Treasury Proposal: An expansive course on Substrate and Polkadot

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General Information

We are excited to propose a comprehensive course on the Polkadot SDK, to be featured on Modern Fullstack — a signature product of Quinence. This course will be specifically designed to provide an accelerated learning experience for motivated developers looking to deepen their expertise in the Polkadot SDK, consisting of Substrate, Polkadot, and Cumulus[1].

Proponent: Quinence/ModernFullstack

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Date: 15 Nov 2023
Requested allocation: USD$60,000 | 10,541.327 DOT
*DOT calculated via EMA30 on the day of the official submission, 2023-12-11 23:15:06 (+UTC), Block #18558323 - 1 DOT ~ 5.691 USD. Conversion: $60,000 USD ~ 10,541.327 DOT
Discussion: https://polkadot.polkassembly.io/post/1997

[1] Henceforth, when we refer to the "Polkadot SDK", we are encompassing the complete development suite that includes Substrate, Polkadot, and Cumulus.
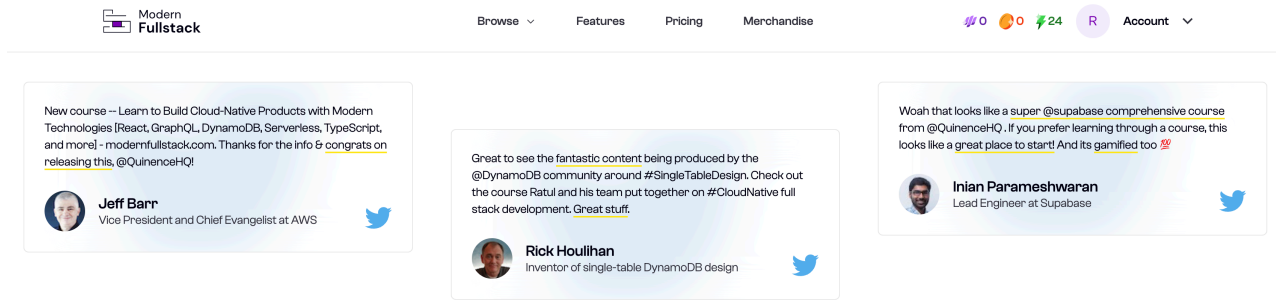
Context

Modern Fullstack[2] is a premier self-paced learning platform catering to fullstack developers in the realms of Cloud and Blockchain. It has garnered public endorsements from both industry leaders[3] and developers for its in-depth content. Over the past year, we have honed Modern Fullstack, optimising for an engaging learning journey. This commitment to quality is evident in our three major courses on (1) Supabase, the highly sought-after backend-as-a-service, (2) GraphQL, a renowned query language for APIs, and (3) Remix, a modern frontend framework on React.

Behind Modern Fullstack is Quinence, a deep-tech product studio headquartered in Singapore. Since its inception in 2017, Quinence has collaborated with numerous Blockchain stalwarts including the Web3 Foundation, Tezos, IBM (Hyperledger), Zilliqa, among others. Beyond product development, Quinence boasts a reputation in tech training and has been a prominent participant in elite bootcamps organised by entities like the Government of Singapore, various polytechnics, and multinational corporations.

The director of Quinence, Dr. Ratul Saha, is not only instrumental

[2] `modernfullstack.com`

[3] Endorsed by industry leaders including Chief Evangelist of AWS, Creator of DynamoDB, React core team, and Founder of Supabase.

Modern Fullstack   Browse ⌄   Features   Pricing   Merchandise   ◆0 ●0 ⚡24 R Account ⌄

New course -- Learn to Build Cloud-Native Products with Modern Technologies [React, GraphQL, DynamoDB, Serverless, TypeScript, and more] - modernfullstack.com. Thanks for the info & congrats on releasing this, @QuinenceHQ!

Jeff Barr
Vice President and Chief Evangelist at AWS

Great to see the fantastic content being produced by the @DynamoDB community around #SingleTableDesign. Check out the course Ratul and his team put together on #CloudNative full stack development. Great stuff.

