

NFT Marketplace Workflow and Key Terms

NFT Marketplace Workflow and Definitions

1. Key Terms Explained:

a) NFT Contract (nftContract):

- The smart contract address managing a collection of NFTs.
- Example: A library is the nftContract, and its books are NFTs.

b) Token ID (tokenId):

- The unique identifier for each NFT in the contract.
- Example: Each book in a library has a unique code, e.g., 101, 102.

c) msg.sender:

- The address of the person interacting with the smart contract.
- Example: If Alice lists an NFT, msg.sender holds her wallet address.

d) msg.value:

- The amount of cryptocurrency (ETH) sent with a transaction.
- Example: Bob pays 2 ETH for an NFT. msg.value holds this amount.

e) IERC721:

- The interface for NFTs following the ERC721 standard.
- Example: A set of rules for transferring NFT ownership.

f) Marketplace Contract (address(this)):

- The address of the marketplace smart contract temporarily holding NFTs.

2. Workflow Explained:

a) Seller Lists an NFT:

- Approves marketplace to transfer NFT: `IERC721(nftContract).approve(address(this), tokenId);`
- Calls `listNFT(tokenId, price, nftContract)` to list an NFT.

b) Buyer Purchases the NFT:

- Calls `buyNFT(tokenId, nftContract)` and pays the required ETH.
- Contract transfers payment to seller and NFT ownership to buyer.

c) Seller Cancels the Listing:

- Seller can cancel a listing to retrieve their NFT.

3. Simplified Example:

- Alice owns NFT 101 in contract `0x456...def` and lists it for 2 ETH.
- Workflow before and after listing:
 - Before: Owner of NFT 101 = Alice.
 - After Listing: Owner of NFT 101 = Marketplace Contract.
 - After Purchase: Owner of NFT 101 = Bob.

4. Example Code Snippets:

a) Listing Function:

```
function listNFT(uint tokenId, uint price, address nftContract) external {  
    require(price > 0, "Price must be greater than zero");  
    IERC721(nftContract).transferFrom(msg.sender, address(this), tokenId);  
    listings[tokenId] = Listing(msg.sender, price, true);  
}
```

b) Purchase Function:

```
function buyNFT(uint tokenId, address nftContract) external payable {  
    require(msg.value >= listings[tokenId].price, "Insufficient payment");  
    payable(listings[tokenId].seller).transfer(msg.value);  
    IERC721(nftContract).transferFrom(address(this), msg.sender, tokenId);  
    listings[tokenId].isActive = false;  
}
```