networks 110 may be heterogeneous and may differ with respect to their underlying consensus mechanisms, data structures, virtual machine architectures, token standards, or governance protocols. For example, in some embodiments, the first distributed ledger network 104 may be Ethereum-based architecture, the second distributed ledger network 106 may be Solana-based architecture, and the third distributed ledger network 108 may be ApeChain-based architecture. While three distributed ledger networks 110 are shown in the illustrated embodiment, it should be understood that the decentralized environment 100 may include any suitable number of distributed ledger networks, and that the techniques described herein may be applied to any configuration of one or more interoperable or independent distributed ledger networks.

[0036] Each of the distributed ledger networks 110 may include a decentralized data structure that is maintained collectively across a plurality of computing nodes 112. The computing nodes 112 may cooperate to record, validate, propagate, and store transaction data within a tamper-evident, append-only ledger that is shared among the computing nodes 112 in the corresponding network. In operation, the computing nodes 112 may generate and manage discrete data entries (e.g., blocks) that may be cryptographically linked to preceding entries using cryptographic hash functions, thereby forming a chronologically ordered and verifiable chain of records. Each block may include a block header, transaction data, a timestamp, and a cryptographic reference to a prior block, which together may enable the ledger to exhibit properties of immutability such that unauthorized modifications may be detectable or practically infeasible. The addition of new data to the ledger may be governed by one or more consensus protocols executed among the computing

nodes 112, such as proof-of-work, proof-of-stake, delegated proof-of-stake, or other suitable fault-tolerant algorithms. Through these consensus mechanisms, the distributed ledger networks 110 may enable agreement on the validity and ordering of transactions without reliance on a centralized authority or single point of control.

[0037] In some embodiments, the plurality of computing nodes 112 may include nodes that perform different roles within the distributed ledger networks 110. For example, certain computing nodes 112 may maintain a complete replica of the ledger state, validate new blocks, and participate directly in consensus, while other computing nodes 112 may maintain partial ledger data or perform auxiliary functions such as querying, indexing, or monitoring network activity. These computing nodes 112 may interact with the distributed ledger networks 110 to retrieve data, submit transactions, or verify block information while relying on other computing nodes 112 for full validation or consensus participation. In certain implementations, the distributed ledger networks 110 may further include virtual machines or runtime environments configured to execute smart contracts or other programmatic logic deterministically across the computing nodes 112. These execution environments may enable each of the distributed ledger networks 110 to support decentralized applications, digital asset issuance, token transactions, and other on-chain operations with predictable and verifiable outcomes.

[0038] The distributed ledger networks 110 may be configured to host a plurality of smart contracts 120 that implement various functionality associated with the operation, governance, or use of the distributed ledger networks 110. By way of example, the first distributed ledger network 104 may be configured to host a first smart contract 122, the second distributed ledger network 106 may be configured to host a second smart contract 124, and the third distributed ledger network 108 may be configured to host a third smart contract 126. Each smart contract 120 may include computer-executable code that is deployed to its respective distributed ledger network 110 as part of a transaction and recorded within the state of the ledger. Once deployed, the corresponding smart contract 120 may be invoked automatically or in response to one or more triggering conditions, such as the submission of a transaction (e.g., a minting request), the receipt of a message, the occurrence of a time-based event, or the satisfaction of predefined state variables.

[0039] The smart contracts 120 may be executed by the computing nodes 112 of the distributed ledger networks 110, which may interpret and process the code of the smart contract 120 using a

runtime environment or virtual machine associated with the network (e.g., the Ethereum Virtual Machine or another execution engine). Each smart contract 120 may encode a set of conditions, rules, or operations that govern how data is written to the ledger, how assets are created, transferred, or modified, and how interactions among network participants are mediated. Because the smart contracts 120 are stored directly on the distributed ledger networks 110, their execution results and any resulting state transitions may be replicated, validated, and verified across the computing nodes 112, thereby providing deterministic behavior, transparency, auditability, and trust-minimized execution without reliance on centralized intermediaries.

[0040] As such, each of the distributed ledger networks 110 may be configured to host one or more smart contracts 120 that implement functionality associated with the creation, management, and transfer of digital tokens. In certain embodiments, one or more of the smart contract 120 may implement a non-fungible token (NFT) standard, such as ERC-721 or ERC-721C, or other suitable protocols compatible with the underlying distributed ledger network 110. Such smart contracts 120 may define the data structures and executable functions used to create unique tokens, assign and update ownership records, enforce transfer restrictions, and associate tokens with on-chain or off-chain metadata. Any of the distributed ledger networks 110 may include a public or private blockchain network, such as Ethereum, Solana, ApeChain, Cardano, Abstract, Polygon, Binance Smart Chain (BSC), Avalanche, Arbitrum, Optimism, or Base, although other suitable distributed ledger networks may also be used. The selection of a particular network or token standard may vary by implementation and may depend on factors such as the underlying consensus mechanism, transaction throughput, execution environment, token standard compatibility, or the degree of decentralization desired for a given application.

[0041] A smart contract 120 implemented according to a non-fungible token standard may instantiate and manage one or more NFTs 130. An NFT 130 may include a cryptographically unique data structure recorded on a distributed ledger network 110 and configured to represent a distinct digital asset, entitlement, or unit of information. Unlike fungible tokens, which may be interchangeable and identical in structure and value, each NFT 130 may be individually identifiable and associated with unique metadata, attributes, or references that distinguish it from other tokens managed by a corresponding smart contract 120. The state and identifying information of the NFT 130, such as a token identifier, ownership record, metadata descriptor, or

pointer to associated content, may be immutably recorded on the corresponding distributed ledger network 110 and replicated its computing nodes 112, thereby enabling verifiable provenance, authenticity, and ownership tracking. Metadata associated with the NFT 130 may include structured information (e.g., JSON) describing the properties of the represented asset and may be stored directly on-chain or referenced by a pointer to off-chain storage. The lifecycle of the NFT 130 (e.g., minting, transfer) may be governed by functions encoded within the corresponding smart contract 120, and state transitions resulting from these operations may be recorded on the corresponding distributed ledger network 110 as transactions. In some examples, the NFT 130 may represent a digital item, such as an image, audio file, video, or document, or may correspond to a right or interest in a physical or virtual resource.

[0042] In some embodiments, the content associated with one or more of the NFTs 130 may be stored off-chain, external to the distributed ledger networks 110 themselves. In such implementations, the NFT 130 may include a uniform resource identifier (URI), which may be a uniform resource locator (URL) or another type of addressing scheme, that identifies the location of the associated content stored in a separate repository 140. The repository 140 may include a distributed or decentralized storage network such as an InterPlanetary File System (IPFS), a content-addressable storage system, or another suitable storage medium. In certain embodiments, the repository 140 may include a centralized or federated database that is hosted by one or more servers 142 configured to store image files, metadata, or other data associated with the NFTs 130. The one or more servers 142 may, in certain implementations, be included within or operated by a subset of the plurality of computing nodes 112, or may alternatively be external resources that are communicatively coupled to the distributed ledger networks 110. Storing large or mutable data off-chain in this manner may allow the distributed ledger networks 110 to efficiently manage storage demands while still maintaining on-chain verifiability and provenance through the unique cryptographic references of each NFT 130.

[0043] The decentralized environment 100 may include a digital asset marketplace 144 (e.g., OpenSea®) that is configured to enable a user to mint, trade, purchase, sell, or otherwise interact with NFTs 130 or other digital assets. The digital asset marketplace 144 may include a network-accessible platform that provides a user interface for creating new NFTs 130 through interaction with the smart contracts 120, listing and discovering NFTs 130 for sale, executing purchase and

sale transactions, and transferring token ownership between accounts. The digital asset marketplace 144 may be hosted by the one or more servers 142 or other servers, and may be accessed by a user through a client device 146. The client device 146 may include a laptop, smartphone, tablet, or other computing device that enables a user to connect to and interact with the digital asset marketplace 144.

[0044] The distributed ledger networks 110, the one or more servers 142, the digital asset marketplace 144, the client device 146, the digital asset management system 102, and any other suitable components of the decentralized environment 100 may be communicatively coupled through a network 150, such as the Internet, which may utilize communication protocols including Transmission Control Protocol/Internet Protocol (TCP/IP), Hypertext Transfer Protocol (HTTP or HTTPS), or other suitable networking standards. This network connectivity may enable transactions initiated through the one or more servers 142, the digital asset marketplace 144, the client device 146, and the digital asset management system 102, for example, to be transmitted to the distributed ledger networks 110 for processing and finalization by participating computing nodes 112.

[0045] As discussed in detail herein, the digital asset management system 102 may be configured to deploy the smart contracts 120 on distributed ledger networks 110 with the functionality described above. In particular, the digital asset management system 102 may be configured to structure the smart contracts 120 to support the creation (e.g., minting), distribution, and control of NFTs 130 across multiple distributed ledger networks 110 in accordance with a scheme designated by a user of the digital asset management system 102. By way of introduction, the digital asset management system 102 may include processing circuitry 160, which may include one or more processors 162 and a data storage 164 (e.g., memory, a database). The processing circuitry 160 may be configured to execute some of or all of the techniques described herein. As such, any reference in this disclosure to the digital asset management system 102 performing an action, instructing an action to be performed, receiving or analyzing instructions or data, or transmitting signals should be understood as referring to the processing circuitry 160 executing some of or all of those actions. In other words, while the digital asset management system 102 may be described as performing certain operations for simplicity, those operations may be carried

out in whole or in part by the processing circuitry 160 or other suitable components within the decentralized environment 100.