Rick Houlihan
Inventor of single-table DynamoDB design

Woah that looks like a super @supabase comprehensive course from @QuinenceHQ . If you prefer learning through a course, this looks like a great place to start! And its gamified too 💯

Inian Parameshwaran
Lead Engineer at Supabase

ELEVATE TOGETHER

Endorsed by leaders, loved by the community

Figure 1: A screenshot of the testimonials at the Modern Fullstack platform at `https://modernfullstack.com`.

in content creation but has also personally mentored hundreds of engineers in Cloud and Blockchain domains. With a Ph.D. in Computer Science from the National University of Singapore, specialising in probabilistic distributed systems, Dr. Saha has also co-authored pioneering research in Blockchain security.

In May 2022, under Dr. Saha's stewardship, the team at Quinence curated and conducted the very first Polkadot DevCamp, which emerged as one of the pioneer Polkadot and Substrate Developer Bootcamps in collaboration with the Web3 Foundation, Parity Technologies, and Tribe (a well known ecosystem partner)[4]. This week-long initiative, running 3 hours daily, was sculpted for seasoned developers acquainted with Blockchain development, specifically in Rust and Substrate. From a staggering 1600 applications, fewer than 40 were handpicked, and every participant saw the program through to completion.

Now, Quinence is thrilled to propose the creation of the most comprehensive course on the Polkadot SDK. Our vision is to offer this through Modern Fullstack, our flagship platform dedicated to self-paced learners.

[4] `https://tinyurl.com/polkadot-devcamp-2022`

Why the one-year hiatus after the bootcamp? Following the bootcamp, Ratul celebrated the birth of his daughter. While he took some personal time, he and the team continued refining the Modern Fullstack platform.

Problem statement

We have done an extensive review of the existing content on the Polkadot SDK. We identified a lack of a self-contained and expansive resource for motivated learners looking to jumpstart with Substrate and Polkadot. It is understandably a complex endeavour to build such content due to the breadth and intricacies involved in understanding the subject.

Currently, the main resource for Substrate learning is its documentation[5]. The documentation — in particular, the tutorials[6] — act as an excellent resource to start building on Substrate. Nonetheless, the documentation is not a comprehensive learning material.

Beyond that, most resources on Substrate and Polkadot are outdated[7], unstructured[8], not beginner-friendly[9], or overly specialized[10], [11]. There are a few tutorial-focused[12,13,14] to get started with different applications and pieces of Substrate, which serve as a great showcase of the flexibility that Substrate provides. Nonetheless, they often lack the balance between theoretical and implementation details, requiring the learner to scramble back and forth between the documentation and the tutorial.

The Polkadot Blockchain Academy (PBA)[15] stands out as a notable exception, offering an in-depth exploration of the Substrate and Polkadot development. However, its in-person format and selective nature limit its accessibility to the broader developer community. This applies to other bootcamp-focused programmes[16,17] as well, including the Polkadot DevCamp that we pioneered. Very recently, the speaker notes for PBA have been released. Nonetheless, these remain hard to grasp as a self-learning content, especially for someone newer to the ecosystem.

While these learning materials remain an invaluable part of the ecosystem, this landscape highlights a clear educational gap: a well-structured, in-depth learning path that intertwines theory with practical application, and steers learners away from the maze of isolated tutorials.

Proposal objectives

At Modern Fullstack, our aim is to roll out a comprehensive, learner-friendly curriculum, transitioning developers from the basics to advanced facets of the Polkadot SDK rapidly. Our objectives are:

- Serve as the go-to resource for Substrate and Polkadot development. We aim to cover a broad range of topics, as outlined at the course structure in a later section.

[5] https://docs.substrate.io/
[6] https://docs.substrate.io/tutorials/

[7] https://tinyurl.com/udemy-substrate
[8] https://tinyurl.com/yt-tech-explainers
[9] https://tinyurl.com/yt-substrate-1
[10] https://tinyurl.com/yt-polkadot-deep-dive
[11] https://tinyurl.com/kusama-academy
[12] https://tinyurl.com/substrate-tutorial-1
[13] https://tinyurl.com/substrate-tutorial-2
[14] https://tinyurl.com/substrate-tutorial-3
[15] https://tinyurl.com/polkadot-academy
[16] https://tinyurl.com/global-series
[17] https://tinyurl.com/rise-in

- Enable learners to progress from no prior knowledge to building complex Blockchains and applications. This is our most crucial goal — to have the perfect balance of theoretical understanding and application development to provide a holistic view of the Polkadot SDK.

