Zenith

Emerging Technology
Special Interest Group
Aug 10th, 2023

Please add your attendance to:
https://github.com/finos/zenith/issues/69

Agenda

- Announcements
- Deep Dives
  - Artificial Intelligence Primers
  - POC Program
- Any Other Admin
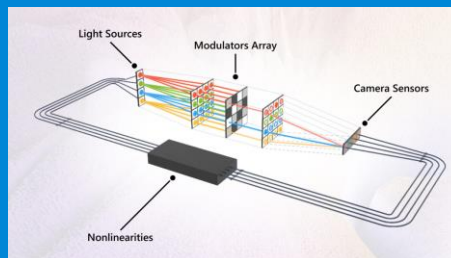- Call to Action
- Any Other Business
- Thanks & Close-Out

Announcements

Announcements

Blogs

Analog Iterative Machine's lightning-fast approach to optimization

DeepSpeed ZeRO++, a leap in speed for LLM and chat model training with 4X less communication

Microsoft announces NVD5

Announcements

Upcoming Events

Thursday, Aug 10   *(Today!)*

- **11am EST / 4pm BST**

  FDC3: Web Browsers

- **11pm EST / 4pm BST**

  Morphir

https://www.finos.org/news-and-events

- **September 19 - Linux Foundation Open Source Summit Europe**

Open Source Summit is the premier event for open source developers, technologists, and community leaders to collaborate, share information, solve problems, and gain knowledge, furthering open source innovation and ensuring a sustainable open source ecosystem. It is the gathering place for open-source code and community contributors. Register here.

- **November 1 – Open Source in Finance Forum - NYC**

Registration is open for our annual Open Source in Finance Forum in the Marriott Marquis Hotel in Times Square NYC. Find information on how to sponsor or register here.

Announcements

The Future of AI Writing Contest
by Gadfly AI & HackerNoon

GADFLY AI | HACKERNOON

contests.hackernoon.com

Upcoming Events

Sal Kimmich
*Director of
Open Source,
Escher Cloud*

All through August

🏆 Prizes:

Exclusive Interview:

There's a chance to get interviewed by Sal Kimmich, a known leader in Open Source, AI and DevOps, working with site reliability engineers and cybersecurity specialists to implement best tools and practices to remove toil from developer workflows.

Showcase Your Ideas:

The top entries will be featured in Gadfly AI's Cyberscape Zine, giving you exposure in the AI and tech community!

✏️ **How to Participate:**

1. Write a story about AI on **Hackernoon.com**.

2. Add #future-of-AI to your entry.

3. Share your thoughts on the future of AI.

🚀 Topics to Explore:

- How AI is changing creativity and art.

- The blend of AI and generative art + code.

- Ethical and regulatory aspects of AI.

- Latest AI research insights.

- Embrace the transformative power of AI.

- Dive into AI security discussions.

Deep Dive – Artificial Intelligence
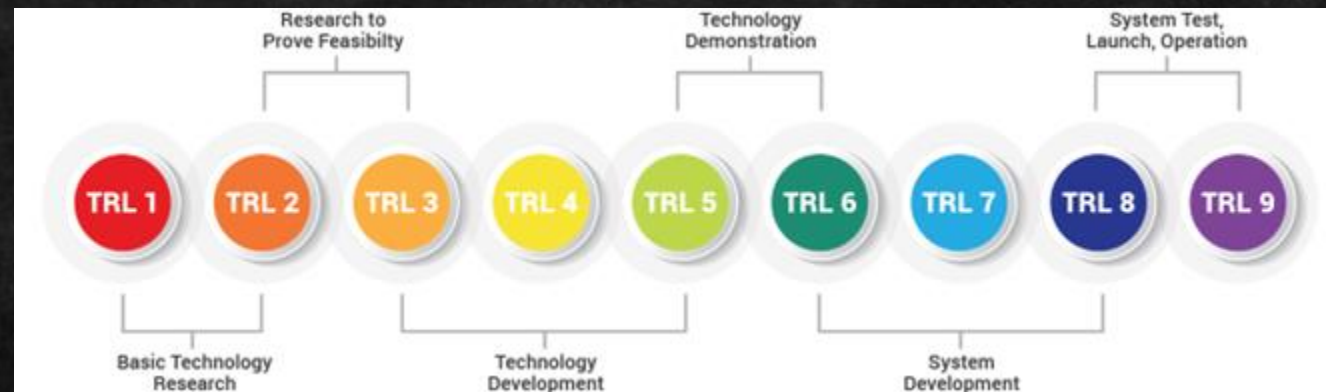
Primers
bit.ly/zenith-primers