[0046] For example, in certain embodiments, a user may utilize the client device 146, the digital asset marketplace 144, the servers 142, another device, or a combination thereof, to communicate with the processing circuitry 160 (e.g., via the network 150) and provide instructions that cause the processing circuitry 160 to perform the disclosed techniques. Additionally or alternatively, the digital asset management system 102 may include one or more input/output (I/O) interfaces 166 that enable the user to input instructions to the processing circuitry 160 and/or to other components of the decentralized environment 100. For clarity, references throughout this disclosure to a user providing instructions, commands, inputs, or other information to the digital asset management system 102 may encompass interactions via the client device 146, the digital asset marketplace 144, the servers 142, the I/O interfaces 166, or any other suitable device communicatively coupled to the digital asset management system 102 (e.g., via the network 150), through which such instructions may be transmitted to the processing circuitry 160 to effectuate execution of the techniques described herein.

[0047] **FIG. 2** illustrates a flow diagram of an embodiment of a method 200 for managing attributes of NFTs 130 across the decentralized environment 100. **FIG. 2** will be referenced concurrently with **FIG. 1** throughout the following discussion. It should be understood that the steps of method 200 may be performed in any suitable order and are not limited to the sequence shown in the illustrated embodiment. Additionally, certain steps may be omitted, and other steps may be added, depending on the implementation. In some embodiments, method 200 may be executed by the processing circuitry 160 or by any other suitable processing circuitry. Executable instructions for performing the steps of method 200 may be stored, for example, in data storage 164.

[0048] In some embodiments, the method 200 may be used to manage a project 170 (e.g., a non-fungible token (NFT) collection, a collection of NFTs 130 or other digital assets) of NFTs 130 distributed across a plurality of distributed ledger networks 110. For example, one or more users may wish to create, own, or otherwise participate in a collection of NFTs 130, where the collection spans multiple distributed ledger networks 110. The NFTs 130 within the collection may share structural characteristics, such as a common metadata schema or a standardized set of attributes,

while maintaining individual uniqueness and cryptographic distinctiveness. For example, the project 170 may serve as a foundational unit for organizing, distributing, or interacting with NFTs 130 in decentralized applications. This structure may enable users, smart contracts, or external systems to reference the project 170 as a whole for purposes such as discovery, indexing, licensing, or programmatic access.

[0049] Each NFT 130 within the project 170 may be individually identified and managed using a token identifier (ID) 172. As discussed below, the token ID 172 may be a unique numeric or alphanumeric value assigned to each NFT 130 by a governing smart contract 120 at the time of minting. The token ID 172 may serve as a distinct index within the project 170 and may be used by the smart contracts 120 or external systems to reference, query, transfer, or modify the state of a specific NFT 130.

[0050] Managing an NFT project or collection across multiple distributed ledger networks 110 presents several technical challenges. When tokens are minted or exchanged concurrently on different distributed ledger networks 110, there is a risk of token ID collisions, which may occur when multiple NFTs 130 within the same project 170 are assigned identical or overlapping token IDs. This may lead to ambiguity regarding whether a given token is a duplicate or a valid, unique instance of an NFT 130 on a particular distributed ledger network 110. This ambiguity can undermine the integrity of the project 170 and complicate verification processes for ownership, authenticity, and holder-benefit distributions.

[0051] The digital asset management system 102 disclosed herein addresses these challenges by enabling coordinated deployment of an NFT project across the distributed ledger networks 110, while ensuring that each NFT 130 retains a singular, verifiable instance within the project 170, regardless of the distributed ledger network 110 on which an instance of the NFT 130 currently resides.

[0052] By way of example, the method 200 may begin with receiving configuration data 174 for the project 170, as indicated by block 202. The configuration data 174 may define desired attributes or characteristics of the project 170, desired attributes or characteristics of one or more NFTs 130 to be included within the project 170, or both. In some embodiments, a creator of the project 170 (e.g., one or more users launching the project 170) may provide the configuration data 174 to the digital asset management system 102 via the client device 146 of the digital asset

marketplace 144. For instance, the user may utilize the client device 146 to connect to the digital asset management system 102 (e.g., to the processing circuitry 160) and to input configuration parameters based on the type of NFT collection the user intends to create. In other embodiments, the user may interact with the I/O interfaces 166 of the digital asset management system 102 to supply the configuration data 174, or may utilize another suitable device of the decentralized environment 100 to provide such data.

[0053] The configuration data 174 may include, without limitation, minting conditions associated with the project 170, such as total supply limits, eligibility criteria, and minting schedules for creating NFTs 130 within the project 170. The configuration data 174 may specify the types of distributed ledger networks 110 on which the project 170 should be supported and usable. Additionally or alternatively, the configuration data 174 may define one or more divit rules that govern various aspects of the project 170. As discussed in detail below, the divit rules may specify, for NFTs 130 in the project 170, parameters related to issuance and distribution, including allocation policies and phased release schedules; metadata configuration, such as schema definitions, mutability settings, and base URI references; transfer and ownership conditions, including restrictions and access controls; economic terms, such as royalty percentages, eligibility requirements, and designated payment recipients; licensing provisions, including permitted usage rights and limitations; governance settings, such as administrative roles and upgradeability options; or other suitable functionality. As such, the configuration data 174 may include designating token metadata schema, minting policy parameters, royalty payout logic, ownership restrictions, transfer restrictions, programmable utility parameters, license grant terms, access control parameters, a combination thereof, and other suitable attributes or parameters for the project 170 and the NFTs 130 within the project 170.

[0054] In some embodiments, the divit rules may establish a consistent set of attributes, permissions, and behaviors that apply to the NFTs 130 within the project 170 and to their holders, including owners and licensors, regardless of the specific distributed ledger network 110 on which an instance of the NFT 130 is currently deployed. In other words, the divit rules may apply to an owner or holder of an NFT 130 regardless of whether the NFT owner currently has an instance of the NFT 130 active on the first, second, or third distributed ledger networks 104, 106, 108, for example. As such, the digital asset management system 102 enables a project 170 to be launched

on any supported blockchain (e.g., chain, distributed ledger network) with a designated set of divit rules. As such, the digital asset management system 102 may configure the project 170, for example, through customization of the smart contracts 120, so that the divit rules apply not only to the source chain on which the project 170 may be launched, or the source chain on which a first NFT of the project 170 may be minted, but also to any additional distributed ledger networks 110 specified as being eligible to support the project 170.

[0055] The various distributed ledger networks 110 may exhibit structural differences that influence how the NFTs 130, other digital assets, or decentralized applications are created, used, and launched thereon. These differences may include variations in consensus protocols, transaction models, block-level parameters (e.g., block time, block size, and fee metering schemes), and execution environments (e.g., supported virtual machines and programming languages). Some distributed ledger networks 110 may offer native support for specific token standards and developer tooling, while others may require custom implementations or alternative specifications.

[0056] Due to these architectural differences, enabling deployment the project 170 across multiple distributed ledger networks 110, while maintaining adherence to the common design specifications (e.g., divit rules) defined in the configuration data 174, may present implementation challenges. For example, enabling certain NFTs 130 of the project 170 to reside on (e.g., be deployed on) one distributed ledger network (e.g., the first distributed ledger network 104) and other NFTs 130 of the project 170 to reside on a different network (e.g., the second distributed ledger network 106), while conforming to a unified configuration schema, may require distinct design and deployment strategies for each distributed ledger network 110.

[0057] As discussed below, the digital asset management system 102 may be configured to generate (e.g., based on the configuration data 174) and deploy smart contracts 120 on each of the distributed ledger networks 110, where these smart contracts 120 may be programmed to manage and execute the NFTs 130 on their respective distributed ledger networks 110 in accordance with the common configuration data 174. Additionally, the smart contracts 120 may be configured to enable activation, deactivation, transfer, and/or modification of the NFTs 130 across different distributed ledger networks 110, as designated by a user. As such, the user, and other users authorized by the project 170, may utilize the smart contracts 120 residing on various distributed

ledger networks 110 to create, remove, archive, or transfer NFTs 130 within the project 170, while adhering to the constraints and benefits specified by the configuration data 174.

[0058] For example, in some embodiments, the digital asset management system 102 may be configured to generate, based on the configuration data 174, a factory smart contract 176, as indicated by block 204. The factory smart contract 176 may be generated by the processing circuitry 160 and be stored in, for example, the data storage 164. The factory smart contract 176 may include executable code configured to deploy a plurality of smart contracts (e.g., the smart contracts 120) across the plurality of distributed ledger networks 110. Each deployed smart contract 120 may be programmed to manage the NFTs 130 on its corresponding distributed ledger network 110 in accordance with the configuration data 174.

[0059] By way of non-limiting example, the configuration data 174 may specify that the project 170 is to be transferable to, or otherwise usable on, the first distributed ledger network 104 (e.g., Ethereum), the second distributed ledger network 106 (e.g., Solana), and the third distributed ledger network 108 (e.g., ApeChain). Accordingly, execution of the factory smart contract 176 may result in the generation and deployment of the first smart contract 122 on the first distributed ledger network 104, the second smart contract 124 on the second distributed ledger network 106, and the third smart contract 126 on the third distributed ledger network 108. Each of the first, second, and third smart contracts 122, 124, 126 may be tailored to host and manage the project 170 on the first, second, and third distributed ledger networks 104, 106, 108, respectively, in accordance with the configuration data 174. The method 200 may include executing the factory smart contract 176 to deploy the first, second, and third smart contracts 122, 124, 126 on the respective first, second, and third distributed ledger networks 104, 106, 108, as indicated by block 206.

