StarkNet Security, Lexicon Memories:

MEDICAL MEMORY PALACE

Where Every Health Detail
Finds a Secure Sanctuary to
Unlock the Past and Secure the Future

Problem

In the current healthcare landscape, traditional Electronic Health Record (EHR) systems face numerous challenges, ranging from data security and patient privacy concerns to inefficient data sharing and lack of patient ownership. Centralized databases are susceptible to breaches, leading to potential misuse of sensitive health information. Additionally, the fragmented nature of healthcare systems often results in interoperability issues, hindering seamless data exchange among healthcare providers.

Solution:
Lexicon’s Medical Memory Palace

Lexicon's EHR NFT solution not only addresses existing challenges in healthcare data management but also sets a new standard for security, patient empowerment, and collaboration within the healthcare ecosystem. Through cutting-edge technology and a patient-centric approach, Lexicon aims to revolutionize the way electronic health records are created, shared, and managed.

Lexicon’s Medical Memory Palace

1. Enhanced Security and Integrity:
Lexicon leverages the security features of blockchain technology to create EHRs as Non-Fungible Tokens (NFTs). This ensures an immutable and tamper-proof ledger, addressing concerns related to data breaches and unauthorized alterations. Patient health records stored as NFTs on StarkNet are safeguarded against unauthorized access, providing unparalleled security.

2. Patient-Centric Ownership:
Lexicon places patients at the center of their healthcare journey by providing them with ownership and control over their EHRs. Through the tokenization of health records, patients can grant access to specific individuals or healthcare providers, empowering them to manage their data and decide who can view it.

3. Seamless Interoperability:
By adopting standardized formats and utilizing the decentralized nature of StarkNet, Lexicon ensures interoperability among diverse healthcare systems. This enables smooth and secure sharing of health information, fostering collaboration among healthcare providers and facilitating a more comprehensive view of a patient's medical history.

4. Incentivized Data Sharing:
Lexicon introduces a tokenization model that incentivizes patients to contribute their health data for research purposes. Patients receive acknowledgment and potentially financial rewards for sharing their anonymized data, fostering a collaborative environment between patients, researchers, and healthcare institutions.

5. Technological Innovation:
Lexicon represents a pioneering approach to healthcare technology by integrating EHRs with blockchain and NFTs. This innovation attracts forward-thinking healthcare professionals and organizations seeking to embrace modern, secure, and patient-centric solutions for managing electronic health records.

6. Transparent Auditing and Compliance:
Lexicon ensures transparency in healthcare data management, facilitating compliance with regulatory requirements. The blockchain's auditable nature enables healthcare institutions to maintain a clear record of all interactions with patient data, streamlining audit processes and ensuring adherence to privacy regulations.

What are EHRs?

Electronic Health Records (EHRs) are digital versions of patients' paper charts and medical histories. They contain comprehensive information about a patient's health, including medical history, diagnoses, medications, treatment plans, immunization dates, allergies, radiology images, and laboratory test results. EHRs are designed to streamline healthcare processes, improve patient care, and enhance overall efficiency. In summary, Electronic Health Records streamline healthcare information management, providing a centralized, secure, and interoperable platform for storing and accessing patient data. The goal is to enhance patient care, improve efficiency, and support evidence-based decision-making in healthcare.

Lexicon's adoption of Web3 principles introduces significant advancements in the realm of electronic health records, addressing the limitations associated with traditional Web2 EHR systems. Through decentralization, patient empowerment, and incentivized collaboration, Lexicon aims to revolutionize how health data is managed and shared.

Data Collection:
Healthcare providers input patient information into the EHR system during appointments, procedures, and other healthcare interactions. This can include subjective information from the patient, as well as objective data such as vital signs and test results.
Centralized Storage:
EHRs store all patient information in a centralized digital repository. This centralization facilitates easy access to the patient's entire medical history from various healthcare providers within a network.
Interoperability:
Many EHR systems are designed to be interoperable, allowing for the exchange of patient data between different healthcare institutions and systems. This helps create a more comprehensive and cohesive view of a patient's health.
Access Control:
EHR systems incorporate access control measures to ensure that only authorized individuals, such as healthcare providers and administrative staff, can access sensitive patient information. Access levels are typically tailored based on job roles and responsibilities.
Clinical Decision Support:
EHRs often feature clinical decision support tools that assist healthcare professionals in making informed decisions. These tools may include reminders for preventive care, drug interaction alerts, and best practice guidelines.
Patient Portals:
Many modern EHR systems offer patient portals, allowing individuals to access their own health records online. Patients can view lab results, request prescription refills, schedule appointments, and communicate securely with their healthcare providers.
Integration with Diagnostic Devices:
Some EHR systems can integrate with diagnostic devices, such as imaging equipment and laboratory instruments. This integration enables the direct import of test results and images into the patient's electronic record.
Security Measures:
EHR systems implement robust security measures to protect patient privacy. This includes encryption, access logs, and compliance with healthcare data protection regulations.
Data Exchange:
Interoperable EHR systems facilitate the secure exchange of patient data between healthcare providers, laboratories, pharmacies, and other entities involved in patient care. This sharing of information ensures that all providers involved in a patient's care have access to up-to-date and relevant data.
Audit Trails:
EHRs maintain audit trails, documenting who accessed a patient's record and when. This feature enhances transparency and supports compliance with regulatory requirements.
Reporting and Analytics:
EHR systems often include reporting and analytics tools that allow healthcare organizations to analyze trends, outcomes, and overall performance. This data-driven approach can inform decision-making and improve healthcare delivery.