Next Primers

- Generative AI

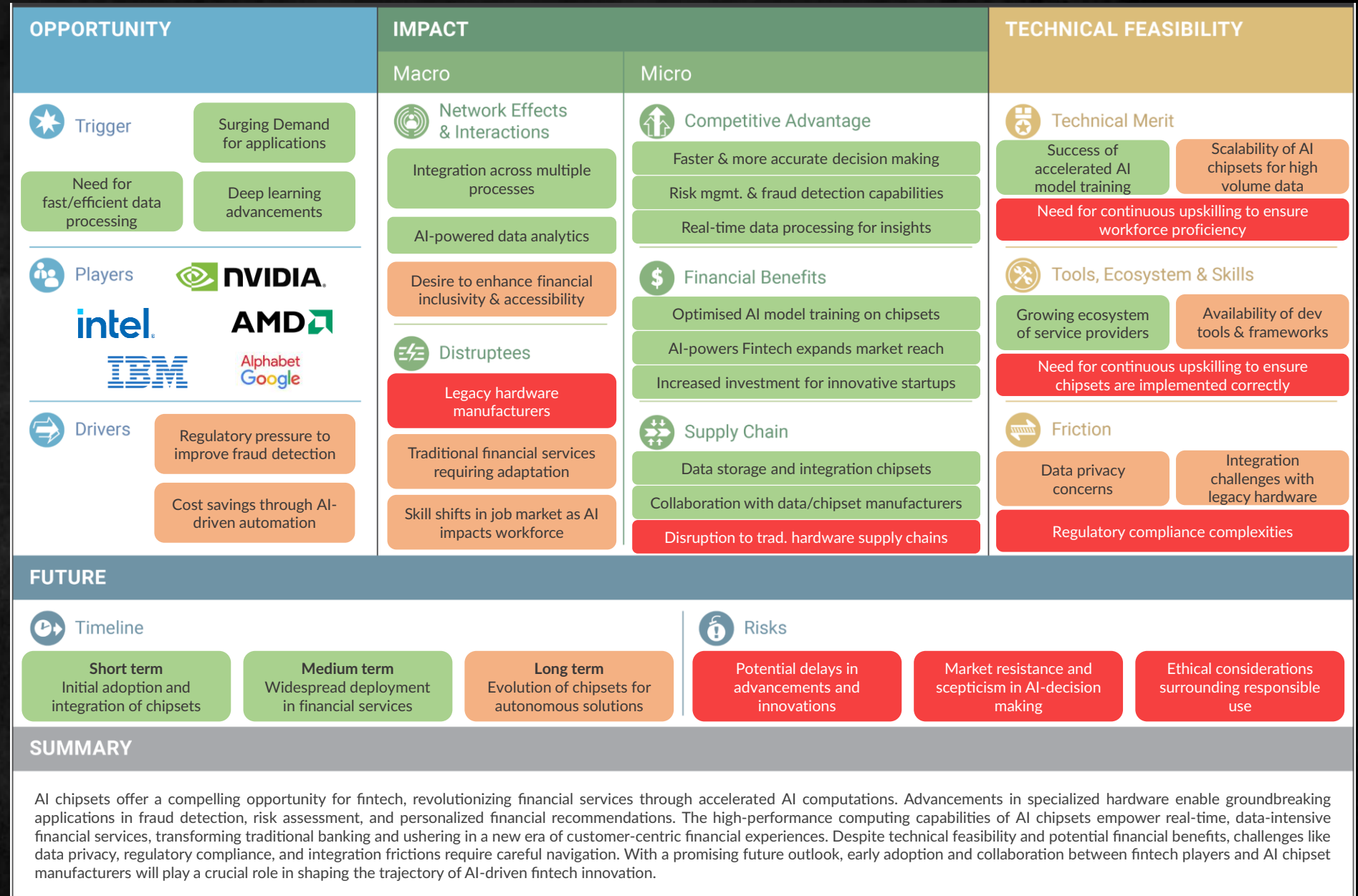- Data Annotation

- Data De-Identification

AI Chipsets

Specialized processors designed to accelerate AI computations, enabling faster and more efficient AI model training and inference.

In fintech, AI chipsets drive groundbreaking advancements, powering complex algorithms for fraud detection, risk assessment, and personalized financial recommendations.

The high-performance computing capabilities of AI chipsets empower fintech companies to deliver real-time, data-intensive services, transforming the way financial institutions operate and serve their customers.

You can find out more about this subject in our AI Chipset Primer on the Zenith GitHub.

OPPORTUNITY

Trigger
- Surging Demand for applications
- Need for fast/efficient data processing
- Deep learning advancements

Players
- NVIDIA
- intel
- AMD
- IBM
- Alphabet Google

Drivers
- Regulatory pressure to improve fraud detection
- Cost savings through AI-driven automation

IMPACT

Macro

Network Effects & Interactions
- Integration across multiple processes
- AI-powered data analytics
- Desire to enhance financial inclusivity & accessibility

Distruptees
- Legacy hardware manufacturers
- Traditional financial services requiring adaptation
- Skill shifts in job market as AI impacts workforce

Micro

Competitive Advantage
- Faster & more accurate decision making
- Risk mgmt. & fraud detection capabilities
- Real-time data processing for insights

Financial Benefits
- Optimised AI model training on chipsets
- AI-powers Fintech expands market reach
- Increased investment for innovative startups

Supply Chain
- Data storage and integration chipsets
- Collaboration with data/chipset manufacturers
- Disruption to trad. hardware supply chains