[0060] The smart contracts 120 deployed on the respective distributed ledger networks 110 may be configured to allow users to mint, transfer, sell, license, or perform other operations with the NFTs 130 of the project 170. For example, the first smart contract 122 may enable a first user to mint a first NFT 180 of the project 170 on the first distributed ledger network 104, while the second smart contract 124 may enable a second user to mint (e.g., simultaneously mint) a second NFT 182 of the project 170 on the second distributed ledger network 106. Through implementation of the factory smart contract 176, the digital asset management system 102 may create a unified

project 170 governed by a global configuration standard (e.g., in accordance with the configuration data 174), while enabling seamless interaction across multiple distributed ledger networks 110.

[0061] As discussed above, it may be desirable to allow users to mint NFTs 130 within a particular project 170, or to transfer NFTs 130 of the project 170, between different distributed ledger networks 110, while ensuring that only one active instance of each NFT 130 exists across the supported distributed ledger networks 110. This coordination enables decentralized minting flexibility without introducing risks of token duplication or compromising token integrity. When a user acquires ownership of an NFT 130 in a project or collection (e.g., the project 170) managed by the digital asset management system 102, the NFT 130 may function as a cryptographic key that assigns ownership of that specific token (e.g., identified by a unique token ID) across all distributed ledger networks 110 supported by the digital asset management system 102. The digital asset management system 102 may enforce a constraint that only one instance of the NFT 130 is active on a given distributed ledger network 110 at any time. In this way, the digital asset management system 102 ensures that ownership rights are preserved across all distributed ledger network 110s, may prevent unauthorized minting of duplicate representations on other distributed ledger networks 110, and may restrict the NFT owner from activating multiple instances of the same NFT 130 simultaneously across different distributed ledger network 110.

[0062] In some embodiments, the digital asset management system 102 may store, for example in the data storage 164, token identifiers (e.g., the token IDs 172) corresponding to the NFTs 130 within the project 170. When a user owns a particular NFT 130, the digital asset management system 102 may mark the associated token ID 172 as claimed across the distributed ledger networks 110 that support the project 170. This enables the user to create or activate instances of the NFT 130 with that token ID 172 on different chains, or perform other permitted actions, while ensuring that no two instances of the same token ID 172 are active simultaneously across different supported networks.

[0063] In certain implementations, when a user attempts to mint an NFT 130 on a given chain, the digital asset management system 102 may query the data storage 164 to determine whether the proposed token ID 172 is already active on another chain, has previously been active on the current chain or another chain, or is assigned to another owner. Based on the query results, the digital asset management system 102 may allow or block validation of the mint operation. To illustrate, the

following discussion presents exemplary steps of the method 200 that may be implemented to realize the technical benefits described herein.

[0064] For example, the user may, via the client device 146 or another suitable device (e.g., the digital asset marketplace 144), transmit a minting request to the first smart contract 122. The minting request may include information such as a desired token ID (or parameters for generating the token ID, such as via an incremented counter), references to associated metadata or content (e.g., pointers to the repository 140), minting fees, or other suitable information for minting an NFT 130 on the first distributed ledger network 104. In response to the request, the first smart contract 122 may generate and initiate a first minting transaction by propagating the minting request to the corresponding computing nodes 112 of the first distributed ledger network 104. Prior to confirmation and inclusion in a validated block of the first distributed ledger network 104, the first minting transaction may reside in a mempool 184 (e.g., a memory pool) maintained by one or more of the corresponding computing nodes 112. The mempool 184 may comprise a transient, in-memory data structure that stores unconfirmed transactions broadcast to the first distributed ledger network 104 but not yet committed to the canonical ledger state of the first distributed ledger network 104. It should be appreciated that each of the distributed ledger networks 110 may include a corresponding mempool 184, which are referred to herein collectively as the mempool 184. Accordingly, the NFT 130 may exist in a provisional state, represented by a provisional token entry 186 held in the mempool 184. This provisional token entry 186 may include attributes such as a provisional token ID 188, an intended NFT owner address, metadata references, and other identifying information. Although not yet recorded on the first distributed ledger network 104, the provisional token entry 186 may serve as a temporary logical representation of an instance of the NFT 130, pending consensus validation.

[0065] In some embodiments, the factory smart contract 176 may configure the first smart contract 122 (e.g., during its initial deployment on the first distributed ledger network 104) to instruct the computing nodes 112 to transmit a signal to the digital asset management system 102 upon the occurrence of minting transactions on the first distributed ledger network 104. This signal may include relevant metadata or transaction details relating to provisional token entries, for example. In other embodiments, the digital asset management system 102 may be configured to periodically query the distributed ledger networks 110 to detect whether any NFT minting

transactions have occurred, are in process, or are stored in the mempool 184. As such, the digital asset management system 102 may receive an indication of the minting transactions and may parse, as indicated by block 208, the minting transactions to determine, for example, the provisional token ID 188.

[0066] In some embodiments, the digital asset management system 102 may maintain a registry in the data storage 164 that maps token IDs of NFTs 130 within the project 170 to registered users. A registered token ID may indicate that the associated user holds usage rights to the corresponding NFT 130 across all distributed ledger networks 110 supported by the project 170. Accordingly, registration of an NFT 130, or its token ID, may allow the NFT 130 to function as a cryptographic key that grants the user access and usage rights to instances of that NFT 130 across the supported distributed ledger networks 110.

[0067] As indicated by block 210, the digital asset management system 102 may query whether the provisional token identification (ID) 188 is already registered to a user participating in the project 170. This query may involve checking the registry stored in the data storage 164 to determine whether a registered token ID corresponding to the provisional token ID 188 is currently active on at least one of the supported distributed ledger networks 110, as indicated by block 212. That is, the digital asset management system 102 may determine whether the provisional token ID 188 matches a registered (e.g., validated) token ID that may be stored in the data storage 164.

[0068] If the provisional token ID 188 is determined to be unregistered (e.g., unvalidated), the digital asset management system 102 may transmit an instruction to the computing nodes 112 to validate the provisional token entry 186 on the first distributed ledger network 104. This validation may result in the generation of an instance of the NFT 130, as indicated by block 214. That is, the computing nodes 112 may convert the provisional token entry 186 into a confirmed on-chain token record stored on the first distributed ledger network 104. The digital asset management system 102 may update data storage 164 to mark the provisional token ID 188 as a registered token ID (e.g., a validated token ID) associated with the user, thereby categorizing it as claimed across all supported distributed ledger networks 110, as indicated by block 216. Once registered, the user may exercise control over the NFT 130 (e.g., the validated NFT 130), including selling, licensing, or using the NFT 130 within decentralized applications of the decentralized environment 100, such as games

or marketplaces (e.g., the digital asset marketplace 144), across the distributed ledger networks 110.

[0069] The user may also mint additional instances of the same NFT 130 with the same token ID on other supported chains. Because the token ID is registered to the user, it may serve as the cryptographic key that enables the user to instantiate or use the NFT 130 on other distributed ledger networks 110 supported by the project 170, provided that only one instance of the NFT 130 is active on any given chain at a time. The user may also transfer the NFT 130 to another user, thereby granting that user control over the NFT 130 on the current chain and the ability to instantiate it on other supported distributed ledger networks 110 in accordance with the techniques described herein.

[0070] The digital asset management system 102 may also parse additional minting transactions occurring on distributed ledger networks 110 to either mint new NFTs 130 of project 170 or transfer existing NFTs 130 between networks using locking and unlocking operations. For example, the digital asset management system 102 may receive an indication of a second minting transaction initiated on the second distributed ledger network 106 via the second smart contract 124. The digital asset management system 102 may identify a second provisional token identification (ID) 190 corresponding to a second provisional token entry 192 generated by the computing nodes 112 of the second distributed ledger network 106. The digital asset management system 102 may query the data storage 164, as indicated by blocks 210 and 212, to determine whether the second provisional token ID 190 is registered (e.g., matches another validated token ID stored in the data storage 164).

[0071] If the second provisional token ID 190 is unregistered, the digital asset management system 102 may validate the second provisional token entry 192 on the second distributed ledger network 106. If the second provisional token ID 190 is registered, the digital asset management system 102 may determine whether the user initiating the minting transaction is the registered owner of the proposed NFT 130, as indicated by block 218. If the mint-initiating user is not the registered owner (e.g., is a non-owner) corresponding to another instance of that NFT 130, the digital asset management system 102 may block validation of the minting transaction, as indicated by block 220. If the mint-initiating user is the registered owner, the digital asset management system 102 may initiate a locking and unlocking operation, as indicated by block 222. For example,

the digital asset management system 102 may lock the instance of the NFT 130 on the first distributed ledger network 104 (or other network where an instance of the NFT 130 may be active) to prevent its use on the first distributed ledger network 104, and may validate the minting transaction on the second distributed ledger network 106 to deploy an instance of the NFT 130 on the second distributed ledger network 106. The digital asset management system 102 may update data storage 164 to mark the NFT 130 as inactive on the first distributed ledger network 104 and active on the second distributed ledger network 106. This may ensure that only one active instance of the NFT 130 exists across the supported distributed ledger networks 110 and allows the digital asset management system 102 to track which instance of the NFT 130 is currently active.