Web2 (Traditional EHR Systems):

- Centralized Architecture:
  - Web2 EHR systems are typically centralized, meaning that patient health data is stored in a central database controlled by a healthcare institution or a third-party service provider.
- Interoperability Challenges:
  - Traditional EHR systems often face interoperability issues, making it difficult for different healthcare providers and systems to share and exchange patient information seamlessly.
- Limited Patient Control:
  - Patients have limited control and ownership of their health data. Access to and management of EHRs are primarily controlled by healthcare providers, reducing patient autonomy.
- Security Concerns:
  - Centralized databases are susceptible to security breaches. A single point of failure increases the risk of unauthorized access, data breaches, and potential misuse of sensitive health information.
- Fragmented Data:
  - Patient health records are often fragmented across different healthcare systems, leading to incomplete and scattered information. This can hinder healthcare professionals' ability to make well-informed decisions.

Web3 (Lexicon EHR NFTs on StarkNet):

- Decentralized and Secure:
  - Lexicon leverages Web3 principles by adopting a decentralized approach. Patient health records are stored as NFTs on the StarkNet blockchain, ensuring security, immutability, and resistance to unauthorized alterations.
- Seamless Interoperability:
  - Utilizing StarkNet's decentralized nature, Lexicon promotes seamless interoperability among various healthcare systems. This allows for secure sharing of health information, leading to a more holistic view of a patient's medical history.
- Patient-Centric Ownership:
  - Lexicon places patients at the forefront, providing them with ownership and control over their EHRs. Patients can manage access permissions, decide who can view their records, and actively participate in their healthcare journey.
- Incentivized Data Sharing:
  - Lexicon introduces tokenization models that incentivize patients to share anonymized health data for research purposes. Patients may receive acknowledgment or financial rewards, fostering a collaborative environment.
- Transparent Auditing and Compliance:
  - The blockchain's transparency facilitates auditing and compliance with regulatory standards. Lexicon ensures a clear and auditable record of all interactions with patient data, promoting adherence to privacy regulations.
- Innovation in Healthcare Technology:
  - Lexicon represents an innovative approach to healthcare technology by integrating blockchain and NFTs into EHRs. This forward-thinking solution aligns with Web3 principles, attracting stakeholders looking for modern, secure, and patient-centric EHR solutions.

Why ZK-Rollup Starknet?

Zero-knowledge technology is crucial for Electronic Health Records (EHR) for several reasons:

Privacy and Security:
Zero-knowledge proofs allow for the verification of information without revealing the actual content. In the context of EHR, this means that medical data can be shared and verified without disclosing sensitive details to unauthorized parties.
Patients' health records often contain highly private and confidential information. Zero-knowledge technology ensures that only authorized entities can access specific details while keeping the rest of the data hidden.
Compliance with Regulations:
Healthcare industries are subject to strict regulations regarding the privacy and security of patient information (e.g., HIPAA in the United States). Zero-knowledge technology aids in achieving compliance by minimizing the exposure of sensitive data.
Interoperability:
EHR systems often involve multiple stakeholders, including healthcare providers, insurance companies, and patients. Zero-knowledge technology facilitates secure and interoperable sharing of data among these entities without compromising data privacy.
Trust and Consent:
Patients are more likely to trust EHR systems that prioritize their privacy. Zero-knowledge proofs ensure that individuals have control over who accesses their health data and under what circumstances, enhancing the overall trust in the system.
Data Monetization and Research:
In some cases, healthcare organizations may want to share anonymized data for research or analytics purposes. Zero-knowledge technology enables the creation of anonymized data sets without revealing the identities of individual patients, allowing for ethical data monetization and research.
Mitigating Data Breach Risks:
Zero-knowledge technology reduces the risk of data breaches. Even if a system is compromised, the information exposed would be limited and would not compromise the entire dataset.
Patient Empowerment:
Zero-knowledge proofs empower patients to selectively disclose information. Patients can share relevant portions of their health records without exposing unnecessary details, giving them more control over their data.

