Flipkart

GRiD 4.0

2022 Campus Challenge

Blockchain-based eCommerce warranty system using NFTs

Team Name: Netajihackers

Institute Name: Netaji Subhash University of Technology, Delhi

Team members details

Team Name	Netajihackers		
Institute Name	Netaji Subhash University of Technology, Delhi		
Team Members >	**1 (Leader)**	**2**	**3**
Name	Lakshay Gulati	Satyam Mishra	Siddharth Majumdar
Batch	2024	2024	2024

Deliverables/Expectations for Level 2 (Idea + Code Submission)

The solution should focus on:

- The blockchain smart contract should allow users to prove ownership
- Provide the purchasing history, warranty period, and other item information
- The warranty card should include the item’s serial number and upon purchase be sent to the customer’s smartphone.
- The NFTs should be decaying in nature, in that, after a certain period their use for the redemption of warranty benefits offered by the brand/retailer will expire
- **Bonus -** GUI-based tool that doesn’t require knowledge of any Blockchain programming to use by Brands and Retailers.
- **Bonus** - Usage of Soulbound NFTs
- **Bonus** - Add any engagement/gamification construct to the loyalty program

Glossary

- **IPFS – Inter Planetary File System** (IPFS) is a protocol and peer-to-peer network for storing and sharing data in a distributed file system. **STORES THE METADATA AND IMAGE ~ The NFT Permanently**

- **Smart Contract - Smart contracts** are simply programs stored on a blockchain that run when predetermined conditions are met

- **ERC – 721 -** is **a standard smart contract for representing ownership of NFTs**, that is, where each token is unique and can be decayed

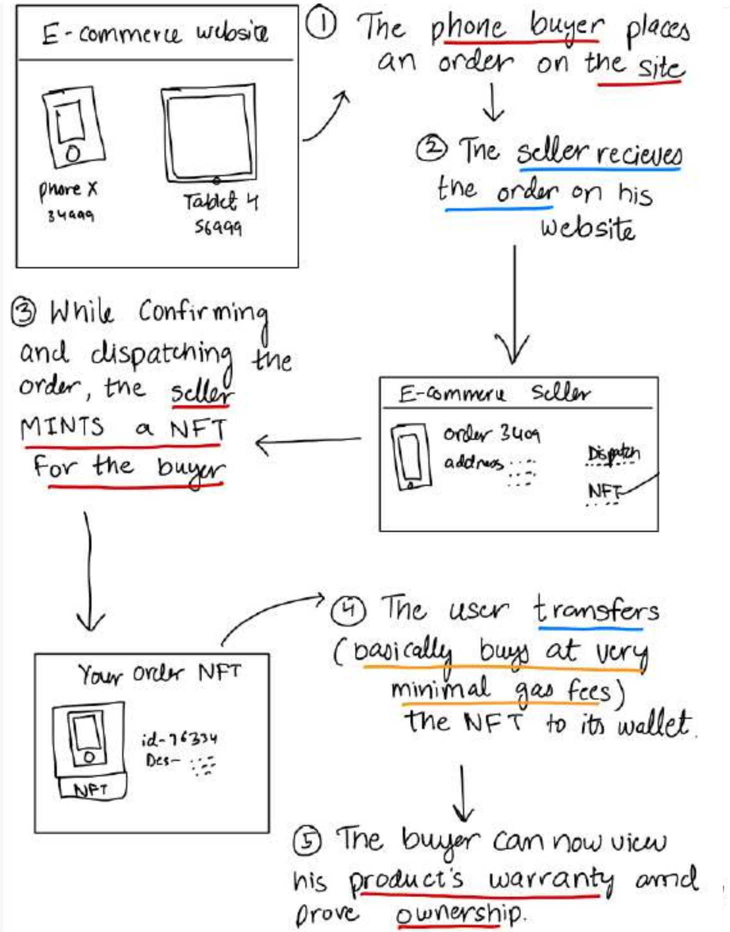
- **MetaMask -** cryptocurrency wallet used to interact with the Ethereum blockchain used to interact with decentralized applications.

- **Polygon - Ethereum blockchain** — allowing speedy transactions and low fees , uses MATIC as currency

- **Gas Fees -** the cost necessary to perform a transaction on the Ethereum network
- **Buyer** – The customer placing the order on E-Commerce Website
- **Seller** – The creator of NFT and selling the order