[0072] In some embodiments, if the digital asset management system 102 determines that the NFT 130 has already been minted on the second distributed ledger network 106 and is registered to the mint-initiating user, the digital asset management system 102 may unlock the instance of the NFT 130 on the second distributed ledger network 106 instead of minting a new instance of the NFT 130 on the second distributed ledger network 106. Through these operations, the digital asset management system 102 enables users to mint and manage NFTs 130 from any supported distributed ledger network 110 while maintaining consistent ownership and usage rights across chains supported by the project 170. The digital asset management system 102 may support cross-chain minting and transfers without requiring destruction (e.g., burning) of NFTs 130. Instead, the digital asset management system 102 may employ selective locking and unlocking mechanisms by tracking the active status of each instance of the NFT 130 across chains. A corresponding owner of one or more NFTs 130 may lock or unlock various instances of the NFTs 130 by using an active instance of the NFT 130 as a verification key (e.g., cryptographic key), ensuring secure and coordinated cross-chain activity while preventing token ID collisions, such as when identical token IDs may be minted by different owners on separate chains.

[0073] As another example, the digital asset management system 102 may support transfer operations that allow active instances of NFTs 130 to be moved from one distributed ledger network 110 to another. For instance, the digital asset management system 102 may receive a request from the registered owner to transfer the NFT 130 from the second distributed ledger network 106 back to the first distributed ledger network 104. In response, the digital asset management system 102 may initiate the locking and unlocking operation, as indicated by block

222. Specifically, the digital asset management system 102 may unlock the instance of the NFT 130 on the first distributed ledger network 104 to enable its application and use on that network, and lock the instance of the NFT 130 on the second distributed ledger network 106 to inhibit use of the NFT 130 on that network.

[0074] Following this operation, the digital asset management system 102 may update the registry in data storage 164 to reflect the change in active status. The digital asset management system 102 may mark the NFT 130 as active on the first distributed ledger network 104 and inactive on the second distributed ledger network 106. As discussed above, this may ensure that only one active instance of the NFT 130 exists at any given time across the supported distributed ledger networks 110.

[0075] **FIG. 3** illustrates a flow diagram of an embodiment of a method 300 for creating and managing divit distribution across the decentralized environment 100. **FIG. 3** will be referenced concurrently with **FIG. 1** throughout the following discussion. It should be understood that the steps of method 300 may be performed in any suitable order and are not limited to the sequence shown in the illustrated embodiment. Additionally, certain steps may be omitted, and other steps may be added, depending on the implementation. In some embodiments, method 300 may be executed by the processing circuitry 160 or by any other suitable processing circuitry. Executable instructions for performing the steps of method 300 may be stored, for example, in data storage 164.

[0076] As noted above, in some embodiments, the digital asset management system 102 may be configured to coordinate and administer divit distributions to holders of NFTs 130 within the project 170. A divit distribution, as used herein, may refer to any benefit, grant, license, royalty payout or allocation, usage right, governance permission, upgradeability option, or other functionality provided to an NFT holder within the decentralized environment 100. The divit distributions may be governed by divit rules, which may define conditions under which NFT holders in a project 170 are eligible to receive such benefits. The divit rules may be designed to reflect project-specific policies, economic incentives, or behavioral requirements, and may be enforced consistently across all distributed ledger networks 110 supporting the project 170. It should be understood that the processing circuitry 160 may implement or form part of a divit system (e.g., a divit engine or divit program) configured to execute the techniques described

herein. In some embodiments, the divit system may operate as a programmatic system for distributing royalties or other benefits collected by a particular NFT contract (e.g., one of the smart contracts 120) to holders of NFTs 130 within a designated project 170. In some embodiments, the divit system (e.g., the processing circuitry 160) may perform such distributions on a periodic basis (e.g., between distribution cycles) upon determining that the NFT holders have granted licenses of their NFTs 130 to owners of the project 170 or to other associated users. These licenses may permit the project 170 (e.g., its owners) to use intellectual property contained in the licensed NFTs 130 for project-related purposes (e.g., marketing activities).

[0077] As indicated by block 302, a creator of the project 170, which may be an individual user or a group of users, may define divit rules as part of the configuration data 174. The divit rules may apply uniformly to all NFTs 130 within the project 170 or may be tailored to specific subsets of NFTs 130 based on attributes such as token type, issuance phase, or intended use. In accordance with the techniques described herein, the digital asset management system 102 may generate, as indicated by block 304, the factory smart contract 176, which may encode the divit rules on the project-specific smart contracts 120. For example, during execution of the factory smart contract 176, the digital asset management system 102 may deploy a customized set of smart contracts 120, each configured to enforce the applicable divit rules on the distributed ledger network 110 where an NFT instance is deployed. This architecture may enable consistent enforcement of divit rules across heterogeneous blockchain environments, regardless of differences in consensus mechanisms, transaction validation protocols, smart contract formats, or node configurations. By embedding the divit logic directly into the deployed smart contracts 120, the digital asset management system 102 may ensure that eligibility conditions, benefit calculations, and distribution mechanisms are applied uniformly, even as NFTs 130 are transferred or instantiated across multiple chains (e.g., the first, second, and/or third distributed ledger networks 104, 106, 108). This approach may support cross-chain interoperability while preserving the integrity and enforceability of project-defined benefit structures.

[0078] In some embodiments, the divit rules may impose specific eligibility requirements that holders of NFTs 130 within the project 170 must satisfy in order to receive divit distributions. The digital asset management system 102 may evaluate eligibility (e.g., a divit eligibility status) during defined distribution cycles, as indicated by block 306. For each distribution cycle, the digital asset

management system 102 may determine whether individual NFT holders have met the conditions specified in the divit rules and may allocate divit benefits accordingly. Eligible holders may receive the full set of applicable divit distributions, while ineligible holders may receive partial divit distributions or be excluded entirely.

[0079] A distribution cycle may be defined as a fixed time interval or may be dynamically determined based on activity within the decentralized environment 100 or the occurrence of designated events, such as project milestones, user actions, or external triggers. At the conclusion of each distribution cycle, the digital asset management system 102 may assess eligibility across all supported distributed ledger networks 110 and split available divit benefits to qualifying NFT holders, as indicated by block 308.

[0080] For example, the divit rules for a particular project 170 may specify that holders who list their NFTs 130 for sale during a distribution cycle are ineligible to receive licensee payments for those NFTs 130. Conversely, holders who retain their NFTs 130 without listing them for sale during the distribution cycle may be deemed eligible. The digital asset management system 102 may determine which token IDs have maintained eligibility, calculate the allocation of available divit benefits (e.g., from a lump-sum royalty pool of the project 170), identify the corresponding NFT owners, and proportionately distribute the divit benefits to those owners.

[0081] This approach may incentivize long-term holding of NFTs within the project 170, potentially increasing the perceived value of the tokens by reducing market supply. In other embodiments, eligibility may be based on alternative criteria, such as user engagement, completion of project-specific objectives (e.g., in-game achievements), participation in governance activities, licensing of one or more intellectual property rights, or fulfillment of other actions defined by the project 170 creator. For example, in some embodiments, the divit rules may specify that eligibility for receiving divit distributions by NFT holders of NFTs 130 within a project 170 depends on whether the NFT holders have licensed one or more rights (e.g., intellectual property rights) associated with their NFTs 130 to the project 170 (e.g., to project owners). For instance, the digital asset management system 102 may distribute a divit to a first NFT holder who has licensed the corresponding NFT 130 to the project 170, while withholding the divit from a second NFT holder who has not provided such a license. In certain embodiments, the digital asset management system 102 may determine the license statuses of NFTs 130 in the project 170 for each distribution cycle

and may adjust divit outputs accordingly, in accordance with the techniques described herein. The divit rules may be designed to reflect the strategic goals of the project 170 and may be enforced consistently across all supported distributed ledger networks 110.

[0082] To support consistent divit distribution across multiple blockchain environments, the digital asset management system 102 may monitor divit eligibility for NFT holders across the distributed ledger networks 110. As indicated by block 310, the digital asset management system 102 may propagate divit distributions across these distributed ledger networks 110 to ensure accurate allocation, regardless of the specific network on which an NFT instance is minted or currently active. For example, for a given distribution cycle, the digital asset management system 102 may determine the total quantity of divit benefits available for the project 170 and calculate how those benefits should be allocated based on the number and status of NFTs 130 held by each user across the supported chains. For example, a first NFT owner may hold twenty NFTs 130 of the project 170 on the first distributed ledger network 104, while a second owner may hold one hundred NFTs 130 of the project 170 on the second distributed ledger network 106 and fifty NFTs 130 of the project 170 on the third distributed ledger network 108. The digital asset management system 102 may execute the corresponding smart contracts 122, 124, and 126 to facilitate the divit distributions based on these holdings. As such, the first owner may receive twenty divit benefits via a payout transaction on the first distributed ledger network 104, while the second owner may receive one hundred divit benefits and fifty divit benefits on the second and third distributed ledger networks 106, 108, respectively.