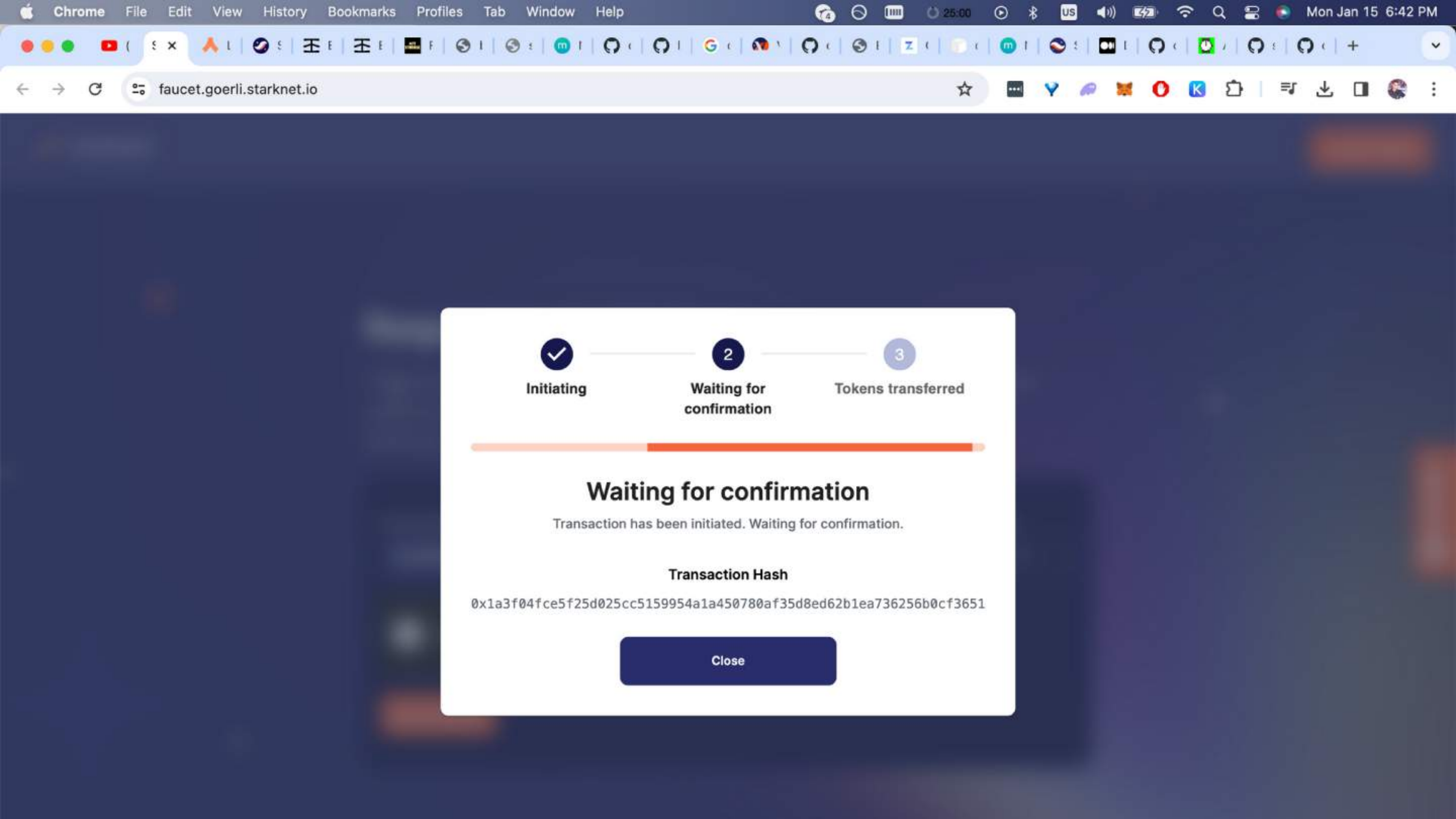
In summary, integrating zero-knowledge technology into EHR systems is essential for ensuring the privacy, security, and compliance of sensitive health information while facilitating secure data sharing and interoperability in the healthcare ecosystem.

1. Scalability:
   - StarkNet operates as a layer 2 solution on Ethereum, providing significant scalability advantages. It allows for a higher throughput of transactions, faster confirmation times, and reduced congestion compared to the Ethereum mainnet. This is crucial for handling the large volume of data associated with EHRs.
2. Cost Efficiency:
   - Using StarkNet can be more cost-effective than relying solely on the Ethereum mainnet for storing and processing EHR data. StarkNet enables more transactions to be processed at a lower cost, making it a suitable solution for applications that involve frequent data interactions.
3. Transaction Speed:
   - StarkNet transactions are processed off-chain and then submitted as a single proof to the Ethereum mainnet. This off-chain processing significantly reduces transaction confirmation times. In the context of EHRs, where quick access to updated patient information is essential, faster transaction speeds are beneficial.
4. Privacy and Security:
   - StarkNet employs Zero-Knowledge Rollups (ZK Rollups), a privacy-focused technology. This means that sensitive EHR data can be kept off-chain and only the necessary proofs are submitted to the Ethereum mainnet. This enhances the privacy and security of patient information.
5. Reduced Gas Fees:
   - Ethereum mainnet transactions involve gas fees, which can be a concern for applications with high-frequency interactions, such as updating EHR records. StarkNet's layer 2 scaling helps reduce the overall gas fees associated with processing transactions.
6. Enhanced User Experience:
   - Faster transaction speeds and lower costs contribute to an improved user experience. Patients, healthcare providers, and other stakeholders interacting with EHR data may benefit from a more seamless and cost-efficient system.
7. Ethereum Ecosystem Integration:
   - StarkNet is built as a layer 2 solution on Ethereum, ensuring compatibility with the broader Ethereum ecosystem. This means that any applications or smart contracts developed for Ethereum can be adapted to leverage StarkNet's scaling benefits without significant modifications.
8. Smart Contract Compatibility:
   - StarkNet supports smart contracts, making it compatible with existing Ethereum smart contracts. This allows for the seamless integration of EHR applications with other decentralized applications (DApps) and services within the Ethereum ecosystem.
9. Layer 2 Innovations:
   - As a layer 2 solution, StarkNet can benefit from ongoing innovations and improvements in the broader Ethereum scaling ecosystem. This ensures that EHR applications hosted on StarkNet can take advantage of the latest advancements in scaling technology.

app.infura.io/key/5f26dce4d0ef47128eb1e50c011e3719/all-endpoints

Polygon DOCS	☐ MAINNET	☐ MUMBAI
Optimism DOCS	☐ MAINNET	☐ GOERLI ☐ SEPOLIA
Arbitrum DOCS	☐ MAINNET	☐ GOERLI ☐ SEPOLIA
Palm DOCS	☐ MAINNET	☐ TESTNET
Avalanche C-Chain DOCS	☐ MAINNET	☐ FUJI
Starknet DOCS	☐ MAINNET	☑ GOERLI ☐ SEPOLIA
Celo DOCS	☐ MAINNET	☐ ALFAJORES

