

Using Besu with Public Ethereum Networks

Proof of Stake, Network Evolution, Sustainability

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BLOCKCHAIN TECHNOLOGIES FOR BUSINESS



Agenda

- 1 The Merge & Besu

- 2 Staking & Validators

- 3 Configure & Sync a Network

- 4 Connect a Wallet & Test

- 5 Development Environments



WE WANT



YOU

Why Get Involved?





You can **shape the direction** of
the project to fit your needs
and use cases





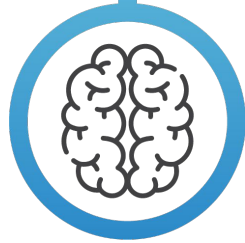
Decrease time to market and
accelerate the work of the
project and what you want
sooner





“With enough eyes all bugs are shallow” - **leverage the community** to fix your bugs





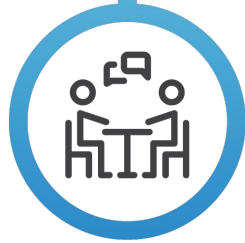
You will **learn a lot** from interacting with other community members





You'll **gain experience** that will
look great on a resume





Tap into a worldwide group of people who are **interested and want to help**



The background image shows a person with long hair sitting at a desk, writing in a spiral notebook with a pen. To the left is a white coffee cup on a saucer. In the foreground, a laptop keyboard is visible. The entire scene is overlaid with a semi-transparent green filter. In the bottom right corner, there is a stylized network diagram consisting of several green circular nodes connected by thin green lines.

Participating in an Open Source Community

If you haven't been involved in an open source project before it can be intimidating to start participating.

Here are some tips for how to get comfortable:



Feel free to lurk

Seeing how other community members interact will help you adjust and learn the social norms in the community



Don't wait for an invitation

Our tools and meetings are open by default, so jump in and introduce yourself, ask questions and share ideas



Read our Code of Conduct

We've set and enforce high standards of professional practice from everyone you'll be meeting



The background of the image is a workshop filled with various tools, including hammers, wrenches, and saws, arranged on shelves and workbenches. The entire scene is overlaid with a semi-transparent blue filter. In the bottom right corner, there is a network diagram consisting of several light blue circular nodes connected by thin lines, forming a web-like structure.

Learn the Basics About our Tools

<https://wiki.hyperledger.org/display/BESU/>



Account

Sign up for a Linux Foundation account



Chat

Join the discussion on chat



Mailing Lists

Participate on the Hyperledger Mailing Lists



Github

Check out our code repositories



Wiki

Get the latest development updates from the wiki



Bug Reporting

Search for open bugs, or report a new one, in our bug database



Documentation and Training

Besu documentation:

<https://besu.hyperledger.org/>

Free online Besu training course:

<https://www.hyperledger.org/learn/training>

Besu tutorials and workshops:

<https://www.hyperledger.org/use/tutorials>

Besu playlist on Hyperledger's YouTube channel:

<https://www.youtube.com/Hyperledger>



Contributions Welcome

Pick a good first issue for Besu and get started

We're looking forward to your first contribution

<https://github.com/hyperledger/besu/issues>

A screenshot of a GitHub repository page for Hyperledger Besu, displaying a list of issues. The issues are sorted by date and include various labels such as 'good first issue', 'P5', 'dev experience', 'mainnet', 'blocked', 'logging', 'TeamRevenant', 'TeamGroot', and 'TeamChupa'. Each issue entry shows the issue title, its ID, the date it was opened, the user who opened it, and the number of comments.