[0083] This architecture may ensure that divit eligibility and distribution are tied to the registered owner of the NFT 130, independent of the specific network on which the NFT 130 is held or active. By enabling cross-chain divit distribution, cross-chain minting, and cross-chain token transfer within a unified framework, the digital asset management system 102 provides enhanced NFT lifecycle management across the decentralized environment 100. Additionally, this approach may reduce computational overhead for the computing nodes 112 involved in supporting, regulating, and managing NFT projects, which may improve system scalability and operational efficiency.

[0084] FIG. 4 is a schematic of an embodiment of a portion of the decentralized environment 100, which includes a distributed ledger network 400. The distributed ledger network 400 may

include an instance of any one of the distributed ledger networks 110 described herein, and may be communicatively coupled to the digital asset management system 102 via the presently disclosed techniques (e.g., via the network 150). In the illustrated embodiment, the distributed ledger network 400 includes a plurality of computing nodes 402 (e.g., the computing nodes 112), which may be arranged in a peer-to-peer (P2P) topology and communicatively coupled to one another over a network 404 (e.g., the network 150). Each computing node 402 may include one or more processors, memory resources, and network interfaces configured to execute software instructions for performing operations associated with the distributed ledger network 400. Although shown schematically as a set of interconnected computing nodes 402, the network topology may dynamically evolve as computing nodes 402 join or leave the network. The distributed ledger network 400 may maintain continuous connectivity and state synchronization among the computing nodes 402 through peer discovery procedures, routing protocols, and message propagation techniques that allow each computing node 402 to locate and exchange data with other nodes in the distributed ledger network 400.

[0085] The plurality of computing nodes 402 may include nodes that perform different roles within the distributed ledger network 400. In some embodiments, the computing nodes 402 may include validator nodes that participate in a consensus protocol to propose, validate, and finalize new blocks, thereby extending the ledger in accordance with the consensus rules of the distributed ledger network 400. Validator nodes may also execute validation logic for incoming transactions, perform digital signature verification, and check the correctness of state transitions before new blocks are accepted into the ledger. The computing nodes 402 may also include full nodes, which may maintain a complete copy of the ledger and verify the integrity of blocks and transactions even if they do not actively propose new blocks. Full nodes may enforce consensus rules locally, reconstruct the ledger state from block data, and provide validated information to other network participants.

[0086] The distributed ledger network 400 may further include light nodes, which maintain only partial ledger data and typically store block headers rather than full transaction histories. Light nodes may rely on validator nodes or full nodes to provide cryptographic proofs that allow them to verify the inclusion of specific transactions or state changes without maintaining the full ledger state. Light nodes may enable resource-constrained devices, such as mobile clients or embedded

systems, to interact securely with the distributed ledger network 400 while minimizing bandwidth and storage requirements. Additional computing nodes 402 may include archive nodes, which may store the complete historical state of the ledger and allow for detailed querying of past blocks and state transitions, and observer nodes, which may replicate and index ledger data to support analytics, monitoring, and external application interfaces.

[0087] Communication among the computing nodes 402 may occur through peer-to-peer messaging protocols that enable transaction data, block proposals, and state updates to propagate efficiently throughout the distributed ledger network 400. In some embodiments, the distributed ledger network 400 may employ propagation techniques in which each computing node 402 relays received messages to a subset of its peers, thereby enabling rapid and redundant dissemination of information without requiring centralized coordination. The peer-to-peer architecture may further support network resilience by allowing the distributed ledger network 400 to tolerate node failures, network partitions, or malicious actors while maintaining consensus and ledger consistency.

[0088] **FIG. 5** is a schematic of an embodiment of the digital asset management system 102, referred to as a computer system 500. In particular embodiments, one or more instances of the computer system 500 perform one or more steps of one or more methods described or illustrated herein. In particular embodiments, one or more of the computer systems 500 provide functionality described or illustrated herein. In particular embodiments, software running on one or more of the computer systems 500 performs one or more steps of one or more methods described or illustrated herein or provides functionality described or illustrated herein. Particular embodiments include one or more portions of one or more computer systems 500. Herein, reference to a computer system may encompass a computing device, and vice versa, where appropriate. Moreover, reference to a computer system may encompass one or more computer systems, where appropriate.

[0089] This disclosure contemplates any suitable number of computer systems 500. This disclosure contemplates the computer system 500 taking any suitable physical form. As example and not by way of limitation, the computer system 500 may be an embedded computer system, a system-on-chip (SOC), a single-board computer system (SBC) (such as, for example, a computer-on-module (COM) or system-on-module (SOM)), a desktop computer system, a laptop or notebook computer system, an interactive kiosk, a mainframe, a mesh of computer systems, a mobile telephone, a personal digital assistant (PDA), a server, a tablet computer system, an

augmented/virtual reality device, or a combination of two or more of these. Where appropriate, the computer system 500 may include one or more computer systems 500; be unitary or distributed; span multiple locations; span multiple machines; span multiple data centers; or reside in a cloud, which may include one or more cloud components in one or more networks. Where appropriate, the one or more computer systems 500 may perform without substantial spatial or temporal limitation one or more steps of one or more methods described or illustrated herein. As an example and not by way of limitation, the one or more computer systems 500 may perform in real time or in batch mode one or more steps of one or more methods described or illustrated herein. The one or more computer systems 500 may perform at different times or at different locations one or more steps of one or more methods described or illustrated herein, where appropriate.

[0090] In particular embodiments, the computer system 500 includes a processor 502 (e.g., the one or more processors 162), a memory 504, storage 506, an input/output (I/O) interface 508 (e.g., the I/O interface 166), a communication interface 510, and a bus 512. The data storage 164 may include the memory 504, the storage 506, or both. As such, the processor 502, the memory 504, and the storage 506 may form part of or all of the processing circuitry 160. Although this disclosure describes and illustrates a particular computer system having a particular number of particular components in a particular arrangement, this disclosure contemplates any suitable computer system having any suitable number of any suitable components in any suitable arrangement.

[0091] In particular embodiments, the processor 502 includes hardware for executing instructions, such as those making up a computer program. As an example and not by way of limitation, to execute instructions, the processor 502 may retrieve (or fetch) the instructions from an internal register, an internal cache, the memory 504, or the storage 506; decode and execute them; and then write one or more results to an internal register, an internal cache, the memory 504, or the storage 506. In particular embodiments, the processor 502 may include one or more internal caches for data, instructions, or addresses. This disclosure contemplates the processor 502 including any suitable number of any suitable internal caches, where appropriate.

[0092] As an example and not by way of limitation, the processor 502 may include one or more instruction caches, one or more data caches, and one or more translation lookaside buffers (TLBs). Instructions in the instruction caches may be copies of instructions in the memory 504 or the storage 506, and the instruction caches may speed up retrieval of those instructions by the

processor 502. Data in the data caches may be copies of data in the memory 504 or the storage 506 for instructions executing at the processor 502 to operate on; the results of previous instructions executed at the processor 502 for access by subsequent instructions executing at the processor 502 or for writing to the memory 504 or the storage 506; or other suitable data. The data caches may speed up read or write operations by the processor 502. The TLBs may speed up virtual-address translation for the processor 502. In particular embodiments, the processor 502 may include one or more internal registers for data, instructions, or addresses. This disclosure contemplates the processor 502 including any suitable number of any suitable internal registers, where appropriate. Where appropriate, the processor 502 may include one or more arithmetic logic units (ALUs); be a multi-core processor; or include one or more of the processors 502. Although this disclosure describes and illustrates a particular processor, this disclosure contemplates any suitable processor.

[0093] In particular embodiments, the memory 504 includes main memory for storing instructions for the processor 502 to execute or data for the processor 502 to operate on. As an example and not by way of limitation, the computer system 500 may load instructions from the storage 506 or another source (such as, for example, another computer system 500) to the memory 504. The processor 502 may then load the instructions from the memory 504 to an internal register or internal cache. To execute the instructions, the processor 502 may retrieve the instructions from the internal register or internal cache and decode them. During or after execution of the instructions, the processor 502 may write one or more results (which may be intermediate or final results) to the internal register or internal cache. The processor 502 may then write one or more of those results to the memory 504. In particular embodiments, the processor 502 executes only instructions in one or more internal registers or internal caches or in the memory 504 (as opposed to the storage 506 or elsewhere) and operates only on data in one or more internal registers or internal caches or in the memory 504 (as opposed to the storage 506 or elsewhere).

[0094] One or more memory buses (which may each include an address bus and a data bus) may couple the processor 502 to the memory 504. The bus 512 may include one or more memory buses, as described below. In particular embodiments, one or more memory management units (MMUs) reside between the processor 502 and the memory 504 and facilitate accesses to the memory 504 requested by the processor 502. In particular embodiments, the memory 504 includes random access memory (RAM). This RAM may be volatile memory, where appropriate. Where

appropriate, this RAM may be dynamic RAM (DRAM) or static RAM (SRAM). Moreover, where appropriate, this RAM may be single-ported or multi-ported RAM. This disclosure contemplates any suitable RAM. The memory 504 may include one or more memories 504, where appropriate. Although this disclosure describes and illustrates particular memory, this disclosure contemplates any suitable memory.

