



Making Tomorrow Happen Today

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Digital Predictions

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Table of Content

Introduction

Trends

- ▶ Gen AI: Large Language Models & Beyond 03
- ▶ Web 3.0, Metaverse & Decentralized Internet 07
- ▶ The Demise of 3rd Party Cookies & Tokenization of Customer Data 09
- ▶ OpenAI, ChatGPT, and Dall-E 11
- ▶ Big Data and Analytics 12
- ▶ Good Cloud, Bad Cloud 13
- ▶ Innovation In MarTech 14
- ▶ Core Digital 15

The Call-to-Action Framework 16



Introduction

Our headline theme for PhotonWorld 23 event, held at NYSE, was "Tomorrow Makers." A toast to our customers who are making tomorrow happen today, embarking on a continuous innovation cycle, and delivering that innovation to their customers every day. Changing the way consumers interact with their favorite brands.

PhotonWorld is more than just a tech conference, it's a platform where we reconnect with peers we've worked with across multiple companies over decades. It is a moment in time where we celebrate their success and provide our point of view on which digital trends will shape industries globally in the next 3-5 years.

As the Co-Founder and CTO of Photon, I reflect on the previous

PhotonWorld events. In 2014, I foresaw the shift toward Big Data and the competitive advantages it would bring data driven companies. At PhotonWorld 2016, I spoke about the challenges of Two-Speed Architecture and the imperative to shift toward a Digital Enterprises. For your systems of records to move at digital speeds. In 2018, at PhotonWorld, I highlighted the transformative impact of Artificial Intelligence on automation and the benefits of the potential AI offered. I foresaw AI's ability to generate content, craft images, and develop code. Today, these predictions made at previous PhotonWorld events have manifested into realities.

In this playbook, I outline the trends I presented at PhotonWorld 23. For each trend, I will demystify what we believe and how these predictions will materialize rather than just the

trends or the buzzwords. In the end, I'll also provide the Call-To-Action Framework that will evolve for each of these trends.

I will delve into Generative AI and demystify what it stands for and how to embrace it. We will understand its capabilities and limitations. We will assess our current understanding with ChatGPT, Dall-E, and other Large Language Models and examine whether they pose potential threats, offer opportunities, or create disruption.

I'll explore Web3 and the Metaverse. This topic dominated discussions in 2022 marked by significant events such as Facebook's rebranding to Meta in Oct 2021. Yet, with the recent challenges in the crypto sector, there has been a noticeable shift in sentiment. I'll provide insights on how this landscape will evolve.

I will further discuss the demise of third-party cookies. It is a game-changer in marketing. Google Chrome has officially confirmed the removal of third-party cookies in 2024. It raises critical questions: How will it redefine marketing strategies? How should businesses reallocate their marketing spends in the absence of third-party cookies? The tokenization of consumer data presents a promising direction. I'll discuss the timeline for this transition and its implications.

I'll explore big data analytics. At its core, there is no AI without data. While big data has been in the picture longer, its applications extend beyond AI, making data analytics an ever-relevant subject. We'll also discuss data-driven organizational design and cloud. Today cloud is on every CIO's agenda. Whether it's a private or public cloud, there are various manifestations. However, there are pitfalls to navigate, such as potential overspending or misallocating resources in cloud.

And finally, where does it leave us with core digital. Core digital is the foundation upon which Photon was built — Websites and Mobile Apps. For people that ask me in an elevator what Photon does, my standard answer is that it is the world's largest developer of mobile apps. Because that's what we're known for. So, what's next in terms of innovation for us? How will we advance in this domain?

Through this playbook, I will answer all the questions above, and demystify the current digital trends. I invite you to read this playbook and learn how we are making tomorrow happen today at Photon.

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TREND 1

Generative AI: Large Language Models & Beyond

History of Artificial Intelligence

AI has been one trend that has experienced numerous more false starts, arguably more than any other technology, tracing back to the 1960s and even earlier. So, it's not a new concept. In fact, during the 1990s, when I was at Stanford, AI wasn't even the favored topic of discussion. The prevailing sentiment leaned towards data. Many believed that specializing in databases was more promising than venturing into AI, even though Stanford had a commendable AI program.



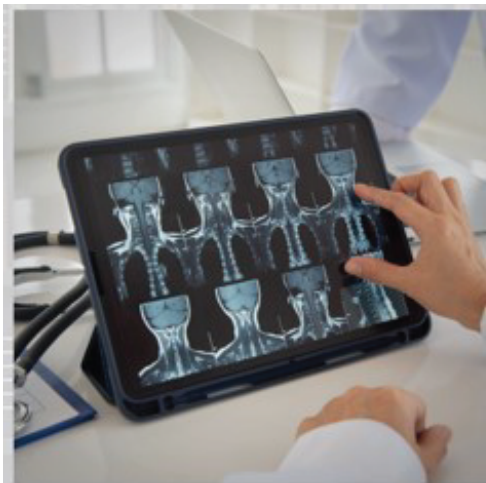
First Generation (1970s - 1990s) Hand Crafted Models

AI's history, particularly from the 1970s to the 1990s, focuses primarily on handcrafted models. These models, tailored for specific tasks, involved training neural networks to emulate human functions like demand forecasting and planning, using historical data to train models and create outputs.



