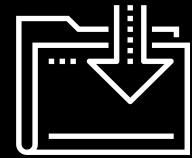




FinTech
Lesson 21.3



Class Objectives

By the end of the class, you will be able to:



Detail some considerations to take into account when launching tokens via a crowdsale.



Create a smart contract for a mintable token by using the OpenZeppelin `ERC20Mintable` contract.

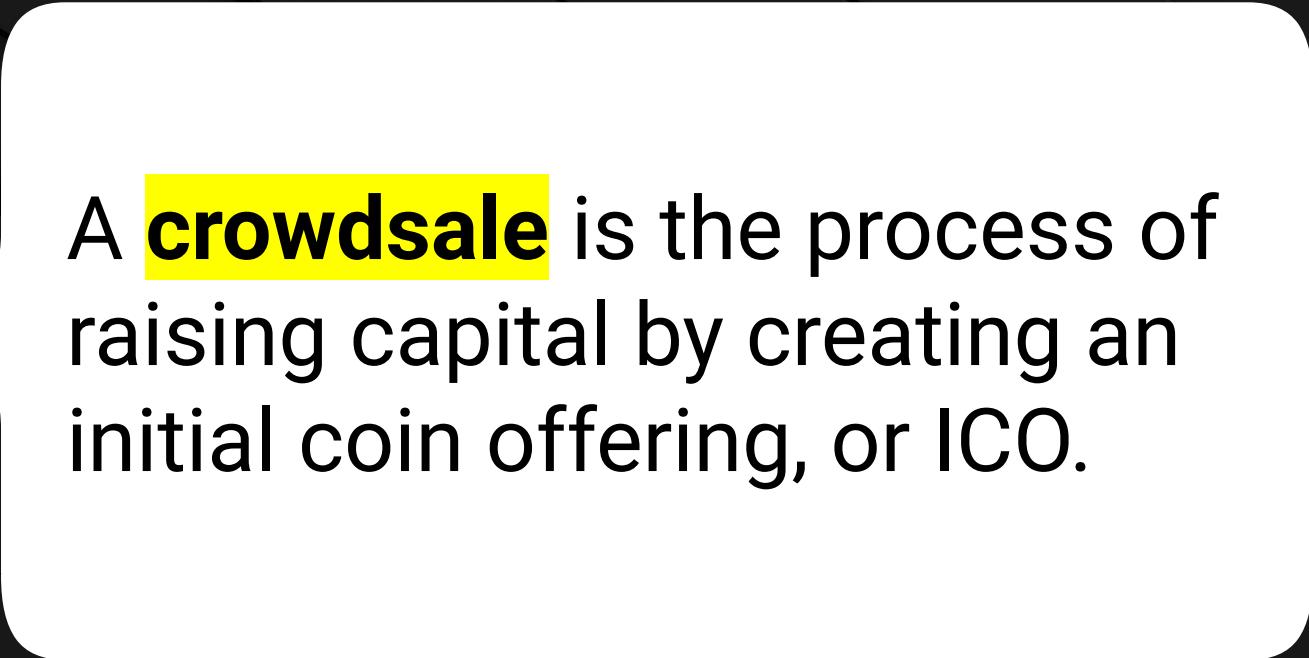


Construct an ERC-20 token crowdsale by using the OpenZeppelin `Crowdsale` and `MintedCrowdsale` contracts.



Use a single deployer contract to create multiple contracts on a blockchain that are distinct but related.

Crowdsales in Ethereum



A **crowdsale** is the process of raising capital by creating an initial coin offering, or ICO.

Crowdsales in Ethereum

Smart contract technology, called **crowdsales**, often power ICOs. A crowdsale is defined as a method of funding a project through the sale of digital tokens that give the buyers the right to participate in the idea that the sale is funding.



An **initial coin offering**, or **ICO**, is a fund-raising mechanism where new coins or tokens are offered in exchange for more-popular cryptocurrencies, like bitcoin or ether.