Proposed approach

Happening at the Frontend



① The phone buyer places an order on the site

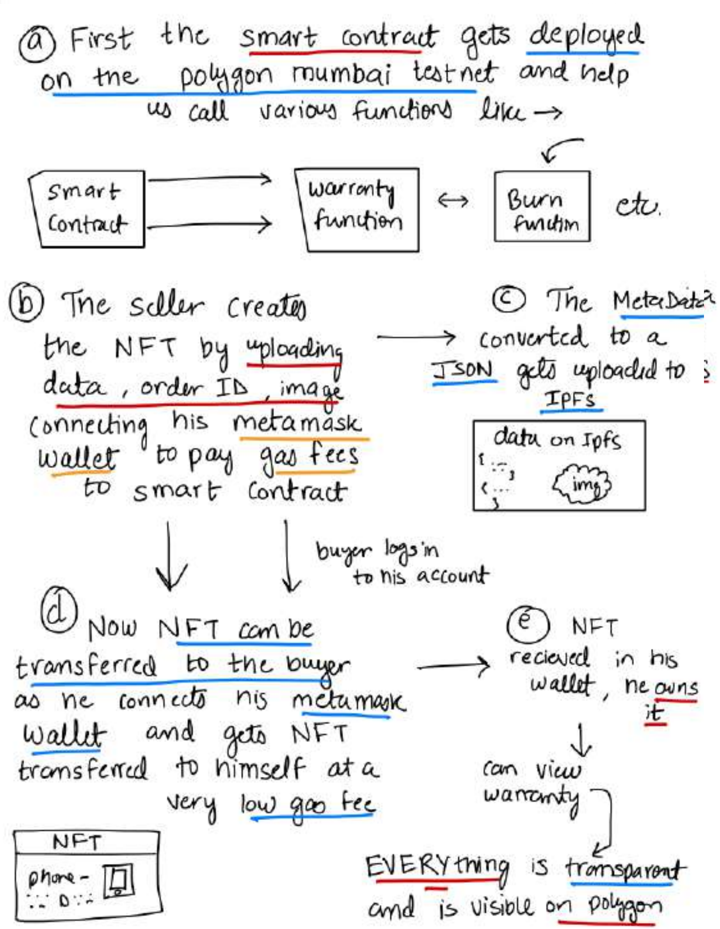
② The seller recieves the order on his website

③ While Confirming and dispatching the order, the seller MINTS a NFT For the buyer

④ The user transfers (basically buys at very minimal gas fees) the NFT to its wallet.

⑤ The buyer can now view his product's warranty amd prove ownership.

Happening at the backend



ⓐ First the smart contract gets deployed on the polygon mumbai testnet and help us call various functions like →

ⓑ The seller creates the NFT by uploading data, order ID, image connecting his metamask wallet to pay gas fees to smart contract

ⓒ The MetaData's converted to a JSON gets uploaded to IPFS

ⓓ Now NFT can be transferred to the buyer as he connects his metamask wallet and gets NFT transferred to himself at a very low gas fee