Expansion APIs	Endpoints
IPFS DOCS	UPGRADE TO PAID PLAN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Initiating
2
Waiting for confirmation
3
Tokens transferred
Waiting for confirmation
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Transaction Hash
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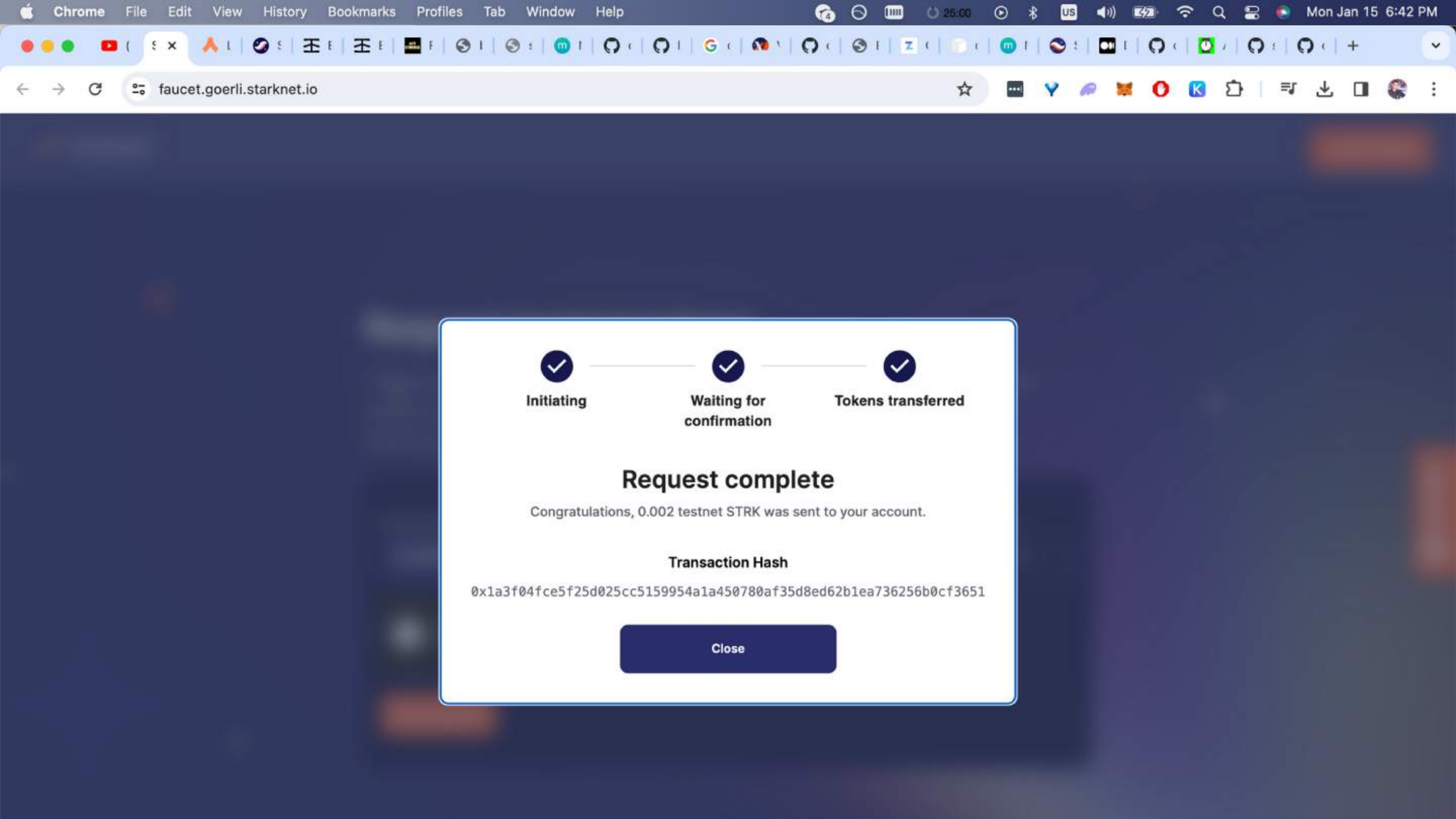
Close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faucet.goerli.starknet.io
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Waiting for confirmation
Tokens transferred
Request complete
Congratulations, 0.002 testnet STRK was sent to your account.
Transaction Hash
0x1a3f04fce5f25d025cc5159954a1a450780af35d8ed62b1ea736256b0cf3651
Close

Standardization of medical Electronic Health Record (EHR) data

1. Interoperability Standards:
   - Lexicon adheres to established interoperability standards, ensuring that health data is formatted and structured consistently. Compliance with standards like FHIR (Fast Healthcare Interoperability Resources) promotes a common language for exchanging health information.
2. Smart Contracts for Data Formats:
   - Utilizing smart contracts, Lexicon enforces standardized data formats for EHR entries. This ensures that regardless of the source or destination, the data follows predefined formats, facilitating seamless communication and interpretation.
3. Consistent Metadata:
   - Lexicon maintains consistent metadata standards for different types of health information. This includes standardized categorization, tagging, and classification of data, promoting uniformity in the representation of medical records.
4. Normalization of Terminologies:
   - Lexicon incorporates standardized medical terminologies, such as SNOMED CT or LOINC, ensuring that the terminology used for describing symptoms, diagnoses, and procedures is consistent across the platform. This helps in avoiding ambiguity and misinterpretation.
5. Compliance with Regulatory Guidelines:
   - Lexicon aligns with regulatory guidelines that emphasize standardized EHR data. Adhering to these guidelines ensures that the platform complies with industry norms and supports efforts for data standardization.
6. Collaboration with Standardization Bodies:
   - Lexicon actively engages with healthcare standardization bodies and organizations working on EHR standardization. Collaborative efforts contribute to the development and enhancement of industry-wide standards.