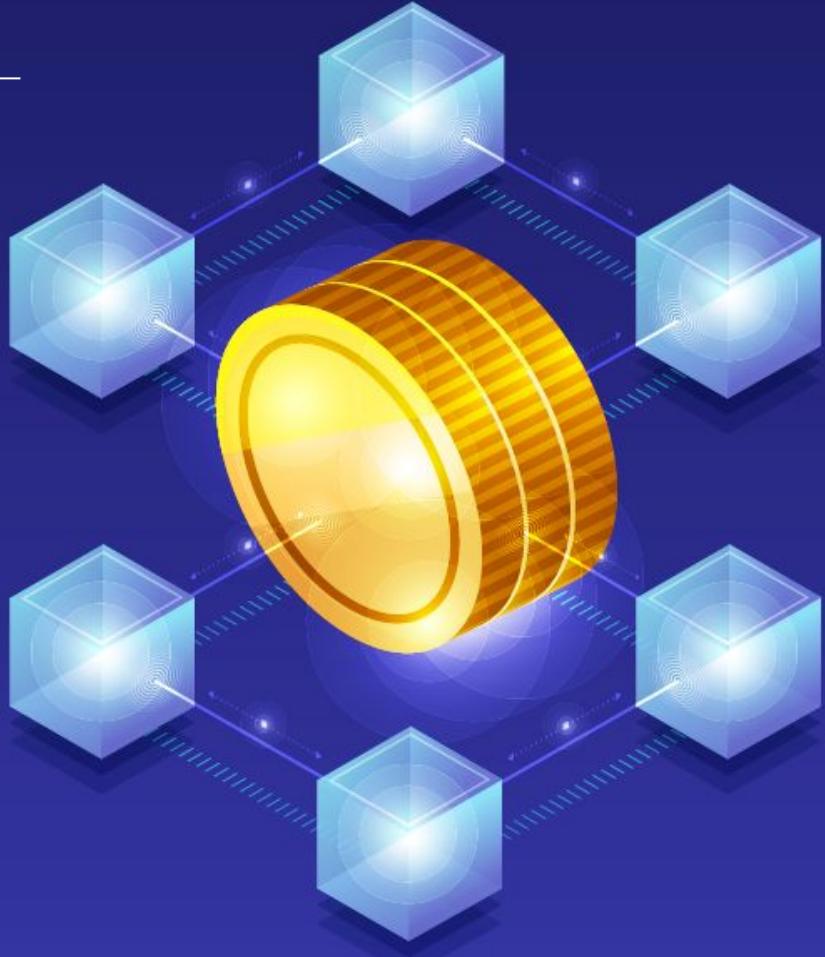
Crowdsales in Ethereum

In an earlier lesson, you learned about token fungibility and ERC token standards.

You also implemented tokens that were compliant with the ERC-20 standard by using the OpenZeppelin library.

When we create and deploy a real-world blockchain token, minting tokens that comply with ERC-20 is only the first step.

The next challenge is to distribute the tokens to other blockchain participants.



Earlier in this unit...

We learned that a blockchain company can distribute tokens via an ICO, which functions much like a traditional IPO.



Crowdsales in Ethereum

In an ICO, a company sells blockchain tokens that represent an asset or utility that's relevant to:



Its platform



Equity in the company



The promise of a future payment, good, or service



Another form of value

Crowdsales in Ethereum

In essence, an ICO uses the democratizing features of blockchain to raise the capital that's needed to support an emerging company or idea.