ⓔ NFT recieved in his wallet, he owns it

can view warranty

EVERYthing is transparent and is visible on polygon

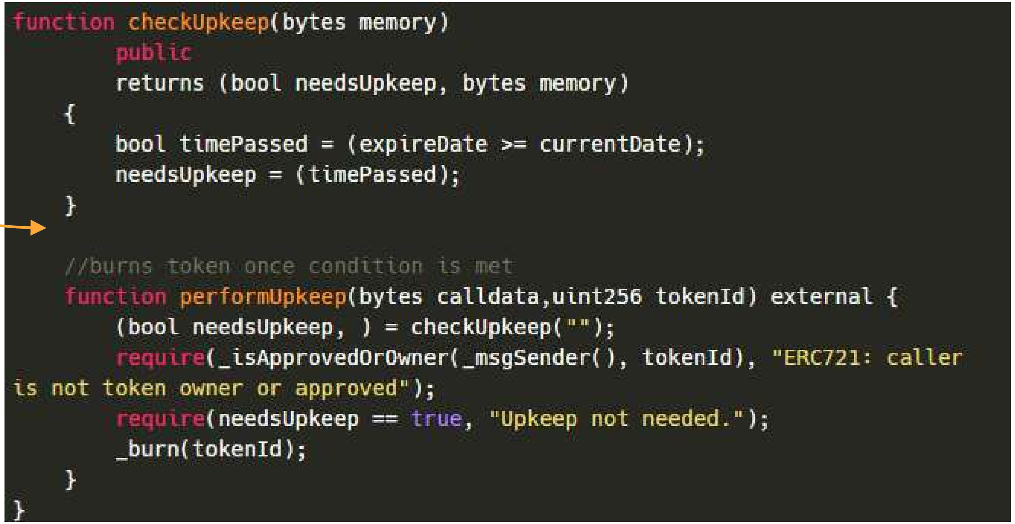
Smart Contract

Functions present –

- Burning the NFT token
- Viewing the Warranty

Other basic ERC 721 functions -

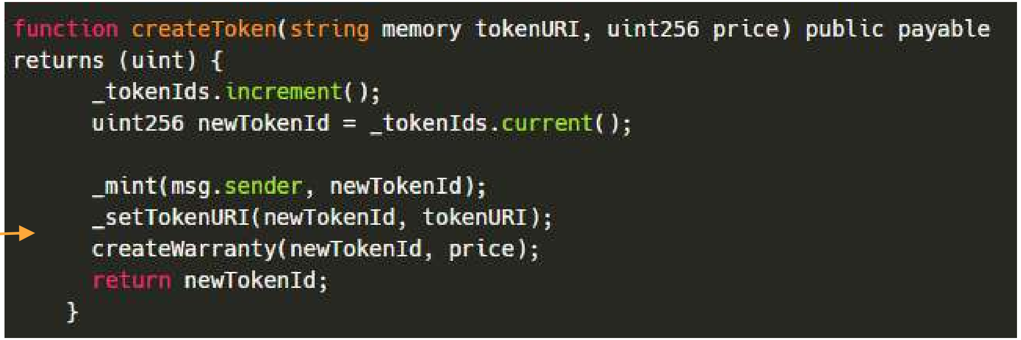
- Fetching the NFT from blockchain with address
- Token URI (unique id for every NFT token created)
- Listing NFT , Transfer approval from owner
- Secure Functions to check ownership



```
function checkUpkeep(bytes memory)
        public
        returns (bool needsUpkeep, bytes memory)
    {
        bool timePassed = (expireDate >= currentDate);
        needsUpkeep = (timePassed);
    }

    //burns token once condition is met
    function performUpkeep(bytes calldata,uint256 tokenId) external {
        (bool needsUpkeep, ) = checkUpkeep("");
        require(_isApprovedOrOwner(_msgSender(), tokenId), "ERC721: caller
is not token owner or approved");
        require(needsUpkeep == true, "Upkeep not needed.");
        _burn(tokenId);
    }
}
```

The smart contract running in hardhat environment gets deployed to the Polygon Mumbai test-net and has an address on which all the functions work.
You can view this here.
And smart contract here.
This function creates the NFT

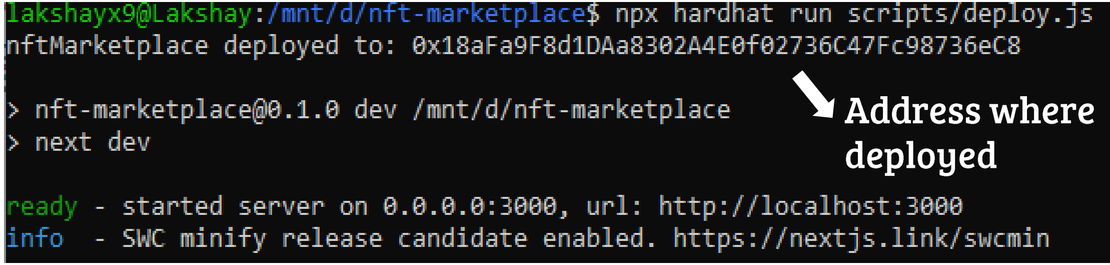


```
function createToken(string memory tokenURI, uint256 price) public payable
returns (uint) {
      _tokenIds.increment();
      uint256 newTokenId = _tokenIds.current();

      _mint(msg.sender, newTokenId);
      _setTokenURI(newTokenId, tokenURI);
      createWarranty(newTokenId, price);
      return newTokenId;
   }
```

The Workflow

- The smart contract gets deployed on the polygon test-net using hardhat , gas fees is charged from the seller / creator. The address where the contract is deployed is saved as a constant in the project file.

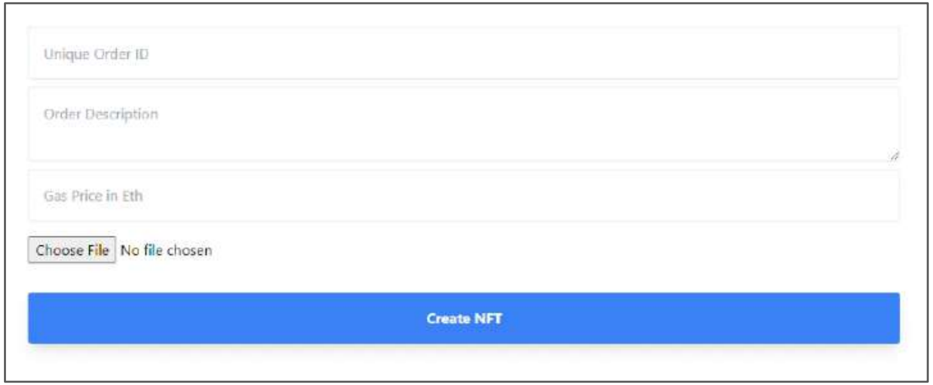


```
lakshayx9@Lakshay:/mnt/d/nft-marketplace$ npx hardhat run scripts/deploy.js
nftMarketplace deployed to: 0x18aFa9F8d1DAa8302A4E0f02736C47Fc98736eC8

> nft-marketplace@0.1.0 dev /mnt/d/nft-marketplace
> next dev

ready - started server on 0.0.0.0:3000, url: http://localhost:3000
info  - SWC minify release candidate enabled. https://nextjs.link/swcmin
```