[0095] In particular embodiments, the storage 506 includes mass storage for data or instructions. As an example and not by way of limitation, the storage 506 may include a hard disk drive (HDD), a floppy disk drive, flash memory, an optical disc, a magneto-optical disc, magnetic tape, or a Universal Serial Bus (USB) drive or a combination of two or more of these. The storage 506 may include removable or non-removable (or fixed) media, where appropriate. The storage 506 may be internal or external to the computer system 500, where appropriate. In particular embodiments, the storage 506 is non-volatile, solid-state memory. In particular embodiments, the storage 506 includes read-only memory (ROM). Where appropriate, this ROM may be mask-programmed ROM, programmable ROM (PROM), erasable PROM (EPROM), electrically erasable PROM (EEPROM), electrically alterable ROM (EAROM), or flash memory or a combination of two or more of these. This disclosure contemplates mass storage 506 taking any suitable physical form. The storage 506 may include one or more storage control units facilitating communication between the processor 502 and the storage 506, where appropriate. Where appropriate, the storage 506 may include one or more storages 506. Although this disclosure describes and illustrates particular storage, this disclosure contemplates any suitable storage.

[0096] In particular embodiments, the I/O interface 508 includes hardware, software, or both, providing one or more interfaces for communication between the computer system 500 and one or more I/O devices. The computer system 500 may include one or more of these I/O devices, where appropriate. One or more of these I/O devices may enable communication between a person (e.g., a user) and the computer system 500. As an example and not by way of limitation, an I/O device may include a keyboard, keypad, microphone, monitor, mouse, printer, scanner, speaker, still camera, stylus, tablet, touch screen, trackball, video camera, another suitable I/O device or a combination of two or more of these. An I/O device may include one or more sensors. This disclosure contemplates any suitable I/O devices and any suitable I/O interfaces 508 for them. Where appropriate, the I/O interface 508 may include one or more devices or software drivers

enabling the processor 502 to drive one or more of these I/O devices. The I/O interface 508 may include one or more I/O interfaces 508, where appropriate. Although this disclosure describes and illustrates a particular I/O interface, this disclosure contemplates any suitable I/O interface.

[0097] In particular embodiments, the communication interface 510 includes hardware, software, or both providing one or more interfaces for communication (such as, for example, packet-based communication) between the computer system 500 and one or more other computer systems 500 or one or more networks. As an example and not by way of limitation, the communication interface 510 may include a network interface controller (NIC) or network adapter for communicating with an Ethernet or other wire-based network or a wireless NIC (WNIC) or wireless adapter for communicating with a wireless network, such as a WI-FI network. This disclosure contemplates any suitable network and any suitable communication interface 510 for it. As an example and not by way of limitation, the computer system 500 may communicate with an ad hoc network, a personal area network (PAN), a local area network (LAN), a wide area network (WAN), a metropolitan area network (MAN), or one or more portions of the Internet or a combination of two or more of these. One or more portions of one or more of these networks may be wired or wireless. As an example, the computer system 500 may communicate with a wireless PAN (WPAN) (such as, for example, a BLUETOOTH WPAN), a WI-FI network, a WI-MAX network, a cellular telephone network (such as, for example, a Global System for Mobile Communications (GSM) network), or other suitable wireless network or a combination of two or more of these. The computer system 500 may include any suitable communication interface 510 for any of these networks, where appropriate. The communication interface 510 may include one or more communication interfaces 510, where appropriate. Although this disclosure describes and illustrates a particular communication interface, this disclosure contemplates any suitable communication interface.

[0098] In particular embodiments, the bus 512 includes hardware, software, or both coupling components of the computer system 500 to each other. As an example and not by way of limitation, the bus 512 may include an Accelerated Graphics Port (AGP) or other graphics bus, an Enhanced Industry Standard Architecture (EISA) bus, a front-side bus (FSB), a HYPERTRANSPORT (HT) interconnect, an Industry Standard Architecture (ISA) bus, an INFINIBAND interconnect, a low-pin-count (LPC) bus, a memory bus, a Micro Channel Architecture (MCA) bus, a Peripheral

Component Interconnect (PCI) bus, a PCI-Express (PCIe) bus, a serial advanced technology attachment (SATA) bus, a Video Electronics Standards Association local (VLB) bus, or another suitable bus or a combination of two or more of these. The bus 512 may include one or more buses, where appropriate. Although this disclosure describes and illustrates a particular bus, this disclosure contemplates any suitable bus or interconnect.

[0099] Herein, a computer-readable non-transitory storage medium or media may include one or more semiconductor-based or other integrated circuits (ICs) (such, as for example, field-programmable gate arrays (FPGAs) or application-specific ICs (ASICs)), hard disk drives (HDDs), hybrid hard drives (HHDs), optical discs, optical disc drives (ODDs), magneto-optical discs, magneto-optical drives, floppy diskettes, floppy disk drives (FDDs), magnetic tapes, solid-state drives (SSDs), RAM-drives, SECURE DIGITAL cards or drives, any other suitable computer-readable non-transitory storage media, or any suitable combination of two or more of these, where appropriate. A computer-readable non-transitory storage medium may be volatile, non-volatile, or a combination of volatile and non-volatile, where appropriate.

[0100] Herein, “or” is inclusive and not exclusive, unless expressly indicated otherwise or indicated otherwise by context. Therefore, herein, “A or B” means “A, B, or both,” unless expressly indicated otherwise or indicated otherwise by context. Moreover, “and” is both joint and several, unless expressly indicated otherwise or indicated otherwise by context. Therefore, herein, “A and B” means “A and B, jointly or severally,” unless expressly indicated otherwise or indicated otherwise by context.

[0101] The scope of this disclosure encompasses all changes, substitutions, variations, alterations, and modifications to the example embodiments described or illustrated herein that a person having ordinary skill in the art would comprehend. The scope of this disclosure is not limited to the example embodiments described or illustrated herein. Moreover, although this disclosure describes and illustrates respective embodiments herein as including particular components, elements, feature, functions, operations, or steps, any of these embodiments may include any combination or permutation of any of the components, elements, features, functions, operations, or steps described or illustrated anywhere herein that a person having ordinary skill in the art would comprehend. Furthermore, reference in the appended claims to an apparatus or system or a component of an apparatus or system being adapted to, arranged to, capable of,

configured to, enabled to, operable to, or operative to perform a particular function encompasses that apparatus, system, component, whether or not it or that particular function is activated, turned on, or unlocked, as long as that apparatus, system, or component is so adapted, arranged, capable, configured, enabled, operable, or operative. Additionally, although this disclosure describes or illustrates particular embodiments as providing particular advantages, particular embodiments may provide none, some, or all of these advantages.

CLAIMS

What is claimed is:

1. A method, comprising:
 - receiving, from a user, configuration data defining one or more attributes of a non-fungible token (NFT) collection;
 - deploying, based on the configuration data, a plurality of smart contracts on a plurality of distributed ledger networks, wherein the plurality of smart contracts facilitates management of the NFT collection across the plurality of distributed ledger networks;
 - parsing a first minting transaction on a first distributed ledger network of the plurality of distributed ledger networks to determine a first provisional token identification (ID), wherein the first minting transaction is executed via a first smart contract of the plurality of smart contracts;
 - querying a database to determine whether the first provisional token ID is registered on at least one distributed ledger network of the plurality of distributed ledger networks;
 - in response to determining that the first provisional token ID is unregistered:
 - triggering validation of the first minting transaction to deploy an NFT of the NFT collection on the first distributed ledger network, wherein the NFT comprises a validated token ID corresponding to the first provisional token ID; and
 - designating, in the database, the validated token ID as registered to an owner of the NFT;
 - parsing a second minting transaction on a second distributed ledger network of the plurality of distributed ledger networks to determine a second provisional token identification (ID), wherein the second minting transaction is executed via a second smart of the plurality of smart contracts, wherein the second provisional token ID matches the validated token ID; and
 - blocking validation of the second minting transaction in response to determining that the second minting transaction was initiated by a non-owner of the NFT.

2. The method of claim 1, further comprising, in response to determining that the second minting transaction was initiated by the owner:
 - locking the NFT on the first distributed ledger network to block application of the NFT on the first distributed ledger network; and

triggering validation of the second minting transaction to deploy the NFT on the second distributed ledger network.

3. The method of claim 2, further comprising updating the database to mark the NFT as inactive on the first distributed ledger network and active on the second distributed ledger network.

4. The method of claim 2, further comprising:
receiving a request from the owner to transfer the NFT from the second distributed ledger network to the first distributed ledger network; and

in response to the request:

unlocking the NFT on the first distributed ledger network to enable application of the NFT on the first distributed ledger network; and

locking the NFT on the second distributed ledger network to block application of the NFT on the second distributed ledger network.

5. The method of claim 4, further comprising updating the database to mark the NFT as active on the first distributed ledger network and inactive on the second distributed ledger network.

6. The method of claim 1, further comprising:
in response to determining that the first provisional token ID is registered on the at least one distributed ledger network as a validated NFT:

querying the database to determine a registered owner associated the validated NFT; and

in response to determining that the registered owner initiated the first minting transaction;

locking the validated NFT on the at least one distributed ledger network to block application of the validated NFT on the at least one distributed ledger network; and

triggering the validation of the first minting transaction to deploy the NFT on the first distributed ledger network.

7. The method of claim 6, further comprising blocking validation of the first minting transaction in response to determining that the first minting transaction was not initiated by the registered owner.

8. The method of claim 1, wherein defining the one or more attributes of the NFT collection further comprises designating the plurality of distributed ledger networks configured to host the NFT collection.

9. The method of claim 1, wherein defining the one or more attributes of the NFT collection further comprises designating token metadata schema, minting policy parameters, royalty payout logic, ownership restrictions, transfer restrictions, programmable utility parameters, license grant terms, access control parameters, or a combination thereof.