TECHNICAL FEASIBILITY

Technical Merit
- Success of accelerated AI model training
- Scalability of AI chipsets for high volume data
- Need for continuous upskilling to ensure workforce proficiency

Tools, Ecosystem & Skills
- Growing ecosystem of service providers
- Availability of dev tools & frameworks
- Need for continuous upskilling to ensure chipsets are implemented correctly

Friction
- Data privacy concerns
- Integration challenges with legacy hardware
- Regulatory compliance complexities

FUTURE

Timeline

Short term	Medium term	Long term
Initial adoption and integration of chipsets	Widespread deployment in financial services	Evolution of chipsets for autonomous solutions

Risks
- Potential delays in advancements and innovations
- Market resistance and scepticism in AI-decision making
- Ethical considerations surrounding responsible use

SUMMARY

AI chipsets offer a compelling opportunity for fintech, revolutionizing financial services through accelerated AI computations. Advancements in specialized hardware enable groundbreaking applications in fraud detection, risk assessment, and personalized financial recommendations. The high-performance computing capabilities of AI chipsets empower real-time, data-intensive financial services, transforming traditional banking and ushering in a new era of customer-centric financial experiences. Despite technical feasibility and potential financial benefits, challenges like data privacy, regulatory compliance, and integration frictions require careful navigation. With a promising future outlook, early adoption and collaboration between fintech players and AI chipset manufacturers will play a crucial role in shaping the trajectory of AI-driven fintech innovation.

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AI-Driven Fraud Detection

This leverages advanced machine learning algorithms to detect and prevent fraudulent activities in real-time.

In fintech, this technology acts as a vigilant security layer, continuously analysing vast volumes of financial data to identify suspicious patterns and transactions.

By swiftly detecting and mitigating fraud, AI-driven systems protect financial assets, preserve customer trust, and enhance overall cybersecurity in the rapidly evolving digital financial landscape.

You can find out more about this subject in our AI Chipset Primer on the Zenith GitHub.

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OPPORTUNITY

Trigger

- Escalating cyber threats
- Growing adoption of digital financial services
- AI advancements increase accuracy & efficiency

Players

feedzai · FORTER · Kount (An Equifax Company) · sift · f5 Distributed Cloud Services · FEATURE SPACE · PayPal · Ravelin

Drivers

- Regulatory mandates & compliance reqs.
- Brand reputation & Consumer trust
- Significant cost saving through loss prevention

IMPACT

Macro

Network Effects & Interactions

- Widespread adoption leads to collective intelligence
- Collaborative Industry-wide defence strategy
- Increased trust in FS promotes further adoption

Distruptees

- Cybercriminals facing more evolved systems
- Legacy fraud detection losing competitiveness
- Shift in the dynamics of financial crime investigation toward automation

Micro

Competitive Advantage

- Superior fraud detection & reduced losses
- Enhanced customer trust & loyalty
- Real-time response capabilities to incidents

Financial Benefits

- Cost savings & less post-fraud investigations
- Customer retention through reputation
- Investments & partnerships for potential applications following successful tests

Supply Chain

- Integration of AI-driven solutions to core infra
- Collaboration between AI solution providers, data aggregators & financial entities
- Potential changes in risk assessment and underwriting of Financial Services

TECHNICAL FEASIBILITY

Technical Merit

- Demonstrable success in real world scenarios
- Scalability of AI models to process vast volumes of data
- Continuous improvement and refinement of ML models to adapt to evolving threat landscape

Tools, Ecosystem & Skills

- Readily available dev. frameworks
- Growing ecosystem of talent working with AI tools
- Need for continuous upskilling to keep up with emerging fraud techniques

Friction

- Data privacy concerns
- Over-reliance on AI models leading to blind spots
- Regulatory compliance complexities in explainability of models

FUTURE

Timeline

- **Short term** Integration efforts into security infrastructure
- **Medium term** Industry-wide adoption & increased reliance
- **Long term** Evolution of AI-driven responses to emerging fraud techniques

Risks

- False negatives where AI fails to detect new or adaptive fraud patterns
- Adversarial attacks targeting AI models to manipulate outcomes
- Potential overfitting or bias in AI models affecting accuracy and/or fairness of detection

SUMMARY

AI-driven fraud detection represents a significant opportunity in fintech, providing real-time protection against sophisticated cyber threats. Advanced machine learning algorithms analyse vast financial data to swiftly identify and prevent fraudulent activities, safeguarding financial assets and customer trust. Collaboration between fintech companies, financial institutions, and cybersecurity experts is driving the development and adoption of robust fraud prevention solutions. The technology's impact is far-reaching, with macro network effects and improved cybersecurity across the digital financial landscape. While the potential for financial benefits and competitive advantages is substantial, the implementation of AI-driven fraud detection requires careful consideration of technical feasibility, frictions, and risks. By striking the right balance between innovation and responsible use, AI-driven fraud detection will continue to transform the way financial entities combat financial crime, contributing to a more secure and trusted financial ecosystem.

Computer Vision

An AI technology that enables machines to interpret and understand visual information.