Creating Electronic Health Record (EHR) NFTs introduces several advantages and innovations to the traditional healthcare data management system. In summary, adopting EHR as NFTs brings about a paradigm shift in how health data is managed, focusing on security, patient empowerment, interoperability, and innovation in healthcare technology. It addresses key challenges in the current healthcare system, offering a more patient-centric and technologically advanced approach to managing electronic health records.

Security and Integrity:
Immutable Ledger: NFTs on blockchain platforms like StarkNet offer an immutable and tamper-proof ledger. Once health records are recorded on the blockchain, they cannot be altered, ensuring the integrity of patient data.

Patient Ownership and Control:
Patient-Centric Approach: Representing EHRs as NFTs gives patients greater ownership and control over their health data. Patients can grant and revoke access to their records, enhancing privacy and empowering individuals to manage their health information.

Interoperability:
Standardized Format: NFTs can be designed to adhere to standardized formats, making it easier to achieve interoperability among different healthcare systems. This facilitates seamless sharing of health information between healthcare providers and institutions.

Decentralization:
Reduced Dependency on Centralized Systems: Decentralized solutions, such as those built on StarkNet, reduce the reliance on centralized databases. This decreases the risk of a single point of failure or unauthorized access, improving the overall security of health data.

Incentivizing Data Sharing:
Tokenization as Incentive: Tokenization through NFTs can provide incentives for patients to share their data for research purposes. This can contribute to medical research while ensuring that patients are acknowledged and potentially rewarded for their contributions.

Efficient Access and Retrieval:
Streamlined Access: NFTs provide a streamlined and efficient way to access and retrieve health records. Authorized individuals, including healthcare providers, can quickly verify and access patient information.

Innovation in Healthcare Technology:
Pioneering Technology: Implementing EHR as NFTs showcases the healthcare industry's adoption of cutting-edge technologies. This innovation can attract interest from tech-savvy professionals and organizations seeking to modernize their healthcare infrastructure.

Compliance and Auditing:
Transparent Auditing: Blockchain's transparent and auditable nature ensures that every interaction with health records is recorded. This can simplify compliance with regulatory requirements and auditing processes.

Transaction

HASH

0×1a3f04fce5f25d025cc5159954a1a450780af35d8ed62b1ea736256b0cf3651

TYPE ?

INVOKE

TIMESTAMP

Jan 15 2024 06:41:59

STATUS

Received — Accepted on L2

Overview | Events 2 | Messages | Internal Calls 2

Transaction Details

BLOCK NUMBER:	PENDING
TIMESTAMP:	2 minutes ago (Jan 15 2024 06:41:59)

goerli.voyager.online/tx/0x1a3f04fce5f25d025cc5159954a1a450780af35d8ed62b1ea736256b0cf3651

Developer Info

UNIX TIMESTAMP:	1705362119
NONCE:	156863
POSITION:	8
VERSION:	1
L1 TXN HASH:	Pending
EXECUTION RESOURCES:	1461 STEPS, 92 MEMORY_HOLES, 6 PEDERSEN_BUILTIN, 41 RANGE_CHECK_BUILTIN

CALLDATA:

Hex | Decimal | Text

INPUT	VALUE
0	"0x01"
1	"0x04718f5a0fc34cc1af16a1cdee98ffb20c31f5cd61d6ab07201858f4287c938d"
2	"0x83afd3f4caedc6eebf44246fe54e38c95e3179a5ec9ea81740eca5b482d12e"
3	"0x00"
4	"0x03"
5	"0x03"
6	"0x20956722ff53760c0e7cb3b03b7c22e03d0228b3"

Example of metadata for an Electronic Health Record (EHR) NFT on LEXICON:

In a medical blockchain project like LEXICON, where Electronic Health Record (EHR) data is stored as NFTs on Starknet, the metadata associated with each NFT provides information about the content and context of the EHR data. It's essential to carefully design the metadata structure to ensure that it complies with privacy regulations (such as HIPAA) and provides relevant information for medical professionals and authorized users. Additionally, considering the sensitive nature of health data, encryption and secure access control mechanisms should be implemented.

This JSON structure provides an example of the kind of information that could be included in the metadata of an EHR NFT on LEXICON. Each section contains relevant details about the patient, medical record, health conditions, treatments, diagnostics, vaccinations, emergency contacts, blockchain information, access control, and encryption. The hash or digital signature at the end represents a measure of data integrity and authenticity.

1. Create a new Web3 access key with StarkNet endpoints, along with a new IPFS access key and Gateway for EHR.

```json
{
  "action": "create_access_key",
  "network": "Web3",
  "project_name": "EHR_StarkNet",
  "type": "starknet"
}
```

This JSON represents the action of creating a new access key for the Web3 network, specifically for StarkNet. The project name is set as "EHR_StarkNet" for clarity.

2. Install necessary dependencies for EHR and deploy the new account for Electronic Health Records.

```json
{
  "action": "install_dependencies",
  "dependencies": ["StarkNet_SDK", "IPFS_HTTP_Client", "dotenv"]
}
```

This JSON signifies the installation of required dependencies for Electronic Health Records, including the StarkNet SDK, IPFS HTTP Client, and dotenv.

```json
{
  "action": "deploy_account",
  "contract_type": "StarkNet_Account",
  "public_key": "your_public_key",
  "private_key": "your_private_key"
}
```

Here, the JSON illustrates the deployment of a StarkNet account for Electronic Health Records, specifying the contract type as "StarkNet_Account" and providing the associated public and private keys.