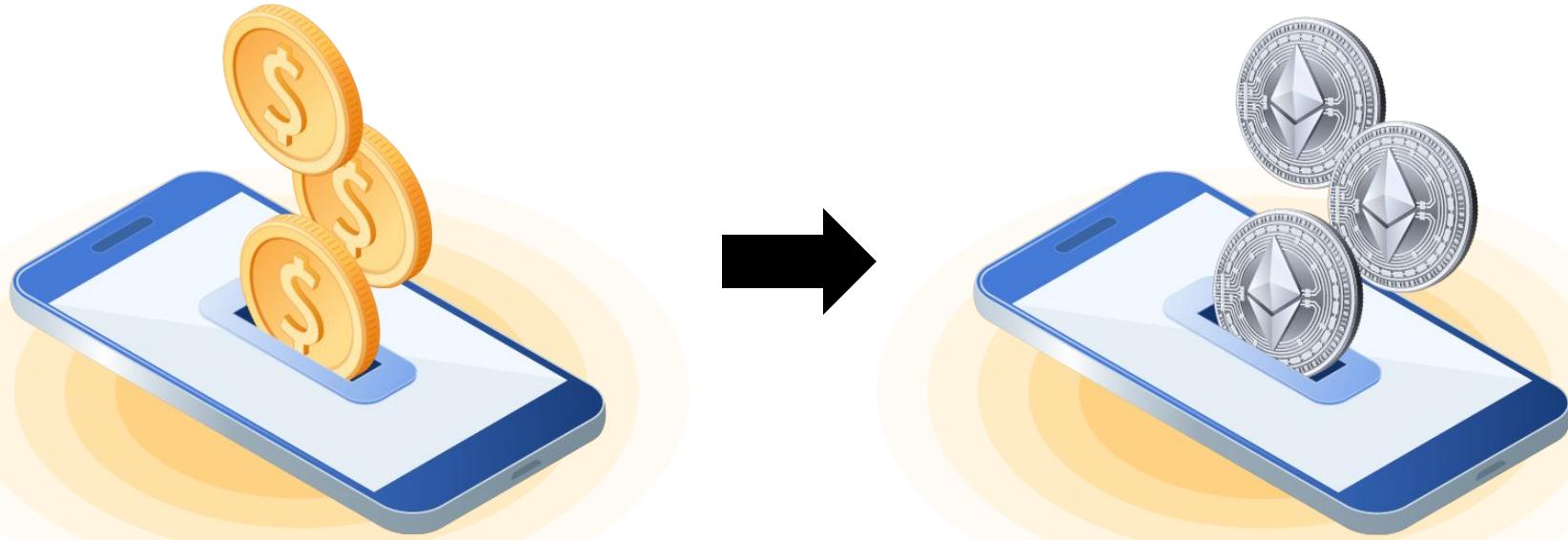




But how does an ICO work from
a technical standpoint?

Crowdsales in Ethereum

Essentially, a crowdsale allows investors to send cryptocurrency to a smart contract and receive tokens in return.



Crowdsales in Ethereum

The crowdsale is a popular method for selling blockchain tokens on the market. Given the functionality of smart contracts, many crowdsales take place on the Ethereum blockchain.



Crowdsale Considerations

Crowdfunding vs.Crowdsales

In this section, you'll compare the concept of **crowdfunding** to **crowdsales**. You'll also highlight some considerations to take into account when conducting a crowdsale.



Crowdfunding

Young companies and startups are often full of innovative new ideas, but executing those ideas can prove expensive.

Over the last decade, crowdfunding has become a popular way for companies to receive funding that enables them to successfully bring their product or service to production.



Crowdfunding is the process of raising funds by asking a large number of people to each contribute a small amount of money.

Usually, those who donate or invest funds in the cause receive the promise of a certain product, service, return on investment, or share in the company in exchange.



Crowdfunding Platforms

Crowdfunding is often done through an online platform like:



In these cases, users are promised a product or service and can then donate money to a particular project in a streamlined manner.

Crowdsale

Unlike in traditional crowdfunding, backers funding the project don't get promised a particular product or service directly.

Instead, they get promised a certain number of tokens at a set price.



Crowdsale

The tokens sold during the crowdsale can then serve as a way for users to take part in the product or service that the company is planning to launch.





What are some applications that
crowdsale funds could be used for?

Crowdsale

Crowdsale funds could be used for:



Marketing funds



Payments to developers



Product development



Product production



Any other initial operating costs



Has anyone participated in a
crowdsale and can you describe
the experience?

Crowdsales in Ethereum

Investors backing a crowdsale project might purchase tokens because they believe that the project will succeed.

But they might purchase tokens because they believe that the tokens themselves will increase in value—even if the project fails.