In fintech, computer vision revolutionizes various processes, from automating document verification and identity recognition to analysing financial charts and visualizing data patterns.

By harnessing the power of computer vision, fintech companies streamline operations, enhance user experiences, and unlock valuable insights from visual data, driving efficiency and innovation.

You can find out more about this subject in our AI Chipset Primer on the Zenith GitHub.

OPPORTUNITY

Trigger
- Increasing availability of HQ visual data
- Rising interest in data-driven FS decision making
- Growing demand for automation & efficiency

Players
Trulioo, PLAID, onfido, COMPLY ADVANTAGE, personetics SELF DRIVING FINANCE, LexisNexis RISK SOLUTIONS, ZEST, feedzai

Drivers
- Competitive advantage through visualising complex data
- Need for fast & accurate ID & docs verification
- Potential improvements to fraud detection

IMPACT

Macro

Network Effects & Interactions
- More focus on visual interaction with data
- Combination of computer vision with other AI tech
- Improved accessibility & inclusivity via automation

Distruptees
- Obsolescence creates need to adapt to automation
- Conventional data analysis methods challenged
- Shift in the skill set required within FS Operational tasks

Micro

Competitive Advantage
- Quick & seamless document processing
- Enhanced security through adv. verification
- Data-driven decision making for strategy

Financial Benefits
- Automation of labour intensive doc verification
- Higher customer engagement & satisfaction
- Demonstration of technological leadership & innovation of products with customer focus

Supply Chain
- Integration of end-to-end operations
- Collaboration required to meet specific industry needs
- Streamlining of data collection & analysis

TECHNICAL FEASIBILITY

Technical Merit
- Real-world demos of visual data interpretation
- Scalability to handle large-scale real-time data
- Continuous improvement and refinement required to improve accuracy & efficiency

Tools, Ecosystem & Skills
- Readily available libraries, APIs and tools
- Growing ecosystem of collaborating entities
- Need for continuous upskilling to keep up with new data use cases

Friction
- Data privacy concerns over processing
- Ethical considerations when decision making
- Potential biases affecting financial data analysis & decision outcomes

FUTURE

Timeline
- **Short term** Document verification and basic data analysis
- **Medium term** Widespread POCs for other FS operations
- **Long term** Augmented Reality based financial interactions

Risks
- Technical challenges affecting decision making
- Regulatory compliance in ID verification & customer data processing
- Market resistance to automated interpretation of visual data

SUMMARY

Computer vision technology holds immense potential in transforming fintech processes, enabling machines to interpret and understand visual information. Fintech companies are leveraging computer vision to automate document verification, enhance fraud detection, and gain valuable insights from complex financial data. The technology's impact extends to improved user experiences, data-driven decision-making, and increased efficiency in financial operations. While the opportunity is significant, challenges related to technical feasibility, ethical considerations, and regulatory compliance must be addressed. The future outlook for computer vision in fintech is promising, with a gradual timeline for adoption and a need for careful risk management and responsible implementation. By capitalizing on the benefits and addressing frictions, computer vision will play a pivotal role in driving innovation and efficiency in the evolving landscape of fintech services.

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Artificial Intelligence Primer

Artificial Intelligence Primer: Introduction to the Subject

Introduction to Artificial Intelligence

Definition and Overview
Importance and Applications
Ethical Considerations
Accessibility
Security
Emerging Current Trends
What comes next?

A Brief History of Artificial Inte

Early Developments
Key Milestones
Current State & Future Directions

AI Primer: Glossary

General AI

Algorithm: A set of instructions that a computer

AlphaGo: A computer program that defeated a [...] made in AI in recent years.

Artificial Intelligence: The simulation of human

Autonomous: Able to operate independently wi

Bayesian network: A probabilistic graphical mod applications, including medical diagnosis, fraud

Bias: A tendency to favour one outcome or grou of the real world.

Bias-Variance Trade-off: The balance between c while variance refers to errors caused by overly c

Big Data: Large and complex data sets that cann

Chatbot: A computer program designed to simu

Feynic
TECHNOLOGY

3 Types of Artificial Intelligence:

Weak AI
- Limited by programming – won't develop new skills
- Analyses preferences and improves over time

Strong AI
- Learns new skills through contextualisation
- Applies knowledge to plan ahead
- Can adapt as changes occur

Superintelligence
- Self-aware
- Surpasses human intelligence
- Only exists in science fiction

Artificial Intelligence

Artificial [...] technology [...] opportunit [...] branch of [...] human tho [...] breakthrou [...] propelling [...]

For fintech [...] stay comp [...] innovation [...] opportuni [...] careful atte [...]

In this exec [...] potential o [...] adoption, a [...]

By address [...] adoption o [...] industry.

In the foll [...] opportunit [...] potential o [...] technolog [...]

AI Industry $190bn

AI Chipsets

AI chipsets, also known as AI accelerators or AI processors, are specialized hardware components designed to accelerate AI workloads. Traditional central processing units (CPUs) and graphics processing units (GPUs) have limitations in terms of computational power and efficiency when it comes to AI tasks. AI chipsets are purpose-built to optimize the processing of AI algorithms, enabling faster and more efficient AI computations.