3. Fund the account for EHR gas payment and deploy the ERC721 contract for Electronic Health Records.

```json
{
  "action": "fund_account",
  "amount": "0.1", // Amount in L2 Girly ETH
  "account_address": "your_account_address"
}
```

This JSON action involves funding the Electronic Health Records account with a specified amount in L2 Girly ETH to cover gas costs.

```json
{
  "action": "deploy_contract",
  "contract_type": "ERC721_EHR",
  "account_address": "your_account_address"
}
```

This JSON demonstrates the deployment of the ERC721 contract specifically designed for Electronic Health Records, associating it with the previously created account.

4. Mint an NFT for Electronic Health Records and upload the data to IPFS for EHR.

```json
{
  "action": "mint_nft",
  "token_id": "1",
  "account_address": "your_account_address",
  "metadata_url": "ipfs://your_metadata_cid"
}
```

This JSON outlines the minting of an NFT for Electronic Health Records, assigning a unique token ID and associating it with the account address. The metadata URL is specified as an IPFS link.

```json
{
  "action": "upload_to_ipfs",
  "data_type": "metadata",
  "data": {
    "patient_name": "John Doe",
    "dob": "1980-01-01",
    "diagnosis": "EHR details and diagnosis information",
    // Additional EHR-related data
  }
```

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Compliance and Auditing:
Transparent Auditing: Blockchain's transparent and auditable nature ensures that every interaction with health records is recorded. This can simplify compliance with regulatory requirements and auditing processes.

EHR NFT JSON Example

Patient Information:
Patient's name
Date of birth
Gender
Unique patient identifier or hash

Medical Record Details:
Medical record ID
Date of creation
Last update timestamp
Relevant healthcare provider information

Health Conditions:
Diagnosed health conditions
Current medications
Allergies
Treatment Information:
Details of past treatments
Surgical procedures
Medication history

Diagnostic Data:
Lab results
Imaging reports (X-rays, MRIs, etc.)
Pathology reports

Vaccination History:
Record of vaccinations received
Emergency Contact Information:
Name and contact details of emergency contacts

Blockchain Information:
NFT Token ID
Smart contract address
Blockchain network (Starknet)

Access Control and Encryption:
Permissions or access rights
Encryption details for privacy and security