- Empower developers to build applications atop of Substrate-based Blockchains as well as to design custom Blockchain solutions. It is crucial to also enable developers to build applications without necessarily having to master everything — we detail more in the discussions around target audiences.

- Provide actionable insights into the learners' journey in boot-camps, hackathons, and teams that use the course as foundational material. Modern Fullstack tracks the progress of each learner along with enjoyable quizzes, providing the learners a clear view into their journey. We are also able to provide data of any co-hort of learners joined through a particular learning event (e.g. a hackathon).

Target audience

In general, the course caters to learners diving deep into the Polkadot SDK. We aim to serve a variety of learners with different aims and expected outcomes.

- First and foremost, developers new to the Polkadot SDK should find the course welcoming. As we have previously done at Modern Fullstack[18], we aim to accelerate the learning experience of newcomers to the field.

- With the contracts pallet, Substrate-based Blockchains support application development with smart contracts (e.g., ink!) and beyond. We aim to empower application developers to build dApps for Substrate-based chains.

- Substrate is great for creating custom and modular blockchains. Our course is designed to enable developers — even those without prior experience in blockchain creation — to build their own.

- Substrate is ideal for enterprise blockchain development, rivalling solutions such as IBM's Hyperledger. Our course is designed to be a go-to resource for tech teams in enterprises that are building private or semi-private Blockchain solutions.

- Last but not the least, both technical and non-technical teams looking to build parachains on Polkadot or engage in various activities within the Polkadot ecosystem will find this course beneficial.

[18] `https://tinyurl.com/modernfullstack`

Expected outcome

We're seeking a grant from the Treasury to fulfil several goals:

- At the heart of our mission is the creation of an extensive course that will equip newcomers with the confidence to build using the Polkadot SDK. Quality content is our top priority. We also aim to keep the content fresh — for six months within the scope of this proposal and then continuing in a sustainable manner. More details are outlined in the milestones.

- Modern Fullstack operates on a subscription basis. We maintain price parity across countries, aligning our subscription cost with that of a standard Netflix subscription in each region. With the Treasury's support, we plan to offer the course for free to everyone. While the course is free, learners will need to sign up for an account, allowing them to track their progress.[19]

- We hope to foster a dynamic community that merges the worlds of Web2 (Cloud/Frontend) and Web3 (Substrate/Polkadot).

- Initially, we have a modest target: to have 200 enthusiastic learners complete the course upon its release.

[19] Our aim is to ensure our economic model resonates with the Polkadot community and remains sustainable.

Course delivery at Modern Fullstack

The courses at Modern Fullstack are structured into chapters, with each chapter further divided into lessons. For instance, MFS401 is a live course on Modern Fullstack that focuses on Supabase, a renowned backend-as-a-service (Figure 2). Comprising a comprehensive 7 chapters and 21 lessons, this course offers a blend of theoretical and practical instruction, including a hands-on project.

The learning experience in Modern Fullstack is heavily influenced by its community. The platform displays a live count of active learners for each course, chapter, or lesson. Moreover, it is deeply integrated with Discord. Once learners connect their Discord at Modern Fullstack, they get custom roles, real-time notifications on their progress and achievements, and more.

While a lesson starts with fundamental theories, it culminates in a more in-depth discussion on a specific subject. For example, a lesson highlighted in Figure 3 shows how it covers both foundational and advanced topics.

The Modern Fullstack approach is unique. Instead of relying on video content or static blog-style formats, we utilize detailed visual guides specifically tailored to teach intricate technical subjects (see Figure 4).

Figure 2: Screenshot of a live and popular course on Modern Fullstack.

Figure 3: An example lesson from a currently live course (MFS401) at Modern Fullstack.

Finally, we can invoke a database function by "querying" it with `select` . For example, we can use the SQL Editor again and invoke the function; we will see that our expected output is shown in the console.

We may also call database functions directly using the supabase-js (and similar client libraries). This allows us to call the functions from server-side, any middleware API using Supabase as a database, or even client-side.