AI chipsets leverage parallel processing and specialized architectures to handle the complex mathematical computations required for tasks such as deep learning, computer vision, and natural language processing. They can significantly enhance the performance of AI applications, allowing for real-time inference and training on large datasets.

Overview of AI-specific Hardware

AI-specific hardware, also known as AI accelerators or AI processors, is a category of specialized hardware designed to optimize the performance of AI workloads. These hardware solutions are developed to address the unique computational requirements of artificial intelligence, providing faster and more efficient processing of AI algorithms compared to traditional central processing units (CPUs) and graphics processing units (GPUs).

AI-specific hardware leverages various architectural optimizations and parallel processing techniques to accelerate AI computations. Here are some key points to understand about AI-specific hardware:

- **Purpose-built Design:** AI-specific hardware is designed from the ground up with AI workloads in mind. The hardware architecture is optimized to perform the specific mathematical operations involved in AI algorithms, such as matrix multiplications, convolutions, and tensor operations.

Leo
Mordasini

*POC Program
Co-ordinator*

Proof of Concepts
Test out new technologies

What is a Proof of Concept (PoC)

Exploration program within the SIG aiming to test concepts and create new projects

Enables innovators to be able to pursue conceptual designs and ideas with the proper resources and sponsorship

Control gates on the process to manage the flow of funding and duration of exploration so that we can fail fast and win quickly.

Projects subject to a vetting process

POC Process Overview

Phase 1: Ideation
- Crowdsource for ideas on how to solve the biggest blockers with our primers

Phase 2: Proposal
- After gathering feedback from the open-source community, officially pitch your idea for approval, funding and sponsorship

Phase 3: POC Kickoff
- Provide the environment and tools needed to successfully facilitate exploration of ideas

Phase 4: Demo
- Showcase wins/loses and contribute insights back to the community

| Ideation | Proposal | Kickoff | Demo |

Phase 1:
Ideation

Opportunity Outline

What is a Primer

- Created by subject matter experts within the **Brain Trust**
- Provides an introduction to the subject & relevant reading to seed knowledge
- Open for comments for further discussion & follow-ups

Outline where disruption is possible or worth exploring

- Current blockers are called out to aid exploration in our POC program

Artificial Intelligence

- Introduction to AI
- History of AI
- Current AI ETAC
- Technology Readiness
- Current Blockers

Resource Optimisation

Blockers:
- Creation of common libraries for industry standard hardware
- Creation of guiding principles for ASICs and their designers

Computer Vision

Blockers:
- Defining core libraries for accuracy and robustness
- Addressing example real-world scenarios to further develop core libraries

Ideation	Proposal	Kickoff	Demo

Call for Action – Discuss your ideas!