- Clear log message when data path is not accessible** (P5, good first issue) #3986 opened on Jun 17 by daniellehrner
- Add subcommand to print configuration and status info** (dev experience, good first issue, mainnet) #3864 opened on May 19 by fab-10
- Clique - add warning to not use in production** (blocked, dev experience, good first issue, logging, TeamRevenant) #3813 opened on May 10 by macfarla
- Noisy unhandled exception on interrupted mining** (good first issue, mainnet, mining) #3627 opened on Mar 23 by jflo
- Unhandled exception error with no details** (good first issue, logging) #3603 opened on Mar 17 by frankisawesome
- custom factories for PicoCLI subcommands** (good first issue) #3584 opened on Mar 14 by macfarla
- change "privacyGroupId" from being a base64 encoded String to a proper class** (good first issue, privacy, TeamRevenant) #2987 opened on Nov 1, 2021 by pinges
- Update JavaDoc so we can build with Java 16+** (dev experience, good first issue, snack, TeamGroot) #2681 opened on Aug 26, 2021 by shemnon
- Improve error message when verifying enode syntax with xdns-enabled** (good first issue, TeamChupa) #2569 opened on Jul 21, 2021 by jlcs-es



Questions?

Feel free to ask in
[#besu-contributors](#)
at chat.hyperledger.org

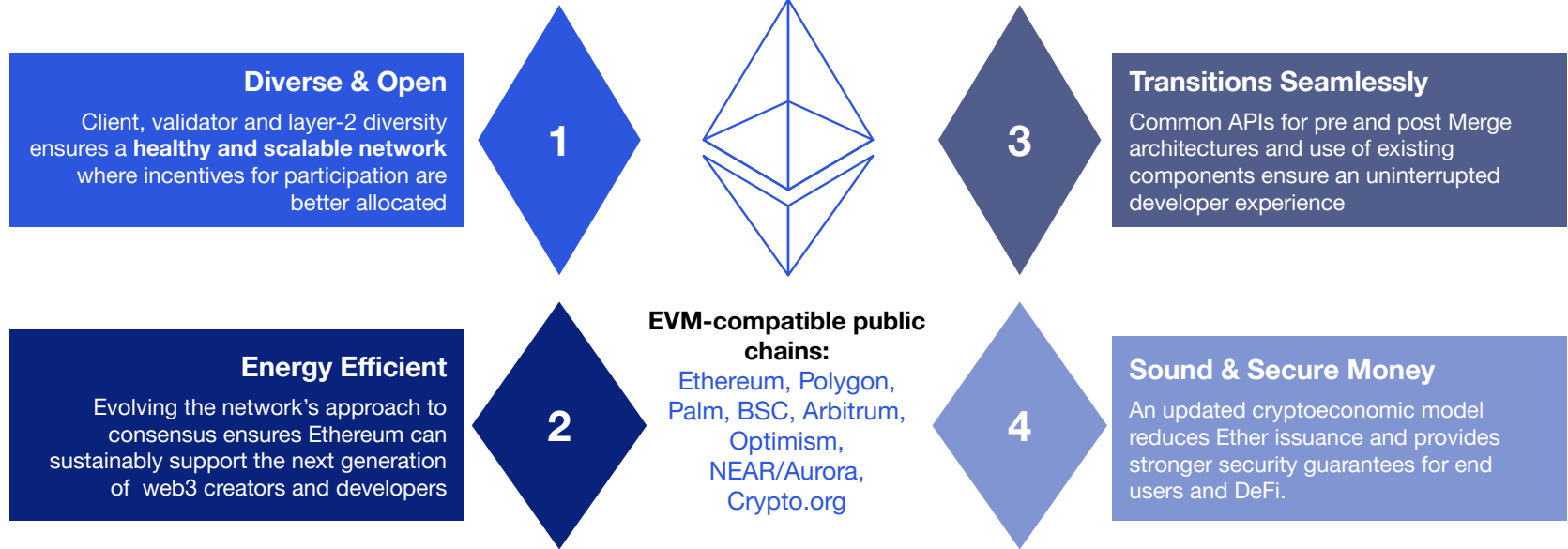
The Merge & Besu



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The Merge is building a more durable, sustainable and easy to use Ethereum on which creators can confidently innovate