We can use RPC (Remote Procedure Call) to execute a database function through supabase-js. The `supabase.rpc` call takes the function name as a string and the arguments as an object.

> 💡 **DID YOU KNOW**
>
> Remote Procedure Call (RPC) is a way for a program to execute functions from another program. In this case, we are using RPCs through supabase-js to instruct the database to execute the function.


```
1    select hello_world('john');
```

Executing the `hello_world` function.

Calling a function from SQL editor from Supabase Dashboard.

Figure 4: A screenshot of a part of lesson in Modern Fullstack. Please visit the platform for the full experience.

To ensure comprehension, we include quizzes at the end of each lesson, allowing learners to assess their grasp of the material (see Figure 5).

The platform has a gamified experience to delight and reward the learners as they progress. After completing each lesson's quiz, learners earn experience points (XPs). Additionally, they can earn "StackBucks", which can be exchanged for merchandise or used for certain in-platform activities. These rewards are given upon completing chapters or reaching specific challenging milestones (see Figure 6).

We recognize that developers typically maintain a weekly routine rather than daily. With this understanding, we've introduced "Dev-Dash", which tracks learners' progress on a weekly basis, promoting consistent learning habits.

By closely monitoring learners' activities and progress, we're in a unique position to offer a comprehensive analysis of a learner group. Coupled with our branded merchandise, we can also distribute Polkadot or event-specific swag to learners who stand out with their remarkable progress.

A tentative course structure

Designing the outline for a course is a meticulous process. Typically, the initial two weeks are dedicated to drafting a detailed course structure, which is subsequently published on Modern Fullstack. The
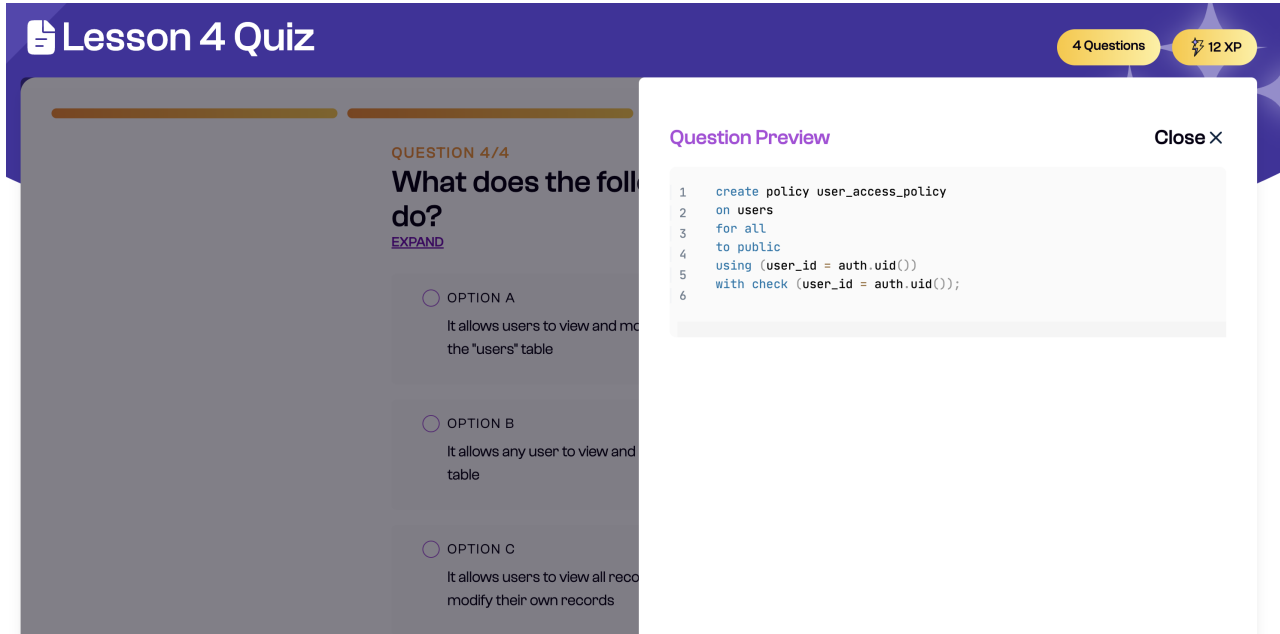
outline provided here offers a broad perspective; the final content may evolve and expand during development.