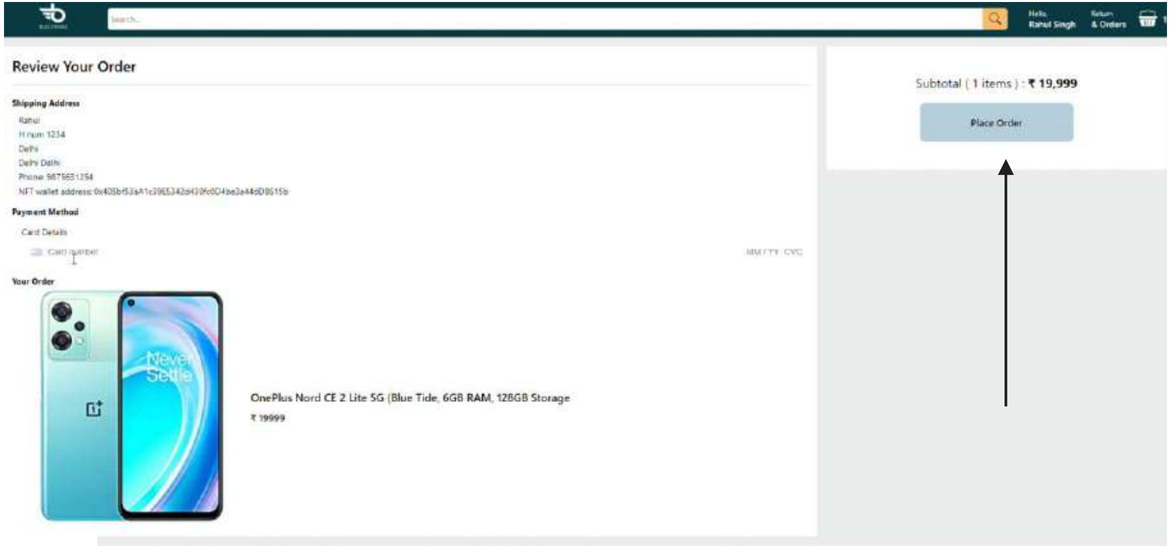
Address where deployed



- We created a simple GUI for seller for him to create warranty easily , he can upload the order image and data , with warranty being automatically created for One year from date of order

Now, this how the order and NFT will be created

1. The Customer / Buyer places the order on the E-commerce website and his details and order gets notified to the seller



Review Your Order

Shipping Address

Rahul
H num 1234
Delhi
Delhi Delhi
Phone: 9875631254
NFT wallet address: 0x405bf53aA1c39E5342d430fc0D4be3a44dD8615b

Payment Method

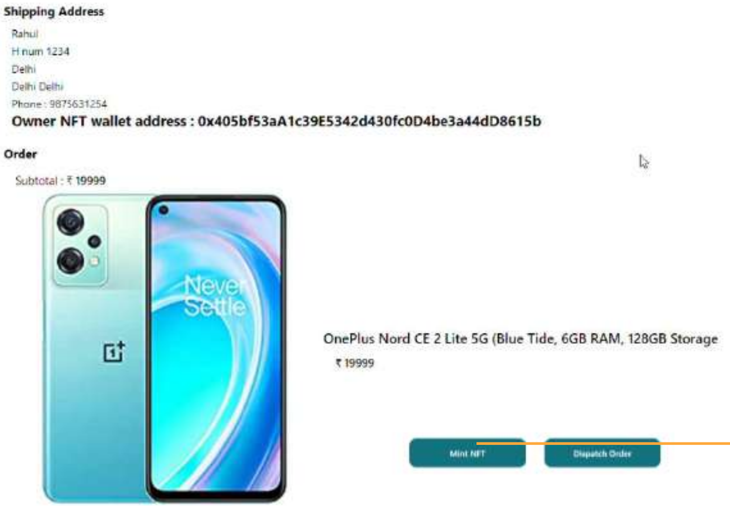
Card Details

Your Order

OnePlus Nord CE 2 Lite 5G (Blue Tide, 6GB RAM, 128GB Storage

₹ 19999

Subtotal (1 items) : ₹ 19,999



Shipping Address

Rahul
H num 1234
Delhi
Delhi Delhi
Phone : 9875631254
Owner NFT wallet address : 0x405bf53aA1c39E5342d430fc0D4be3a44dD8615b