Ethereum's Layer 1 Roadmap is on schedule for 2022

Layer 1 Roadmap: Beacon Chain > The Merge > Sharding

Ethereum 1.0

Proof of Work

The Merge

Execution

Consensus

PoS Beacon Chain

Sharding

Scalable, Sustainable Ethereum

Ethereum will achieve **sustainability** via proof of stake

- The Beacon Chain, launched in December 2020, is already a great success
- The Merge is in good shape, target delivery by Q3 2022

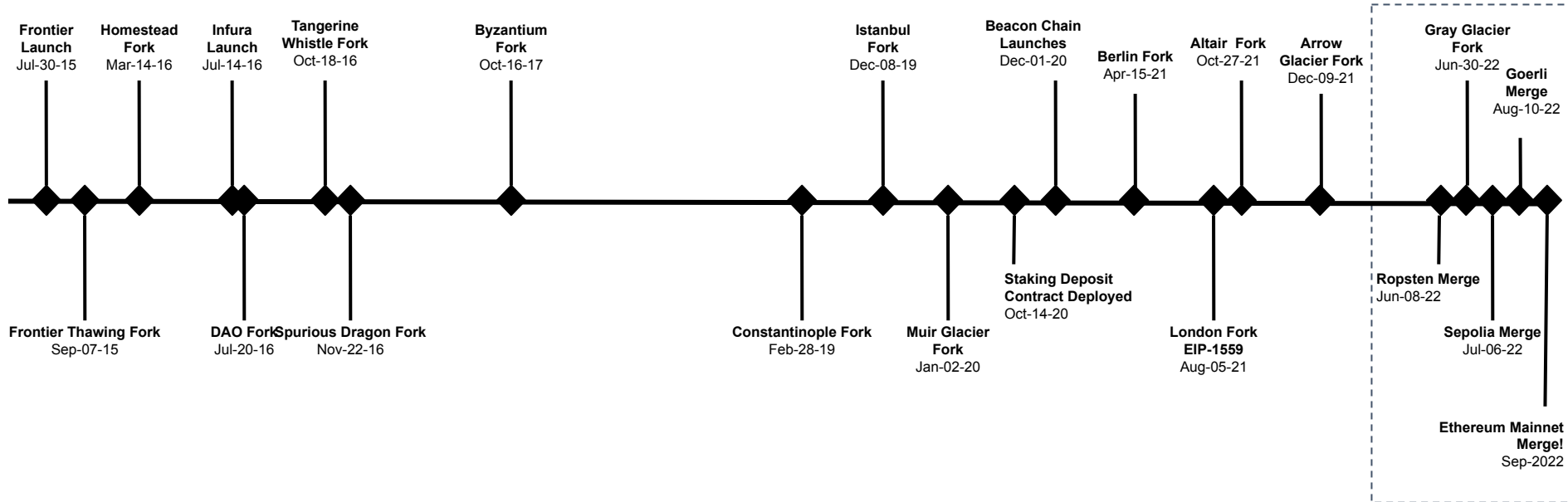
Ethereum will deliver **scaling** via a combination of L1 sharding and L2 rollup technologies

- Rollups are in production now
- Data sharding will supercharge them (late 2022)

For more details: [link](#)



The Merge Timeline



Sources: <https://ethereum.org/en/history/>, <https://tim.mirror.xyz/CHQtTJb1NDxCK41JpULL-zAJe7Y0tw-m4UDw6KDju6c>, and <https://blog.ethereum.org/2022/07/27/goerli-prater-merge-announcement/>