Chapter 1: Substrate and Polkadot Foundations

This foundational chapter is tailored for both technical and non-technical audiences. It begins by exploring the anatomy of Substrate-based Blockchains, delves into the symbiotic relationship between Substrate and Polkadot, and concludes with a primer on the Polkadot ecosystem, touching upon its security and governance structures.

Chapter 2: Building dApps: Smart contracts on Substrate

Building dApps with smart contracts is the fastest way to ramp up a learner's Substrate journey. This chapter dives deep into the ink! language, teaching learners how to craft dApps on Blockchains built with Substrate, including prominent parachains within Polkadot. The module covers the distinct features of ink!, its configuration, and guides learners through the creation and deployment of their maiden dApp on a Substrate-backed chain. All concepts are elucidated through hands-on examples.
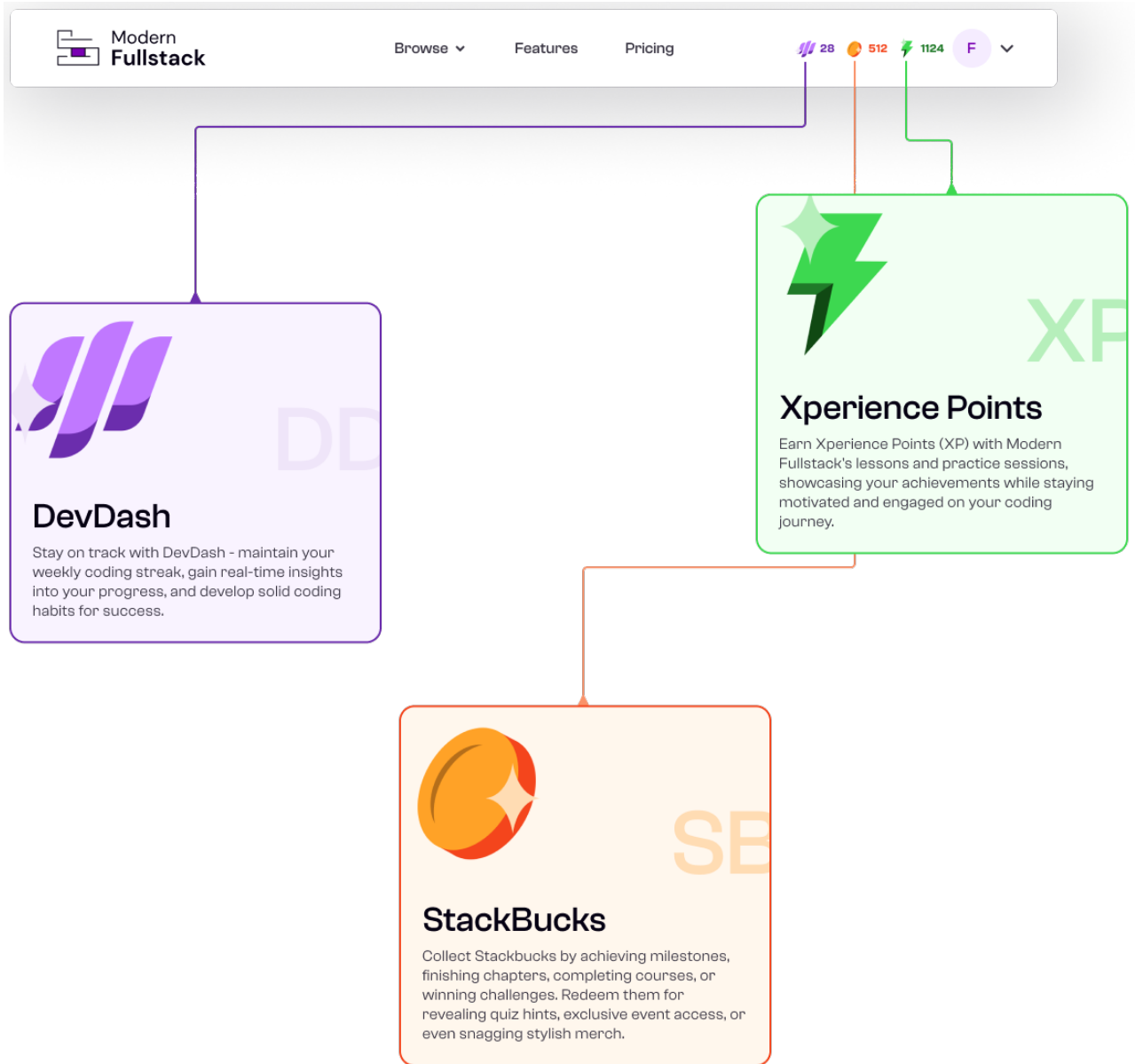
Figure 6: Learners are rewarded as they make progress in Modern Fullstack.