Order

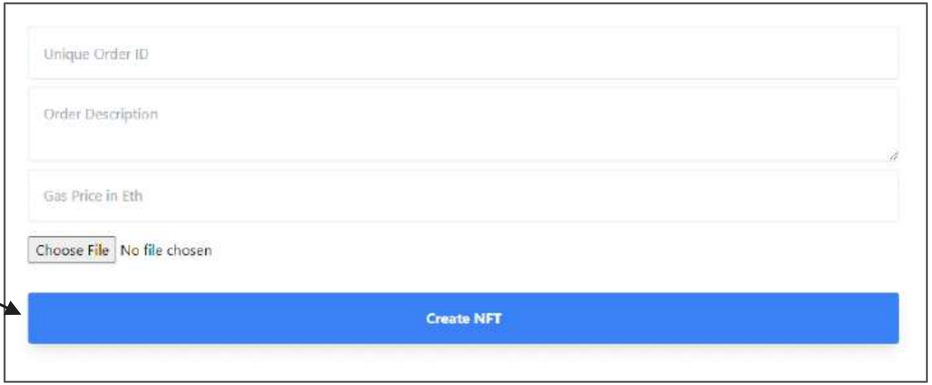
Subtotal : ₹ 19999

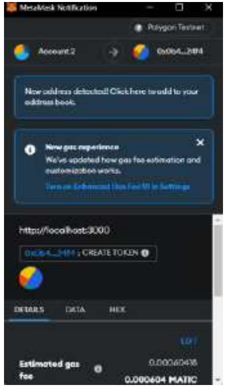
OnePlus Nord CE 2 Lite 5G (Blue Tide, 6GB RAM, 128GB Storage

₹ 19999

2. The seller sees that he has received the order and now dispatches it along with creating NFT when he clicks the Create NFT button which redirects it to the site we created.

3. Now the seller gets redirected to the warranty NFT creation site where he enters the details and clicks on create NFT and approves transaction through metamask wallet
Also uploads the image / product svg





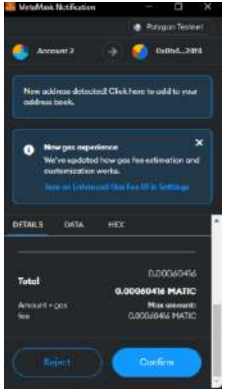
New address detected! Click here to add to your address book.

New gas experience
We've updated how gas fee estimation and customization works.
Turn on Enhanced Gas Fee UI in Settings

https://localhost:3000

0x0b4...24f4 : CREATE TOKEN

Estimated gas fee 0.00060416
0.000604 MATIC

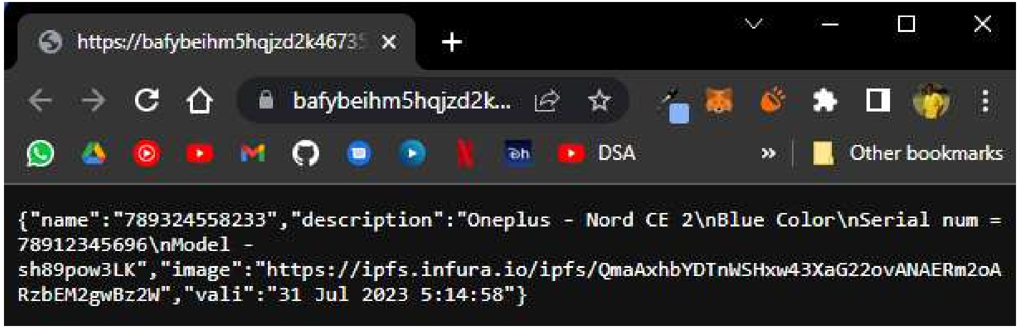


New address detected! Click here to add to your address book.

New gas experience
We've updated how gas fee estimation and customization works.
Turn on Enhanced Gas Fee UI in Settings

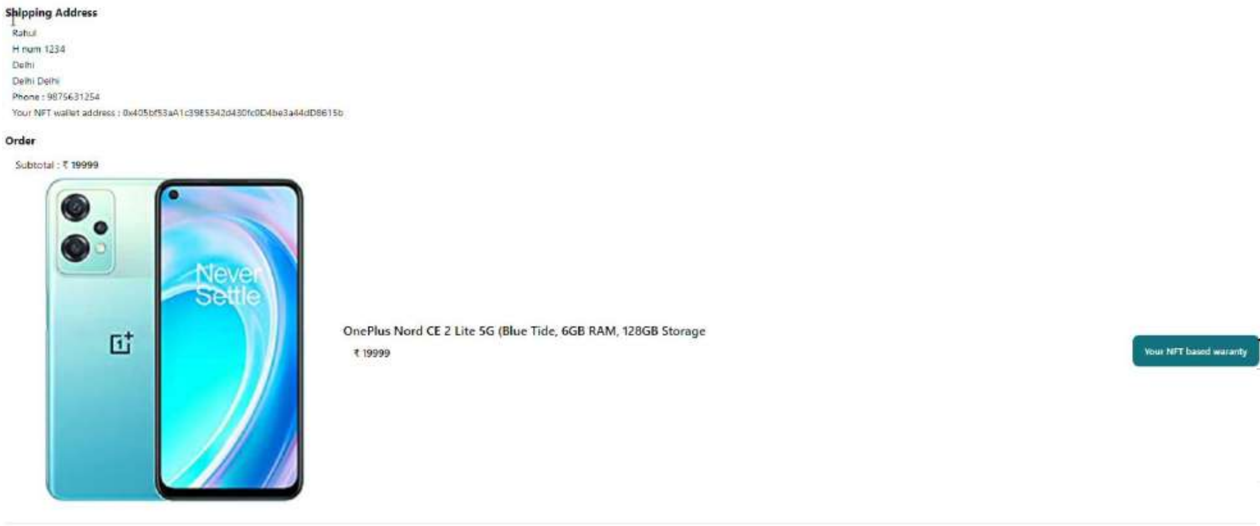
Total 0.00060416
0.00060416 MATIC
Amount + gas fee
Max amount: 0.00060416 MATIC