- Opportunity is posted in the Zenith repo when available

- Utilize GitHub Discussions to facilitate ideation amongst the community
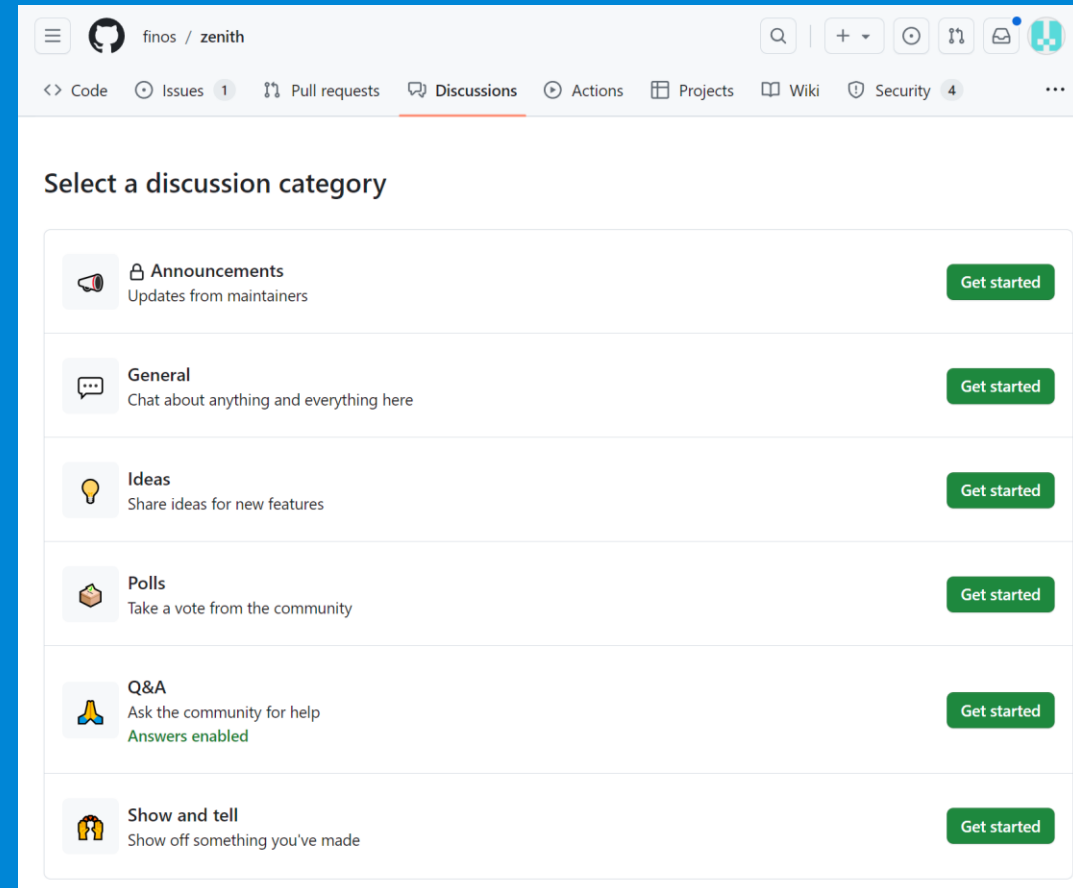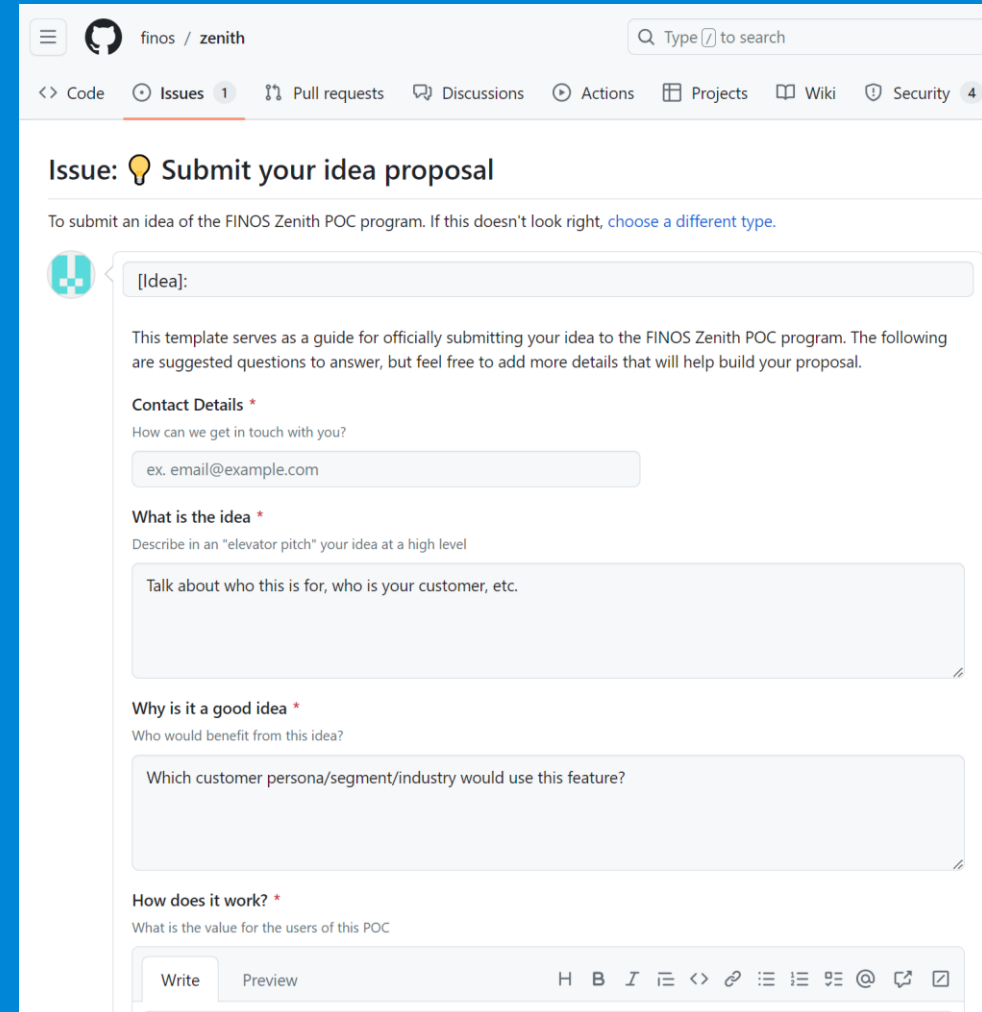
Ideation — **Proposal** — **Kickoff** — **Demo**

Submission of Idea

Innovators submit a PR to the Zenith GitHub repository in the respective opportunity folder