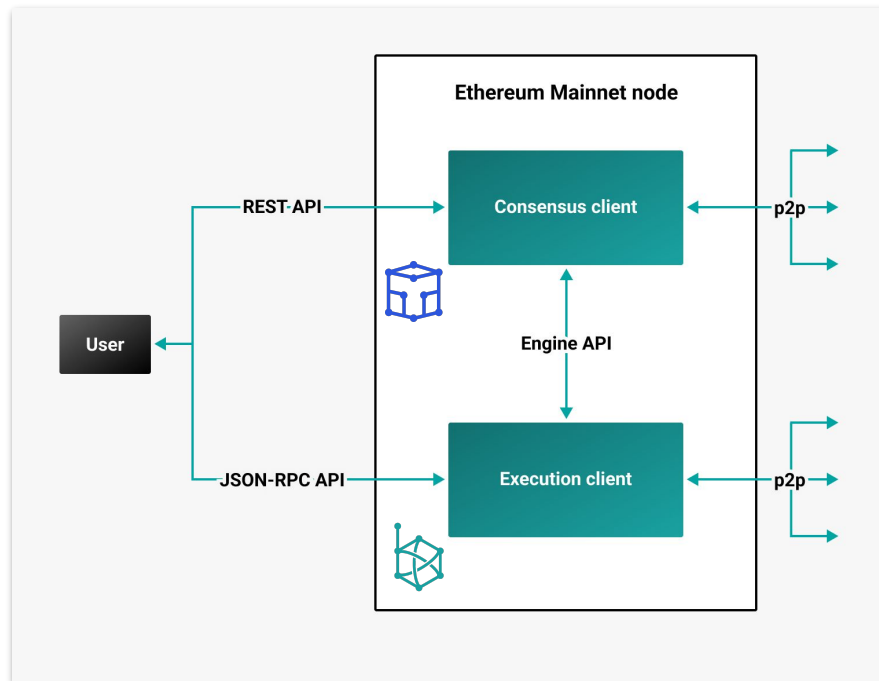
Besu as an Execution Client

From our documentation:

Execution clients, such as Besu, manage the execution layer, including executing transactions and updating the world state. Execution clients serve JSON-RPC API requests and communicate with each other in a peer-to-peer network.

Engine API:

Novel set of APIs to enable maximum re-use of technology for proof of stake and to keep consensus operations quick (via a lightweight consensus client) as Ethereum scales



What does the Merge mean for Enterprise?

Public network participation is **rewarding**...

- Learn to operate node infrastructure, help with network security via staking ETH, and engage a new community of developers and users
- Staking rewards network participation with ~12% returns on an initial stake after the Merge (lower rewards prior)

Public network participation is a **new opportunity**...

- Proof of Stake Ethereum is sustainable, scalable, and open for business
- Public networks provide new ways of interacting with financial and cryptographic primitives, launching distributed apps, doing business with self-sovereign users, and accessing liquidity and services with DeFi

Enterprises can feel secure participating and innovating on public networks...