4. The details entered by the seller gets converted to a JSON file and act as NFT Metadata , Also the warranty date is automatically taken in the metadata (one year after the creation) and Uploaded on IPFS just like what platforms like OpenSea do so it can't be deleted and thus NFT is created , you can view one here.



```
{"name":"789324558233","description":"Oneplus - Nord CE 2\nBlue Color\nSerial num = 78912345696\nModel - sh89pow3LK","image":"https://ipfs.infura.io/ipfs/QmaAxhbYDTnWSHxw43XaG22ovANAERm2oARzbEM2gwBz2W","vali":"31 Jul 2023 5:14:58"}
```

5. Now the NFT can be accessed by seller and he can transfer the NFT to his own wallet address and get owner ship and claim warranty



Shipping Address

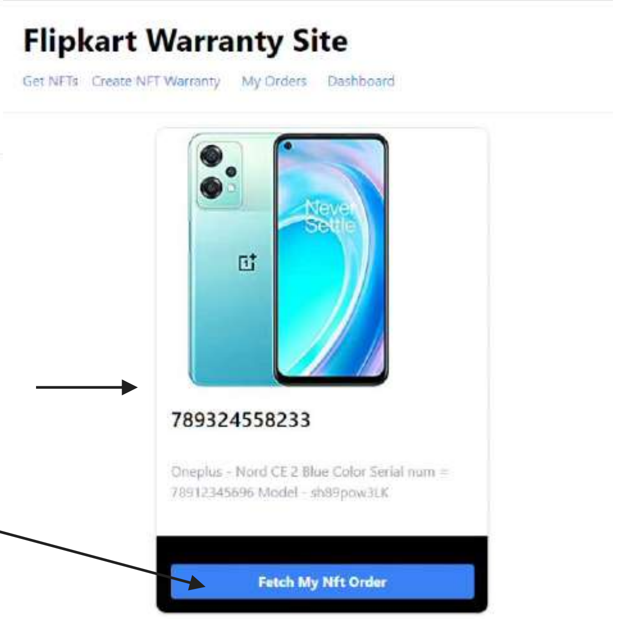
Rahul
H num 1234
Delhi
Delhi Delhi
Phone : 9875631254
Your NFT wallet address : 0x405bf53aA1c39E5342d430fc0D4be3a44dD8615b

Order

Subtotal : ₹ 19999

OnePlus Nord CE 2 Lite 5G (Blue Tide, 6GB RAM, 128GB Storage
₹ 19999

6. The buyer can now view the NFT of the order he placed and can now transfer it to himself

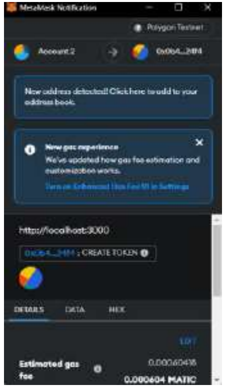


Flipkart Warranty Site

789324558233

Oneplus - Nord CE 2 Blue Color Serial num = 78912345696 Model - sh89pow3LK

7. Now the buyer connects his own meta mask wallet and clicks on Fetch My NFT and pays a nominal gas fee to get the ownership of the NFT

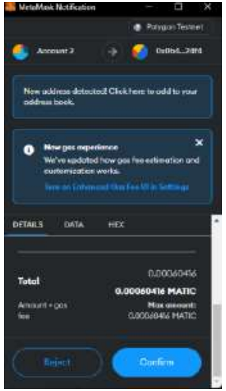


New address detected! Click here to add to your address book.