- Pull Request is the submission of the idea, based on a PR template provided

Template will include all the questions the submitter needs to answer as part of the idea submission
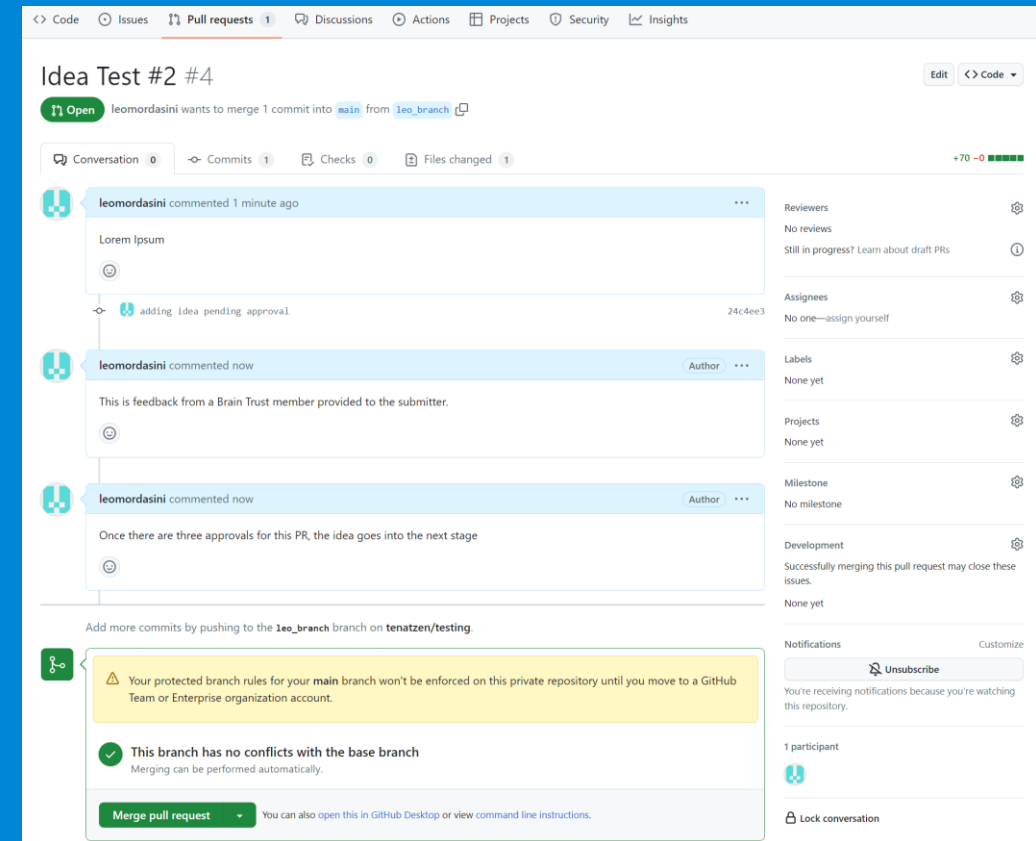

| Ideation | Proposal | Kickoff | Demo |

SME Vetting & Feedback

Sanity check by the Brain Trust to confirm ideas are:
- Possible
- Feasible
- Worthwhile
- Legal
- Not already explored

At least 3 approvals from the brain trust for an idea to move to the value proposition phase

Fully automated via GitHub to not add *unnecessary steps* and ensure a seamless onboarding process

Ideation — Proposal — Kickoff — Demo

Phase 2:
Proposal

Pitch Value Proposition

Partner with the Brain Trust

- You will be partnered with a mentor from the Brain Trust who will help your team put together the pitch value proposition

Create a video proposal

- Your team will have the opportunity to create a proposal for project approval, funding and requesting additional resources.
- This approach removes FINOS from being a bottleneck when reviewing ideas

| Ideation | Proposal | Kickoff | Demo |

Funding Governance

A pool of representatives from FINOS vote to approve access to exploration funds or resources to facilitate exploration

Funding would have a per-project cap on both budget and duration

Projects without funding asks can skip this step

| Ideation | Proposal | Kickoff | Demo |

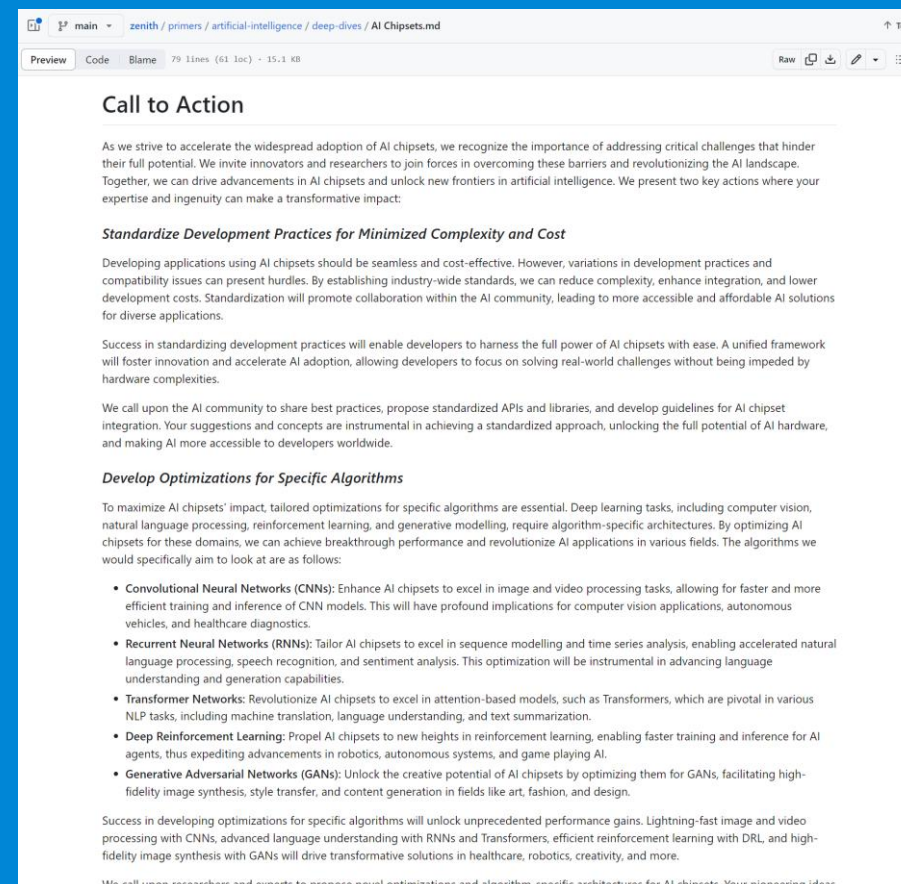# Further phases to be covered in a future session