Participation, Staking & Validators

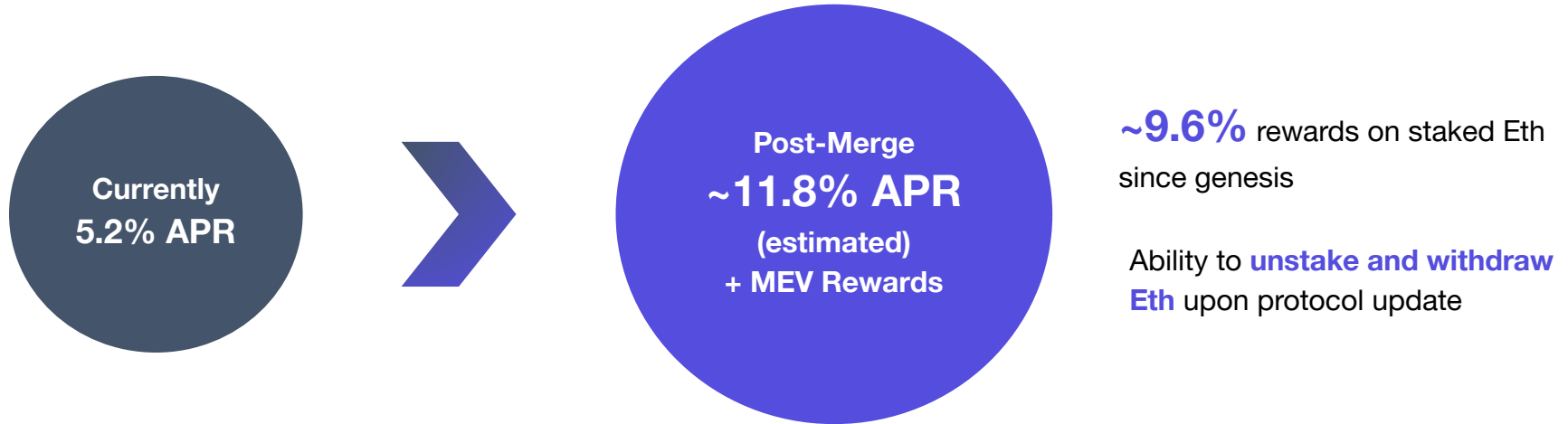


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ETH Returns So far and expected post merge



Post-Merge rewards calculation is based on:

- Current Eth1 miner tips - **~6.6% APR: extra ~2.1 Eth per year per validator**
- Current Eth2 validator rewards - **~5.2% APR: function of number of active validators on the network**
- MEV-enabled rewards post merge - **will vary upon number of active validators on the network**



Getting Started



[Besu Docs](#)

[Docs for this tutorial](#)

[System Requirements](#)

[Understanding CPU Metrics](#)



[Teku Docs](#)

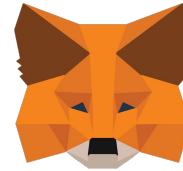
[System Requirements](#)



[Goerli Launchpad](#)



[Besu Postman Collection](#)



[MetaMask Download](#)