Chapter 3: Building custom modular Blockchain with Substrate

As learners gain familiarity with Substrate, this chapter unveils its true prowess: the ability to create custom modular Blockchains. It introduces the Polkadot SDK, emphasizing Substrate, and delves into the intricacies of crafting Substrate nodes. Topics covered include using FRAME (v2) pallets for added functionalities, creating runtime APIs, understanding storage, weights, and much more.[20]

[20] As course development progresses, this chapter may be segmented into multiple chapters for clarity and depth.

Chapter 4: Navigating Cross-Blockchain communication with XCM

One of the most anticipated yet least explained, XCM is a messaging format for delivering cross-concensus messages. We discuss the architecture, pallet, and use cases of XCM.

Chapter 5: Unpacking the potential of Substrate-Based Blockchains

Dedicated to showcasing the vast array of possibilities enabled by custom Blockchains developed with Substrate, this chapter places a strong emphasis on hands-on exercises and tutorials. The exact use cases to be explored will be determined during the initial content creation phase.

Chapter 6: Crafting Parachains for Polkadot

With a solid grounding in Substrate established through the preceding chapters, learners will be guided towards integrating a Substrate-developed Blockchain with Polkadot. Comprehensive discussions will touch upon constructing parachains and parathreads on Polkadot, delving into nuanced aspects like crowdloan-based reserve accumulation.

Chapter 7: Delving into Advanced Substrate and Polkadot Concepts

As the course material unfolds, certain topics— though crucial— might be deemed overly specialized for a linear learning progression. These topics will be clustered together, paving the way for a chapter that dives deep into advanced concepts surrounding Substrate and Polkadot.

Milestones

Our mission is akin to crafting a masterful epic – it's achieved in carefully planned phases.

Phase 1: Laying the Blueprint

Duration: 2 weeks.
Payment upon completion: 18,000 USD (30%).

In these foundational two weeks, we're not just outlining a course; we're carving out a map for our learners' journey. By its end, Modern Fullstack will proudly display a detailed framework, showcasing each lesson and how they interlink to form a cohesive narrative. We have already started working on the content structure and have outlined a tentative course outline in the previous section.

Phase 2: Breathing Life into the Vision

Duration: 8 weeks.
Payment upon completion: 42,000 USD (70%).

Once the course's architecture in place, we will populate it with substance one chapter at a time. During this phase, we actively engage with developers in the field. Their feedback is invaluable, helping us refine our outline and ensuring the course is on the right track. As we progress, we release content on Modern Fullstack chapter by chapter, ideally a chapter a week. We expect the course to be ready in 8 weeks.

Phase 3: Keeping the Tale Timeless

While Substrate and Polkadot are ever-evolving entities, our course won't be left behind. For half a year, post-launch, we pledge to keep our content updated and in tune with the dynamic rhythms of the ecosystem – all within this proposal's budget.

But our vision doesn't stop there. Once the course is closer to being finalized, we plan to propose newer activities to further enrich the content. This will include maintaining the course content beyond the stipulated 6 months, creating YouTube deep-dives, interviews with ecosystem luminaries, and so much more.

Conclusion

We are eagerly anticipating the insights and feedback from the community as we embark on this journey to craft comprehensive and captivating content. We commit to being responsive and attentive to all discussions in the relevant channels, valuing every perspective that comes our way. For more direct communication or specific inquiries, please don't hesitate to reach out to Ratul Saha at ratul@quinence.com or at @ratulsaha-quinence:matrix.org.