Hash or Digital Signature:
Ensuring data integrity and authenticity

NFT.STORAGE

Files

Upload directories easily with NFTUp

+ Upload

Date	CID	Archived	Storage Providers	Size	
1/15/2024, 6:32 PM	bafkreif...fx4fmmtm	📌	Queuing	1.68KB	Actions
12/31/2023, 11:33 PM	bafkreid...pd2mzbre	📌	f097777, f01771403, f01392893, +2 More	65.13KB	Actions
12/31/2023, 11:33 PM	bafkreif...zquvsw74	📌	f097777, f01771403, f01392893, +2 More	73.74KB	Actions
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12/31/2023, 9:12 AM	bafkreig...kqj3biqu	📌	f097777, f01771403, f0717969, +2 More	97.88KB	Actions
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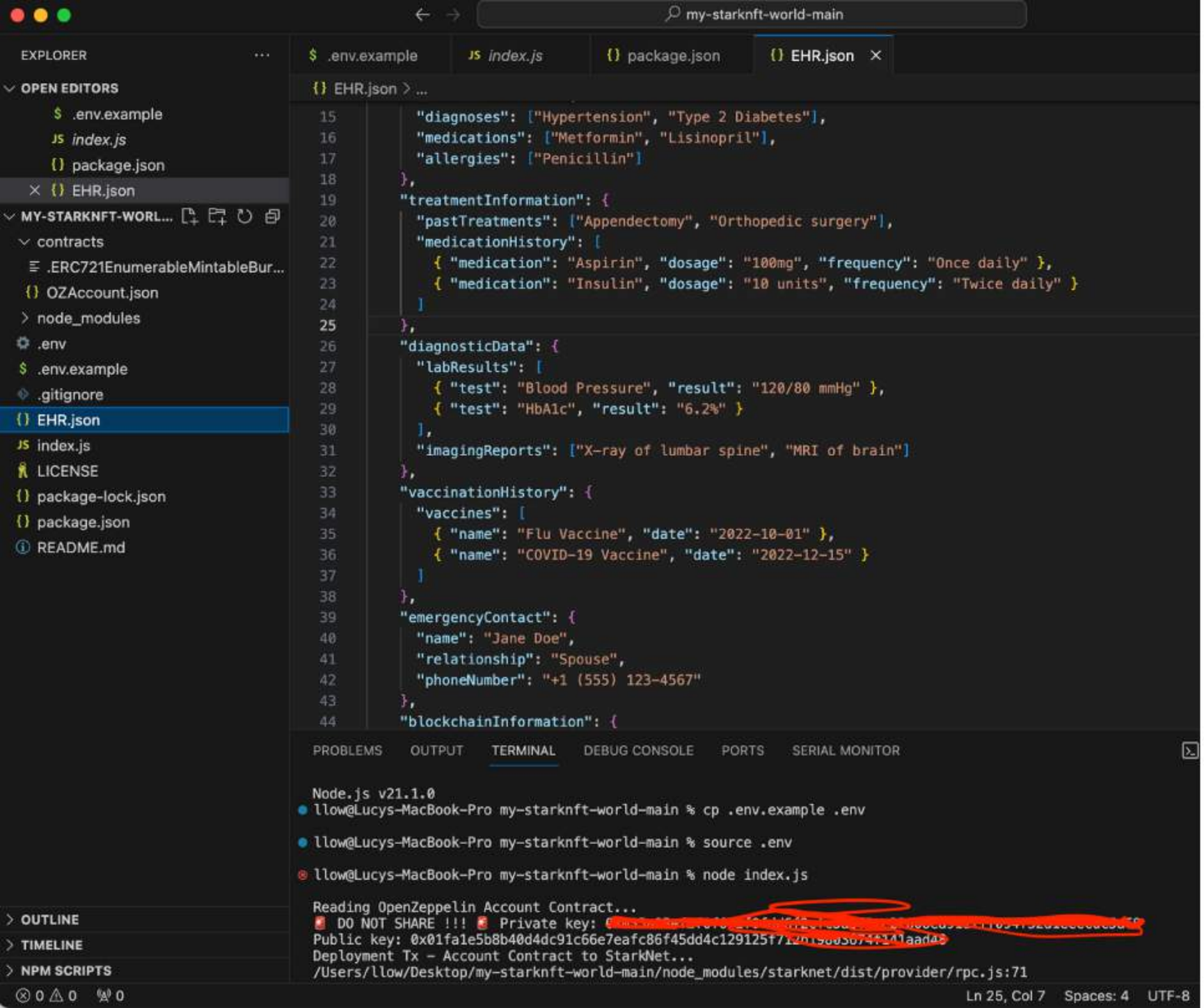


```
{
 "patient": {
  "name": "John Doe",
  "dateOfBirth": "1980-05-15",
  "gender": "Male",
  "patientID": "0xabc123"
 },
 "medicalRecord": {
  "recordID": "MR123456",
  "creationDate": "2023-01-15T08:30:00Z",
  "lastUpdate": "2023-03-20T14:45:00Z",
  "healthcareProvider": "Stark Medical Center"
 },
 "healthConditions": {
  "diagnoses": ["Hypertension", "Type 2 Diabetes"],
  "medications": ["Metformin", "Lisinopril"],
  "allergies": ["Penicillin"]
 },
 "treatmentInformation": {
  "pastTreatments": ["Appendectomy", "Orthopedic surgery"],
  "medicationHistory": [
   { "medication": "Aspirin", "dosage": "100mg", "frequency": "Once daily" },
   { "medication": "Insulin", "dosage": "10 units", "frequency": "Twice daily" }
  ]
 },
 "diagnosticData": {
  "labResults": [
   { "test": "Blood Pressure", "result": "120/80 mmHg" },
   { "test": "HbA1c", "result": "6.2%" }
  ],
  "imagingReports": ["X-ray of lumbar spine", "MRI of brain"]
 },
 "vaccinationHistory": {
  "vaccines": [
   { "name": "Flu Vaccine", "date": "2022-10-01" },
   { "name": "COVID-19 Vaccine", "date": "2022-12-15" }
  ]
 },
 "emergencyContact": {
  "name": "Jane Doe",
  "relationship": "Spouse",
  "phoneNumber": "+1 (555) 123-4567"
 },
 "blockchainInformation": {
  "nftTokenID": "789012",
  "smartContractAddress": "0xdef456",
  "blockchainNetwork": "Starknet"
 },
 "accessControlAndEncryption": {
  "permissions": ["MedicalProfessional", "EmergencyServices"],
  "encryptionDetails": "AES-256"
 },
 "hashOrDigitalSignature": "0x1a2b3c4d5e6f..."
}
```