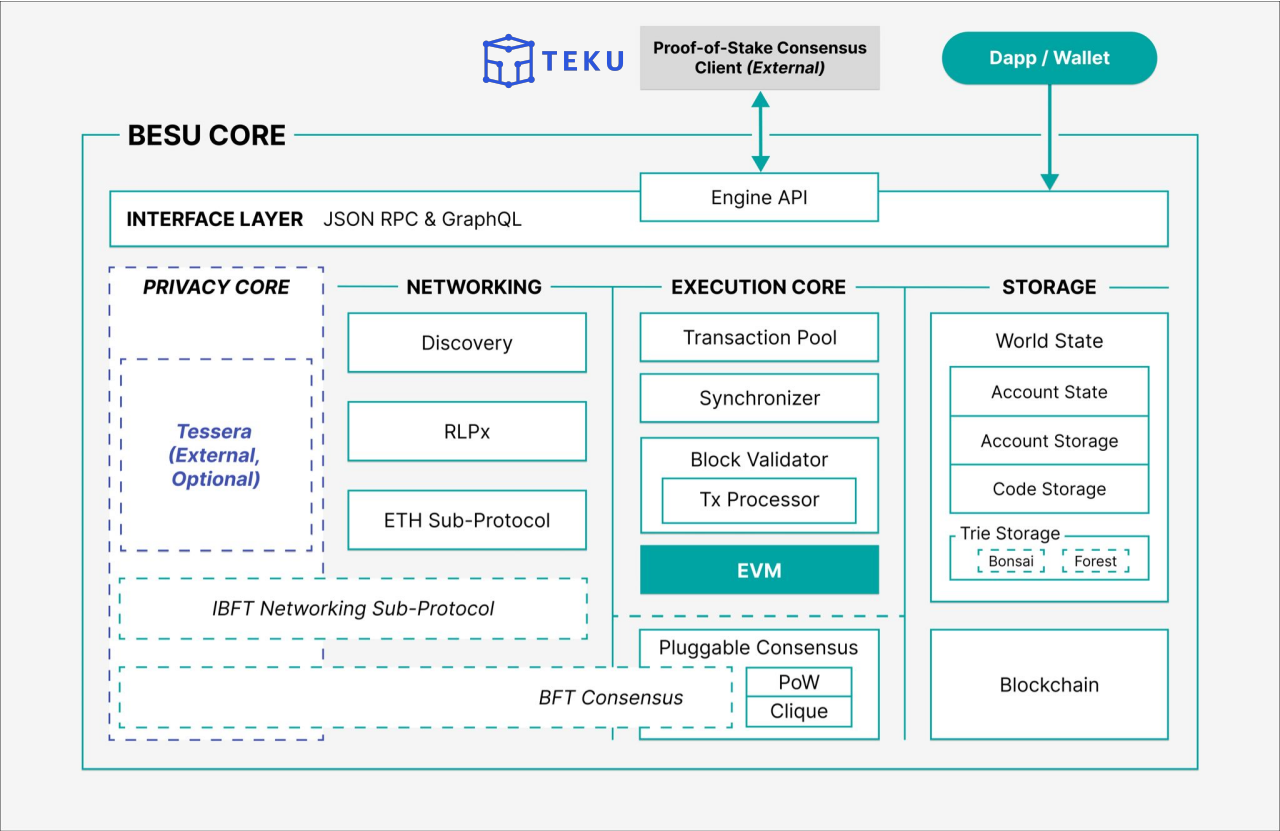


Grafana

[Setting up Metrics](#)

[Docker Approach](#)

Besu Full Architecture



Beaconcha.in

Validator 416865(Pool: **rocketpool**)

Home / Validators / Validator details

Rocket Pool

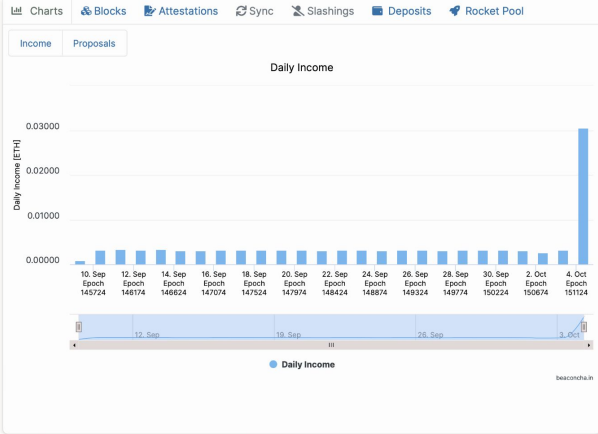
0x996fa46e83c1a9f483ba6af2a7599f22ed8e2b2588888565d5e2e69a98e989f3efb8cf1001c2a0dd192d6c28ae6285

Deposited ✓ 145700 Pending ✓ 145736 Active ⏻ Exited ⊘

Rank 10.6% 📈 Balance **32.10711 ETH** Status **Active** Effectiveness **98% - Good**
32.0 ETH

🔒 1(100%) 📧 5547(99%) 🔄 0 🗑️ 0 📧 2

Income	
Day	+0.03252 ETH
Week	+0.05089 ETH
Month	+0.10711 ETH
APR	8%
Eligible since	Sep 9, 2022, 9:20 PM
Active since	Sep 10, 2022, 1:10 AM



Validator History

Epoch	Balance Change	Att. & Prop.
151,281	+0.00001 ETH	Att.
151,280	+0.00001 ETH	Att.
151,279	+0.00001 ETH	Att.
151,278	+0.00001 ETH	Att.
151,277	+0.00001 ETH	Att.
151,276	+0.00001 ETH	Att.
151,275	+0.00001 ETH	Att.
151,274	+0.00001 ETH	Att.
151,273	+0.00001 ETH	Att.
151,272	+0.00001 ETH	Att.

Showing 1 to 10 of 100 entries

First < 1 of 10 > Last

416865

What's Next...?



[Besu Github Repo](#)

Open issues for bugs/features, contribute code



[Hyperledger Discord](#)
[ConsenSys Discord](#)

Tech support, discussions,
updates, community



[Truffle Smart
Contract
Development](#)



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A large audience is seated in a conference hall, facing a stage where a speaker is visible. The scene is overlaid with a teal geometric pattern of lines and circles on the left side. The word "Questions?" is written in white text across the center of the image.

Questions?