New gas experience
We've updated how gas fee estimation and customization works.
Turn on Enhanced Gas Fee UI in Settings

http://localhost:3000

Estimated gas fee 0.00060416
0.000604 MATIC

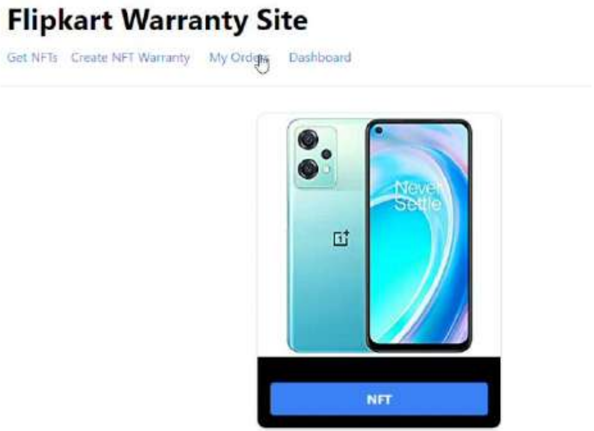


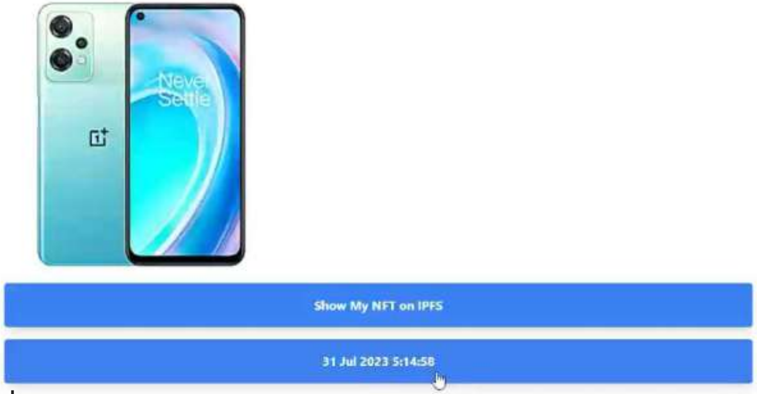
New address detected! Click here to add to your address book.

New gas experience
We've updated how gas fee estimation and customization works.
Turn on Enhanced Gas Fee UI in Settings

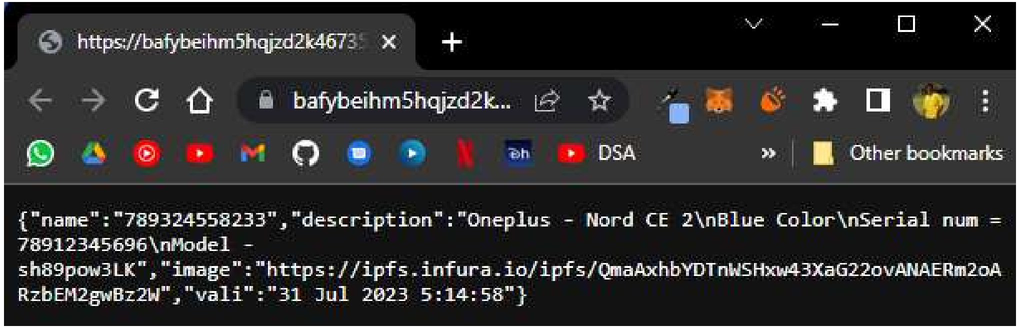
Total 0.00060456
0.00060416 MATIC
Amount + gas fee
Max amount: 0.00060456 MATIC

7. The user can now view his NFT on IPFS and can also see the warranty

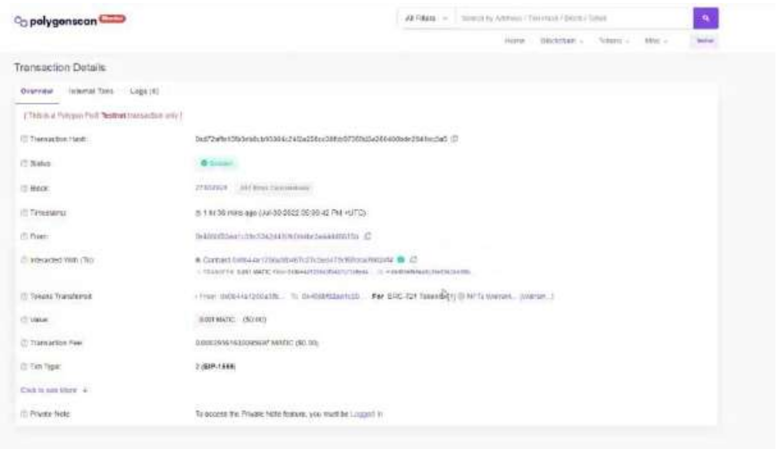




8. Can view his NFT on the IPFS and Polygon Scan



```
{"name":"789324558233","description":"Oneplus - Nord CE 2\nBlue Color\nSerial num =
78912345696\nModel -
sh89pow3LK","image":"https://ipfs.infura.io/ipfs/QmaAxhbYDTnWSHxw43XaG22ovANAERm2oA
RzbEM2gwBz2W","vali":"31 Jul 2023 5:14:58"}
```