bafkreifc7hjruipe7kpdvsp7hxfjspyj6irvase5gmk6gwbb5hfx4fmmtm.ipfs.nftstorage.link

Raw Parsed


```
{
  "patient": {
    "name": "John Doe",
    "dateOfBirth": "1980-05-15",
    "gender": "Male",
    "patientID": "0xabc123"
  },
  "medicalRecord": {
    "recordID": "MR123456",
    "creationDate": "2023-01-15T08:30:00Z",
    "lastUpdate": "2023-03-20T14:45:00Z",
    "healthcareProvider": "Stark Medical Center"
  },
  "healthConditions": {
    "diagnoses": [
      "Hypertension",
      "Type 2 Diabetes"
    ],
    "medications": [
      "Metformin",
      "Lisinopril"
    ],
    "allergies": [
      "Penicillin"
    ]
  },
  "treatmentInformation": {
    "pastTreatments": [
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    ],
    "medicationHistory": [
      {
        "medication": "Aspirin",
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Business Dimension

Lexicon EHR NFTs provide a unique and innovative solution to the healthcare industry, addressing the key dimensions of business value, innovation, and user experience:

1. Commercial Value:
   - Problem Solving: Lexicon EHR NFTs address the challenges of data interoperability, security, and accessibility in the healthcare sector. By utilizing blockchain technology, it ensures the integrity and accessibility of Electronic Health Records (EHRs) while maintaining patient privacy.
   - Industry Application: The solution has direct applicability in the healthcare industry, providing a secure and transparent way to manage and share patient data. This can lead to improved efficiency, reduced costs, and enhanced patient care.
2. Innovation:
   - Blockchain Technology: Utilizing blockchain, specifically on StarkNet, is an innovative approach. The use of Non-Fungible Tokens (NFTs) for EHRs introduces a novel way to represent and manage health records securely. This breaks away from conventional centralized storage systems.
   - Decentralization: The decentralized nature of StarkNet ensures that data is not stored in a single, vulnerable location. This represents a breakthrough in how health data is traditionally managed and stored.
3. User Experience:
   - Intuitiveness: The system is designed to be user-friendly for both healthcare professionals and patients. Access to EHRs through NFTs can streamline the process of data sharing and retrieval.
   - Understanding: The solution simplifies complex processes related to EHRs. Patients and healthcare providers can easily understand and navigate the system, improving overall user experience.

User Journey

This user journey aims to provide developers with an intuitive and streamlined process for managing Electronic Health Records on Lexicon's blockchain platform.

Patients:

Access Control: Patients have secure access to their Electronic Health Records (EHR) through decentralized identity solutions, ensuring privacy and control over their data.
Interoperability: Seamless sharing of health information with healthcare providers and other stakeholders, promoting interoperability and comprehensive healthcare.

Healthcare Providers:

Efficient Data Retrieval: Quick retrieval of patient data during medical consultations, reducing administrative burden and enhancing the efficiency of healthcare delivery.
Immutable Records: Access to tamper-resistant EHR data, ensuring the integrity of medical histories and treatment plans.

Researchers:

Anonymized Data Access: Researchers can access anonymized and aggregated health data, facilitating medical research while protecting individual privacy.
Smart Contracts for Consent: Utilization of smart contracts for transparent and programmable patient consent, ensuring ethical data usage.

Lexicon in Industry Scenarios

Clinical Trials and Research:
Scenario: Pharmaceutical companies conducting clinical trials require a secure and unalterable record of patient data to ensure the integrity of trial results.
Blockchain Impact: Blockchain EHRs enable transparent and tamper-proof records, ensuring the accuracy and authenticity of patient information in clinical trials. Researchers can trust the data, and regulatory bodies can efficiently audit trial processes.

Health Information Exchange (HIE):
Scenario: Healthcare providers in a region need to share patient information securely and efficiently to provide comprehensive care.
Blockchain Impact: Blockchain facilitates a decentralized and secure health information exchange. Patients' consented data can be shared among authorized providers in real-time, reducing redundancies, errors, and delays in treatment.

Supply Chain Integrity for Pharmaceuticals:
Scenario: Ensuring the authenticity and traceability of pharmaceuticals as they move through the supply chain is critical to prevent counterfeit drugs.
Blockchain Impact: By recording the entire supply chain on a blockchain, from manufacturing to distribution, stakeholders can trace the origin and movement of pharmaceuticals. This transparency reduces the risk of counterfeit drugs and ensures the safety of patients.

Patient-Centric Data Ownership:
Scenario: Patients want more control over their health data, allowing them to share it with specific healthcare providers or researchers as desired.
Blockchain Impact: Blockchain empowers patients to own and control access to their EHRs through cryptographic keys. Patients can grant and revoke access, enhancing privacy and putting them in charge of their health information.

Global Health Data Exchange:
Scenario: International travelers may require immediate access to their health records in case of emergencies, but traditional EHR systems may not support cross-border data access easily.
Blockchain Impact: Blockchain enables a decentralized and globally accessible EHR system. Patients can access their health records seamlessly, regardless of their location, promoting continuity of care during emergencies.

Remote Patient Monitoring:
Scenario: Remote monitoring of patients with chronic conditions requires real-time access to accurate health data to make informed decisions.
Blockchain Impact: Blockchain ensures the immutability and real-time availability of patient data. Healthcare providers can trust the integrity of the information, leading to better-informed decisions for remote patient care.

Problem

- Traditional EHR systems face data breaches, lack of patient control, and interoperability challenges.
- Patients struggle with secure access to and management of their health data.
- Healthcare providers deal with centralized systems compromising patient privacy.

Existing Alternatives

Epic Systems Corporation, Cerner Corporation, and Allscripts Healthcare Solutions are leading healthcare technology companies that provide electronic health record (EHR) solutions for managing patient information, medical records, and healthcare workflows.

Solution

- Lexicon leverages StarkNet, a decentralized ZK rollup on Ethereum.
- Provides a secure, transparent, and patient-centric EHR platform using NFTs.
- Zero-knowledge technology ensures data privacy, giving patients control over access.
- Enhances data security and interoperability for healthcare providers.

Key Metrics

User Adoption Rate Data Security and Integrity Interoperability Index Transaction Volume Customer Satisfaction Smart Contract Execution Compliance Adherence Token Utility Community Engagement Cost Savings

Unique Value Proposition

- Secure EHR Management: Provide a decentralized and secure platform for managing Electronic Health Records on StarkNet.
- Privacy and Control: Empower patients to have control over their health data, adhering to privacy regulations.

High Level Concept

Lexicon revolutionizes electronic health records by leveraging the security of blockchain, providing an intuitive and interoperable platform for healthcare data management, fostering trust among stakeholders, and ensuring patient privacy.

Unfair Advantage

- Innovative use of zero-knowledge technology on StarkNet for unparalleled data security.
- Scalability of StarkNet enables seamless integration and efficient healthcare data handling.
- Focus on user experience and adherence to blockchain standards.

Channels

- Online Advertising: Use digital platforms to advertise Lexicon to potential users.
- Industry Events: Attend healthcare and technology conferences to showcase Lexicon.

Customer Segments

- Healthcare Providers: Hospitals, clinics, individual healthcare professionals.
- Patients: Individuals who want secure and private management of their Electronic Health Records (EHR).

Early Adopters

Forward-thinking healthcare institutions and tech-savvy medical professionals who recognize the potential of blockchain-based EHR solutions

Cost Structure

- Development Costs: Invest in ongoing development and maintenance of the Lexicon platform.
- Security Measures: Incur costs associated with ensuring top-tier data security.
- Marketing and Sales: Budget for marketing efforts to reach healthcare providers and patients.

Revenue Streams

- Subscription Fees: Charge healthcare providers and institutions a subscription fee based on the volume of EHR data managed.
- Transaction Fees: Charge a small fee for each NFT minted or transaction on the Lexicon platform.