Second Generation (2000s-2010s) Large Scale Computation and Big Data

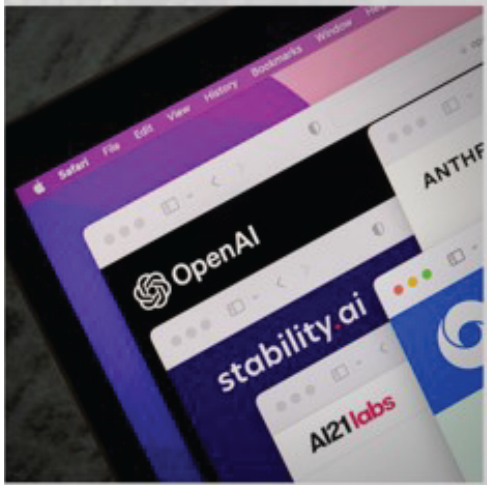
The advent of large-scale computational models marked the second generation of AI, and technologies like MapReduce, Hadoop, and Spark emerged. The primary driver for these technologies at that time was web search. In my Stanford thesis, I even implemented MapReduce, showcasing its capabilities. This was evident with Hadoop's incubation at Yahoo and Google's subsequent pioneering in best-use cases.



Third Generation (2010s-2020s) The Classification Era, Statistical Learning and Trained Models, NLPs

We call the third generation from the 2010s as the "Classification Era." This phase focused on training models with data to accurately classify high degrees or probabilities and the outcomes. Classic examples include analysing millions of X-rays to predict the presence of a tumour. Another example is when Alexa came into the picture, and it predicted with a high degree of probability what you were speaking to a smart speaker.

These classification algorithms also powered advancements in natural language processing and breaking CAPTCHA models.



Fourth Generation (2020s-Beyond) Generative AI and Large Language Models:

The fourth generation of AI is "Generative AI." We anticipated AI's ability to create content. This development in AI was a logical step towards crafting content autonomously. A Large language model is determined by the number of tokens it's trained on. For instance, GPT-4 is trained on approximately four billion tokens. These models predict the next word in a sequence, enabling them to produce a reasonable sense of content.

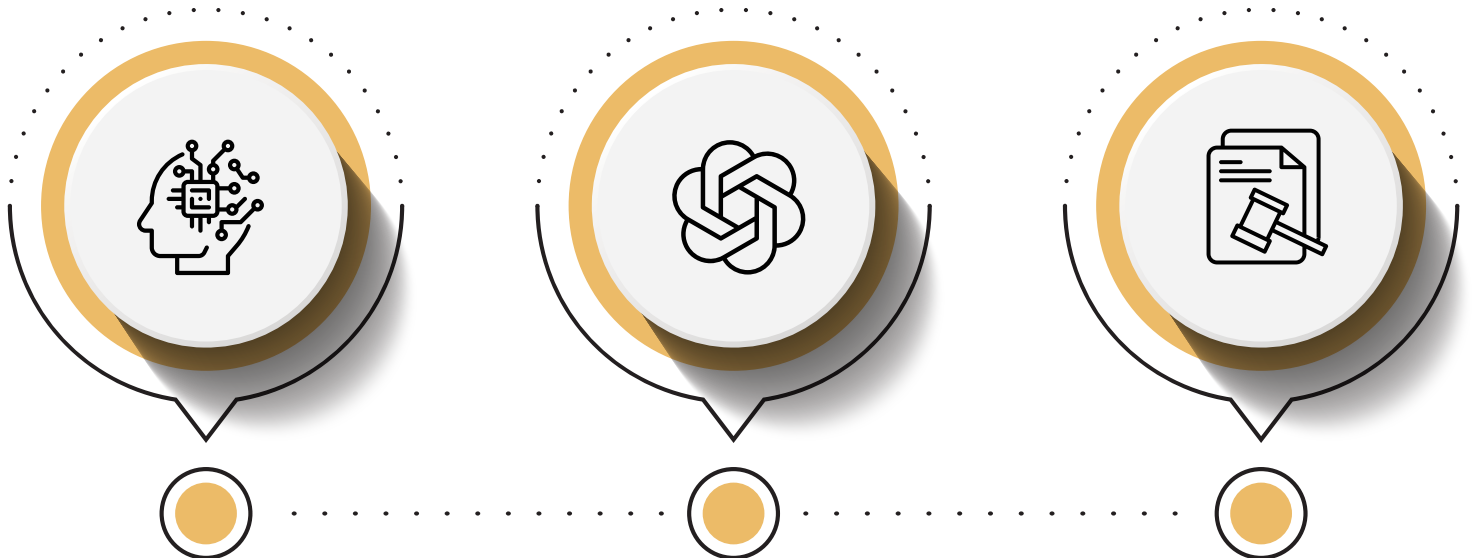


Adoption Patterns We Are Seeing

In terms of what we see as the use cases of AI is a 50-50 split. 50% are domain specific, while the other half span across various industries. Use cases such as generating different forms of emails or blog posts in marketing, customer service, or customer support are cross-industry. However, some use cases are very niche. For instance, customer sentiment analytics is universal, but when generating product descriptions from mere images, that's industry specific.