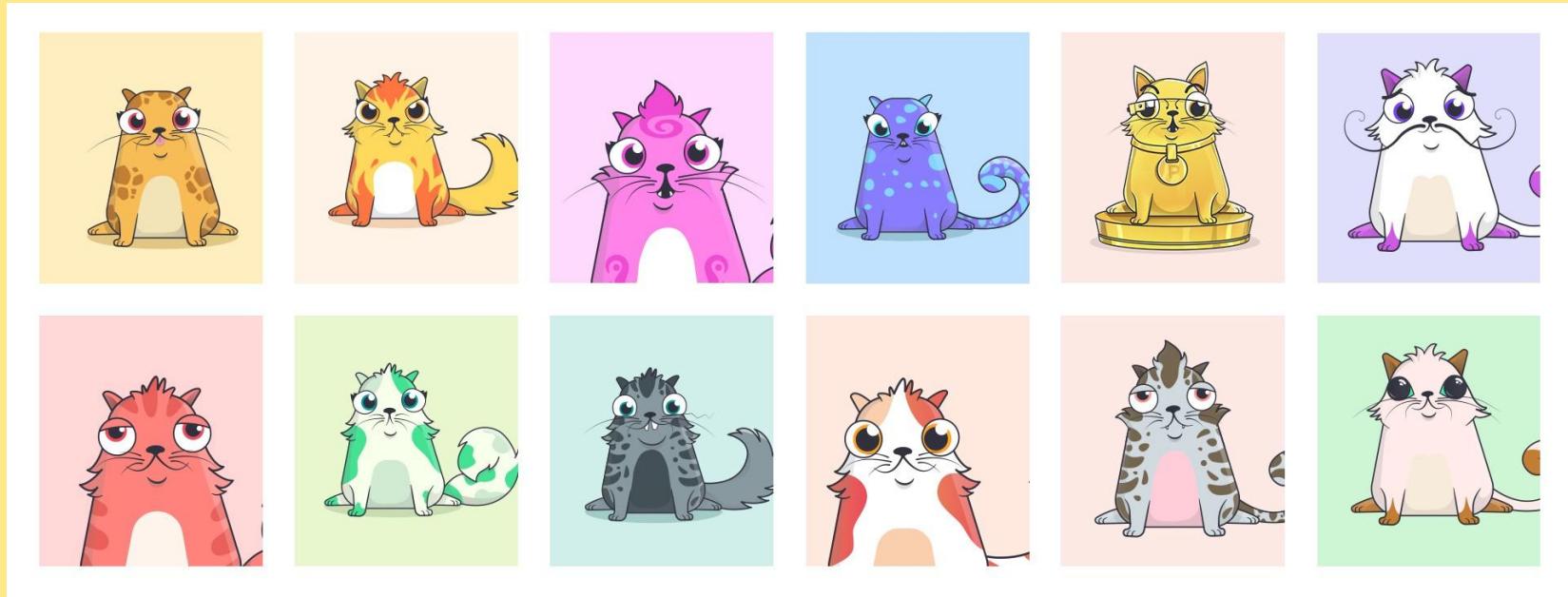




Remember CryptoKitties?

CryptoKitties

Even if the CryptoKitties company went out of business, the cryptokitty tokens would remain on the blockchain and could continue to hold their value and be traded.



Crowdsale

Important factors to consider when developing tokens for a crowdsale include:



The price and rate configuration of the tokens.



How to send tokens to crowdsale investors.



The time frame associated with the sale—that is, when the crowdsale will start and when it will end.



Whether to distribute the funds that get raised by selling tokens during or after the crowdsale.



Whether to have a refund policy if you don't successfully reach the ultimate goal of the project.

When implementing a crowdsale, you have first to decide how you are going to release tokens to the participants of the sale.



This is known as
token emission.



Token Emission

Is normally done in one of three ways:

01

The crowdsale contract owns a given number of tokens and transfers ownership of them as users purchase them.

02

The crowdsale contract dynamically mints new tokens as they are purchased.

03

The crowdsale contract has access to a multi-signature wallet from which it can transfer ownership of tokens as they are purchased.



Building Crowdsales with OpenZeppelin

The OpenZeppelin Contracts library provides various crowdsale-related contracts. With these contracts, we can configure the following contract elements (among many others):



The token price and the exchange rate (that is, the amount of ether that one token costs).



The total number of tokens that can be sold during the crowdsale.



Restrictions on who can make purchases during the crowdsale to comply with **know-your-customer (KYC)** and **anti-money laundering (AML)** regulations.