Call to Action!

First three deep dives have been published!

- AI Chipsets

- AI-Driven Fraud Detection

- Computer Vision
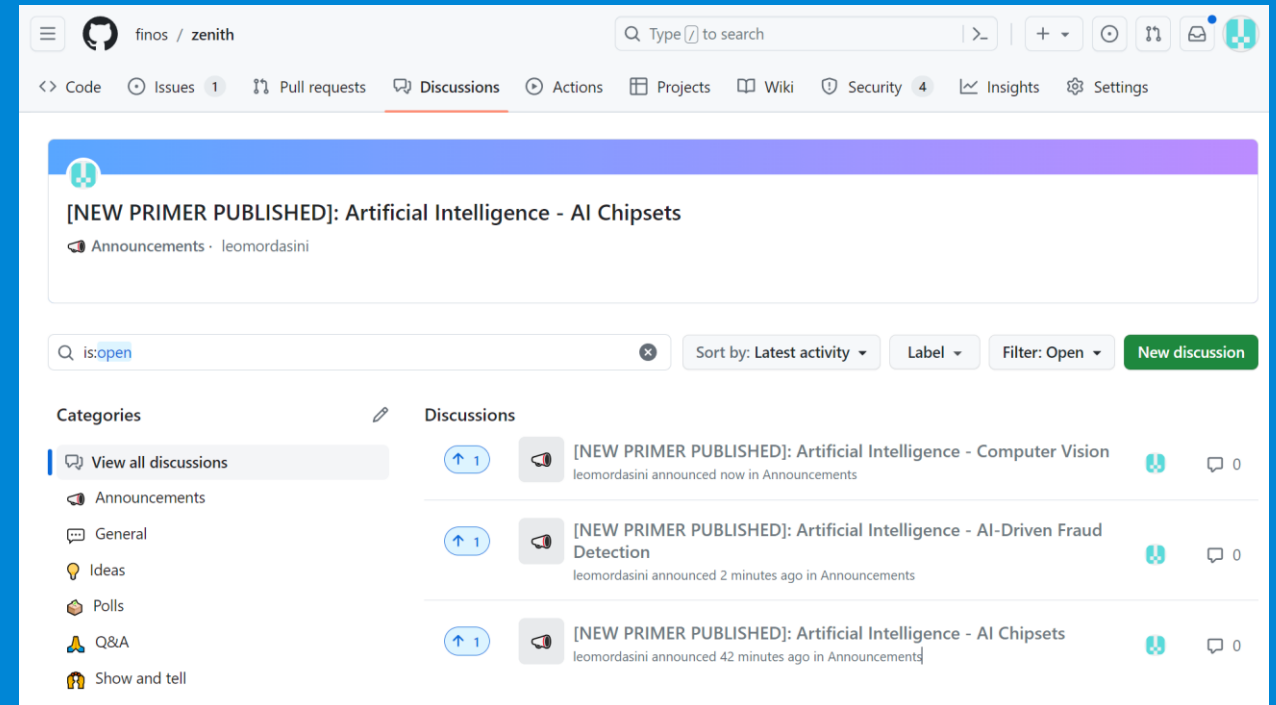

| Ideation | Proposal | Kickoff | Demo |

Start collaborating in Discussions!

- Utilize Discussion tools to collaborate with the open source community:
  - General Discussion
  - Ideas
  - Polls
  - Q&A
  - Show and Tell

| Ideation | Proposal | Kickoff | Demo |

Any Other Admin

Please add your attendance to this call!

https://github.com/finos/zenith/issues/69

Join our mailing list for future updates

(You don't need to put anything in the message)

Call to Action

Go an add your comments and additions to the **AI Primers!**

Get in touch with us through the mail group

Join our **Discussions** and submit POC ideas

Let us know if you'd like a spotlight!

Any Other Business?

Thank you

Join the discussion at
zenith.finos.org

FINOS