10. A system, comprising:
one or more processors; and
one or more computer-readable non-transitory storage media coupled to the one or more of processors and comprising instructions operable when executed by the one or more processors to cause the system to:

receive, from a client device, configuration data defining attributes of a non-fungible token (NFT) collection;

generate, based on the configuration data, a factory smart contract, wherein the factory smart contract comprises executable code configured to deploy a plurality of smart contracts on a plurality of distributed ledger networks, wherein the plurality of smart contracts is configured to enable a user to initiate one or more operations associated with the NFT collection;

execute the factory smart contract to deploy a first smart contract on a first distributed ledger network of the plurality of distributed ledger networks and to deploy a second smart contract on a second distributed ledger network of the plurality of distributed ledger networks;

parse a first minting transaction executed via the first smart contract to determine a first provisional token identification (ID);

query a database to determine whether the first provisional token ID is registered on at least one distributed ledger network of the plurality of distributed ledger networks; and

in response to determining that the first provisional token ID is unregistered:

trigger validation of the first minting transaction to deploy an NFT of the NFT collection on the first distributed ledger network, wherein the NFT comprises a validated token ID corresponding to the first provisional token ID; and

designating, in the database, the validated token ID as registered to an owner of the NFT.

11. The system of claim 10, wherein the one or more processors are further operable when executing the instructions to:

parse a second minting transaction executed via the second smart contract to determine a second provisional token identification (ID), wherein the second provisional token ID matches the validated token ID; and

block validation of the second minting transaction in response to a determination that the second minting transaction was initiated by a non-owner of the NFT.

12. The system of claim 11, wherein the one or more processors are further operable when executing the instructions to, in response to a determination that the second minting transaction was initiated by the owner:

lock the NFT on the first distributed ledger network to block application of the NFT on the first distributed ledger network; and

trigger validation of the second minting transaction to deploy the NFT on the second distributed ledger network.

13. The system of claim 12, wherein the one or more processors are further operable when executing the instructions to update the database to mark the NFT as inactive on the first distributed ledger network and active on the second distributed ledger network.

14. The system of claim 12, wherein the one or more processors are further operable when executing the instructions to:

receive a request from the owner to transfer the NFT from the second distributed ledger network to the first distributed ledger network; and

in response to the request:

unlock the NFT on the first distributed ledger network to enable application of the NFT on the first distributed ledger network; and

lock the NFT on the second distributed ledger network to block application of the NFT on the second distributed ledger network.

15. The system of claim 14, wherein the one or more processors are further operable when executing the instructions to update the database to mark the NFT as active on the first distributed ledger network and inactive on the second distributed ledger network.

16. The system of claim 10, wherein the one or more processors are further operable when executing the instructions to, in response to a determination that the first provisional token ID is registered on the at least one distributed ledger network as a validated NFT:

query the database to determine a registered owner associated the validated NFT; and

in response to a determination that the registered owner initiated the first minting transaction;

lock the validated NFT on the at least one distributed ledger network to block application of the validated NFT on the at least one distributed ledger network; and

trigger the validation of the first minting transaction to deploy the NFT on the first distributed ledger network.

17. The system of claim 16, wherein the one or more processors are further operable when executing the instructions to block validation of the first minting transaction in response to a determination that the first minting transaction was not initiated by the registered owner.

18. The system of claim 10, wherein the plurality of distributed ledger networks comprises Ethereum, Solana, Cardano, ApeChain, Abstract, Polygon, Binance Smart Chain (BSC), Avalanche, Arbitrum, Optimism, Base, or a combination thereof.

19. A method, comprising:

- receiving, from a user, configuration data defining one or more divit rules for a non-fungible token (NFT) collection;
- generating, via a processing circuitry, a smart contract comprising executable code configured to deploy the NFT collection having the one or more divit rules on a plurality of distributed ledger networks;
- executing the smart contract to deploy the NFT collection on the plurality of distributed ledger networks;
- evaluating, for one or more NFT holders in the NFT collection, a divit eligibility status for a distribution cycle, wherein the divit eligibility status is based on an adherence of the one or more NFT holders to the one or more divit rules; and
- providing divit distributions to the one or more NFT holders based on the divit eligibility status.

20. The method of claim 19, wherein providing the divit distributions further comprises providing a first divit distribution on a first distributed ledger network of the plurality of distributed ledger networks and providing a second divit distribution on a second distributed ledger network of the plurality of distributed ledger networks, wherein the first distributed ledger network is different from the second distributed ledger network.

ABSTRACT

In one embodiment, a method includes receiving, from a user, configuration data defining one or more attributes of a non-fungible token (NFT) collection and deploying, based on the configuration data, a plurality of smart contracts on a plurality of distributed ledger networks. The method includes parsing a minting transaction on a distributed ledger network of the plurality of distributed ledger networks to determine a provisional token identification (ID) and querying a database to determine whether the provisional token ID is registered on at least one distributed ledger network of the plurality of distributed ledger networks. The method includes triggering validation of the minting transaction to deploy an NFT of the NFT collection on the distributed ledger network, where the NFT includes a validated token ID corresponding to the provisional token ID, and designating, in the database, the validated token ID as registered to an owner of the NFT.