When and how the distribution of funds will occur.



The time limits for the sale.

Crowdsale

It's also important to consider regulatory factors when making decisions regarding a crowdsale.

- As with IPOs, the US Securities and Exchange Commission (SEC) has regulatory requirements for ICOs in the United States.
- For the activities in this program, we don't need to be concerned with these regulations. This is because we'll deploy tokens only on our local network for educational purposes.
- But if you ever launch a real crowdsale across a live blockchain, you must ensure that your crowdsale complies with all the relevant regulations.





Class Slack Channel:
Spotlight on Initial Coin Offerings (ICOs)

Questions?



Preparing a Token for a Crowdsale

Preparing a Token for a Crowdsale

In the previous lesson, we used OpenZeppelin to leverage contracts that implement the common ERC-20 standard.

Similarly, we can use other code from OpenZeppelin to help us mint and issue tokens for a crowdsale.

Preparing a Token for a Crowdsale

In the case of **ArcadeToken**:



The decision regarding the token emission has been made to dynamically mint new tokens as they get purchased.



We'll streamline the crowdsale creation process by creating a smart contract that can automatically mint tokens when a user sends it ether.



Anyone who wants to purchase the **ArcadeToken** in the crowdsale can send ether to the contract from their account address.



Then, the contract will automatically mint and send tokens to them in return.

Preparing a Token for a Crowdsale



```
name = "QuikNode Coin";  
symbol = "QKC";  
decimals = 18;
```



CROWDSALE RATE

1 ETH = 6000 QKC

The ERC20 token is first created to be used in the crowdsale and given a name, symbol, and decimals (amount it can be divided into).

Then in the crowdsale contract, the rate, the address being paid, and the arcade token are imported. (Crowdsale rate is tightly coupled with the price at which the tokens are being sold. The rate dictates the number of tokens sold for one Ethereum.)





Instructor Demonstration

Preparing a Token for a Crowdsale



XP_Token Mintable

Suggested Time:

20 minutes



Time's Up! Let's Review.

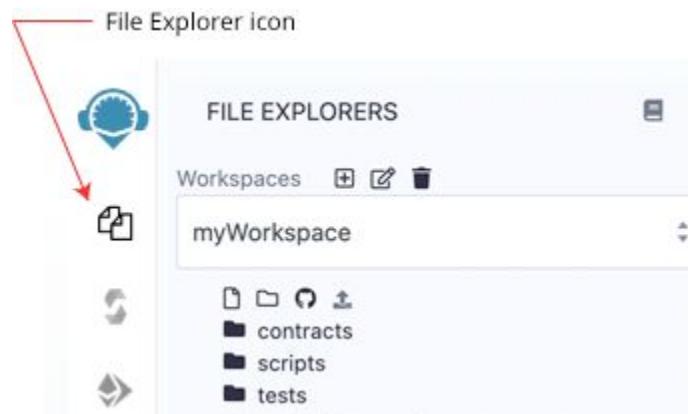


Where can you review the functions
that each of the three OpenZeppelin
contracts contains? **Name two places.**

Review XP_Token Mintable

You can navigate to the GitHub page for each of the contracts to review the contained code.

Once the contract is compiled, you can also go to the File Explorers pane in the Remix IDE and navigate through the folder structure until you get to the specified Solidity contract files.





What function does the
ERC20Mintable contract contain?

Review XP_Token Mintable

The **ERC20Mintable** contract contains a mint function.

Additionally, this contract establishes a **MinterRole**.

The role will control who will be able to mint tokens for the contract.



What's the term for what allows
the XP_Token contract to use
functionality from each of the three
OpenZeppelin contracts?

The term is

inheritance

The `XP_Token` contract inherits functionality from each of the OpenZeppelin contracts via the “`is`” keyword.

Questions?





Instructor Demonstration

Introducing the ArcadeToken CrowdSale

Questions?





Instructor Demonstration

Building Crowdsales with OpenZeppelin

Questions?



Break





Instructor Demonstration

Deploying the ArcadeToken CrowdSale

Questions?





XP_Token CrowdSale

Suggested Time:

40 minutes



Time's Up! Let's Review.

Questions?



*The
End*