Transaction Details

Overview   Internal Txns   Logs [illegible]

[This is a Polygon PoS Testnet transaction only]

Transaction Hash:	[illegible]
Status:	[illegible]
Block:	[illegible]
Timestamp:	[illegible]
From:	[illegible]
Interacted With (To):	Contract [illegible]
Tokens Transferred:	From [illegible] To [illegible] For ERC-721 TokenID [illegible]
Value:	[illegible] MATIC
Transaction Fee:	[illegible] MATIC
Txn Type:	2 (EIP-1559)

Click to see More

Private Note:	To access the Private Note feature, you must be Logged In

Use-cases

- Customers who have trust issues with expensive items being bought online are authentic , can now authenticate the product with the NFT metadata.

- Customers can now claim warranty (Paperless) easily as the NFT behaves like a warranty card and is sent to their account and can even prove the ownership of the product as they are also the owner of the NFT.

- The seller doesn't require any knowledge of blockchain and smart-contract , he just needs to follow easy steps and create NFT with a click of a button.

- Individual sellers / MSMEs can now ease the process of giving warranty and authenticating their product

- Customer can easily transfer ownership of Luxury items like watches when he also transfers the NFT.

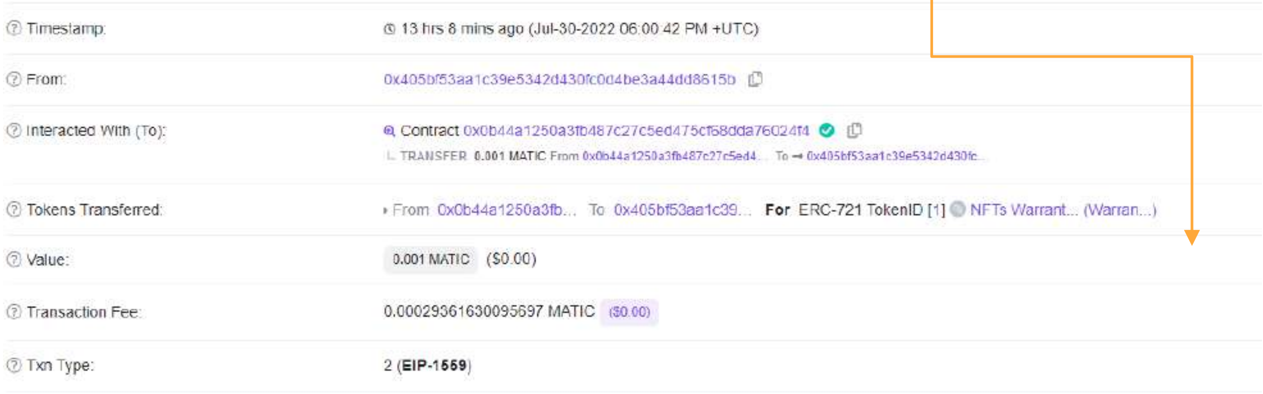
Limitations

- The seller has to manually upload the data to create the warranty based NFT , as when he gets 1000s of orders , he has to manually connect his wallet and create the NFT

- As of now there is no authentication for the seller to login and create NFT on our platform.

- The Platform is working on Mumbai Test-net and uses Test Matic as currency and has not been tested on Main Ethereum Net.

- For every transaction a Gas fees has to paid which will add to the product's cost but is very minimal , as low as 0.0003 MATIC = 0.024 Rupee



ⓘ Timestamp:	13 hrs 8 mins ago (Jul-30-2022 06:00:42 PM +UTC)
ⓘ From:	0x405bf53aa1c39e5342d430fc0d4be3a44dd8615b
ⓘ Interacted With (To):	Contract 0x0b44a1250a3fb487c27c5ed475cf68dda76024f4 ✓ └ TRANSFER 0.001 MATIC From 0x0b44a1250a3fb487c27c5ed4... To → 0x405bf53aa1c39e5342d430fc...
ⓘ Tokens Transferred:	▸ From 0x0b44a1250a3fb... To 0x405bf53aa1c39... **For** ERC-721 TokenID [1] NFTs Warrant... (Warran...)
ⓘ Value:	0.001 MATIC ($0.00)
ⓘ Transaction Fee:	0.00029361630095697 MATIC ($0.00)
ⓘ Txn Type:	2 (**EIP-1559**)

Future Scope

- The Digital NFT is tied to the warranty program but the owners still can not track repairs and replacements to the original item so in future we will create repair tracking on NFTs.
- Transfer the ownership of the NFT from our platform and we can also gain loyalty from it
- Automate the process of Minting/Creating of NFTs , the data will be automatically fetched from our database along with image and seller won't have to create it on its own.
- Bulk Uploading of the NFTs