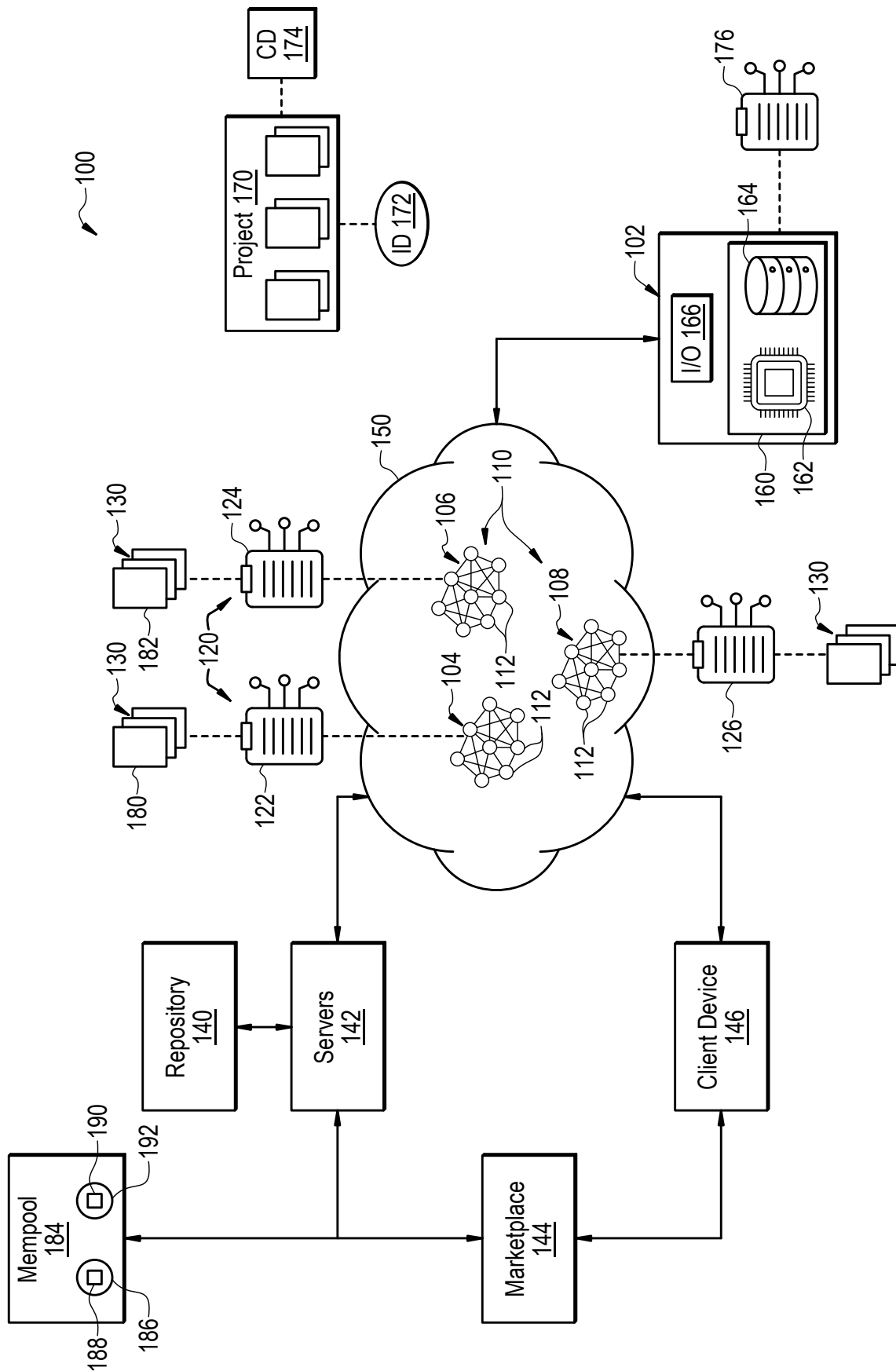


FIG. 1

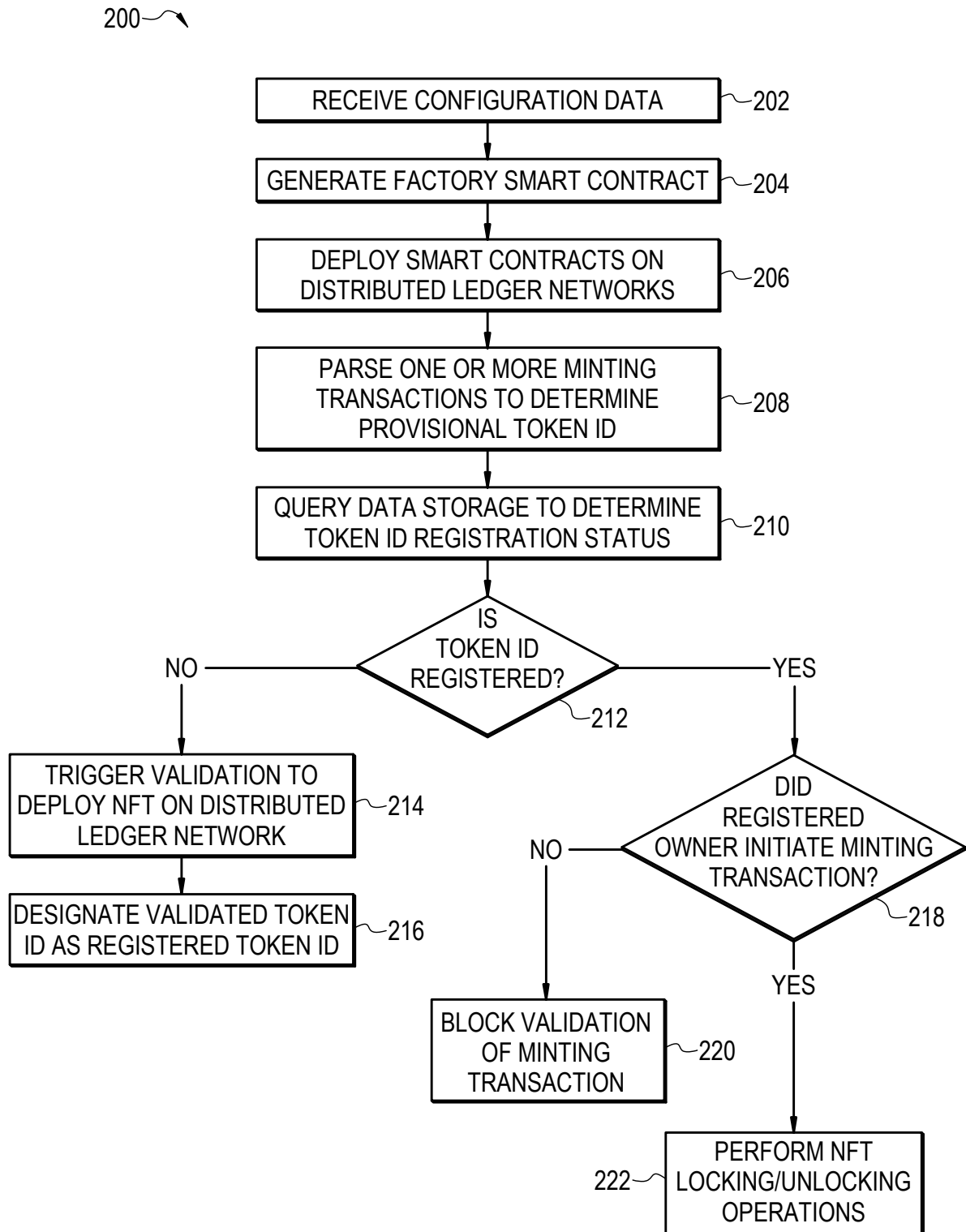


FIG. 2

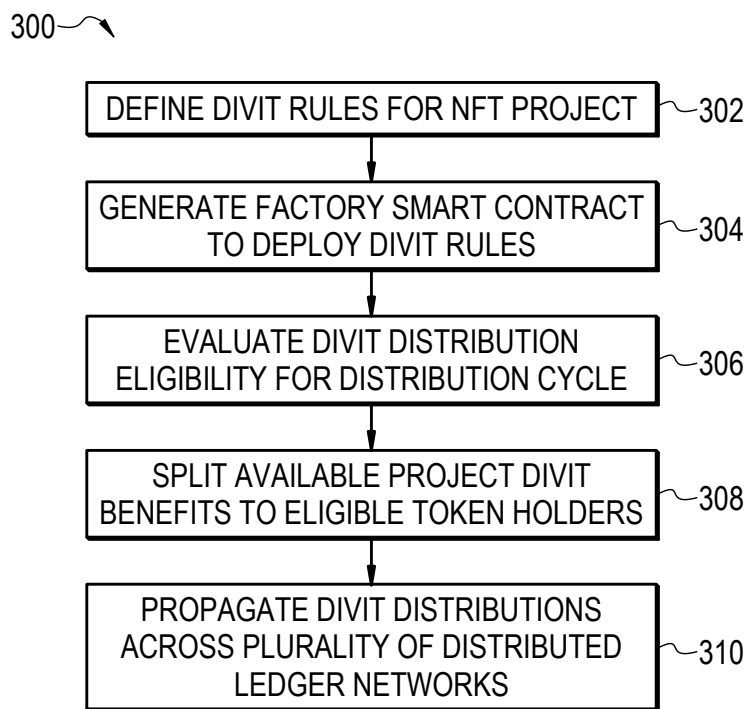


FIG. 3

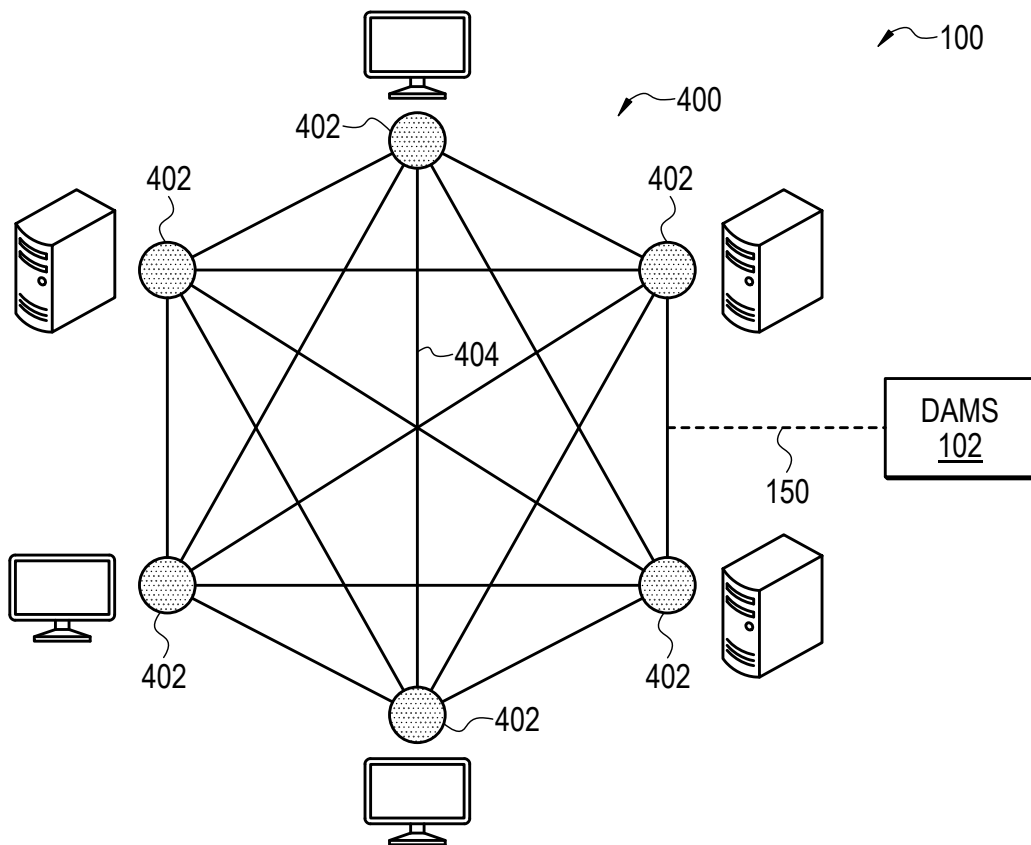


FIG. 4

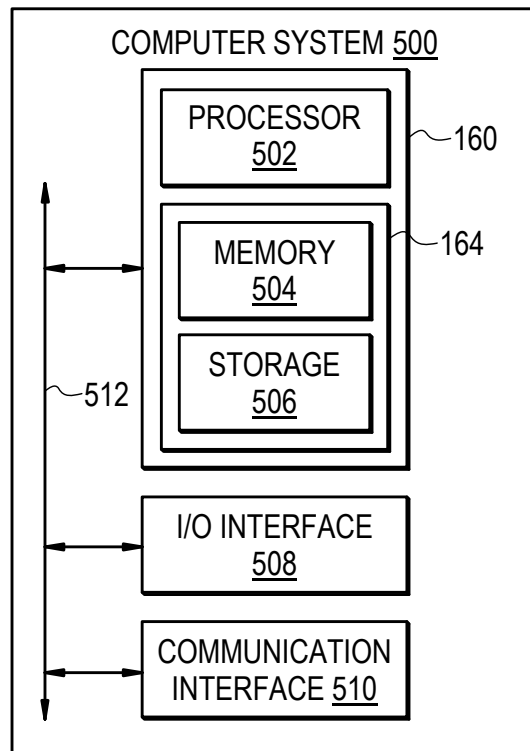


FIG. 5