For example, in our project with a leading luxury brand, we've been tasked to generate descriptions for over 15,000 overstock items in their inventory. It is a prime example of a retail-centric application—similarly, insurance claims adjudication in the insurance sector or fraud and risk identification in the financial sector are examples of domain-specific use cases. Currently, based on roughly 120 discussions and about two dozen practical implementations we're undertaking, these are the trends we've observed.

Photon's POV



AI is not going to take our jobs. AI is currently in the "Experiment and Invest" phase.

OpenAI on Azure and Bard on Google are available. However, OpenAI has taken the lead as the first mover. But as an emerging space, it will become operational soon.

The caveat is that government regulations on large language models and beyond are inevitable.

TREND 2

Web 3.0, the Metaverse & Decentralized Internet



Web 3.0 and Metaverse combine two trends—First, Web 3.0 which is decentralized internet backed by crypto. Second is spatial computing which encompasses Augmented, Virtual, and Mixed Reality. So Metaverse is the confluence of two different trends coming together. While Web 2.0 was about social content, Web 3.0 aims to draw users to decentralized platforms, incentivizing them through NFTs and crypto. Decentraland is an excellent example of the two trends coming together.

I have built this business on the iPhone, and Apple can change consumer behavior—They've proven this multiple times. Yes, I agree that the Vision Pro is expensive. And its production is limited to only 400,000 units in the first year, given that the company that manufactures these lenses has an annual capacity of only 800,000, and they have refused to increase the capacity. However, it will provide an avenue that will be fundamental.

Remember the time of video game arcades? When nobody could get video games in their homes, people would visit video game arcades and spend a few dollars to play a game. That experience was uniquely captivating. Now there's a place in London that I go to with my son called the 'OtherWorlds.' They offer a cocktail and a dedicated suite where you can play games with your partner. It's an impressive experience. That's like the video game arcade now.

Apple Vision Pro will bring that Atari moment, bringing the experience into your home. Although it is currently in the experimental phase and there's a gestation period.

It will transition to operational status within the next 12 to 18 months, with the Apple Vision Pro set to launch in the first half of 2024. So, you need to start putting these new experiences in the hands of your consumers.

ChatGPT reached 100 million users in few months while Threads hit 150 million users in just six days. Threads, a Fediverse implementation using the Activity Pub protocol, is possibly an implementation of Web 3.0. Yet, nobody talks about it. Though Thread experience is still not there, Instagram's vast user base aids its rapid adoption. I am not a big fan of Mark Zuckerberg's products; Facebook looks like a Yahoo homepage with cluttered ads, but I am confident that Mark will eventually get this right.



TREND 3

The Demise of 3rd Party Cookies & Tokenization of Customer Data

Google Chrome has officially confirmed the removal of third-party cookies in 2024, emphasizing that views of consumers and consumers' trust are coming together. Earlier, Apple's decision to stop tracking across apps significantly dropped Facebook's ad sales on iOS. Chrome's upcoming change will cause a similar impact. Although Chrome has postponed launching this change thrice, it is crucial for you to start preparing now, considering the government regulations in sight. Let us demystify on how it pans out:



Zero-Party Data

The data that consumers want you to have (identity, preferences and financial data at banks).



1st-Party Data

Data you glean from user' actions on digital properties and presences you operate.



2nd-Party Data

Data you purchase about your users from others willing to sell it to you. This data is frowned upon by the regulations.



3rd-Party Data

Data for all practical purposes; platforms like Facebook, Google and Amazon collect, sell it to you at an aggregate level.

For example, one of the world's leading beauty companies initiated an ambitious program to transform into a beauty tech company. Their goal was to ensure that they created beauty products and services like Virtual Makeup Try-On to gather valuable Zero-Party data when users sign up. When users interact with their services, the brand accumulates first-party data, enabling them to market more effectively to its users. You need to start experimenting and investing in this approach today.

Photon's POV

Optimize your marketing spend over the next 12 to 18 months considering that you will have no or only limited access to third-party data.

As I have highlighted in several past PhotonWorld events, put the data back into the hands of your consumers. Think of it as a bank account: consumers own their data and can withdraw their data at any moment.

Transitioning to such a decentralized platform on a global scale will need more time. However, that time will now eventually come.



TREND 4

OpenAI, ChatGPT, and Dall-E: Opportunity, Threat or Disruptor

We at Photon are actively looking for ways to incorporate tools like Open AI, ChatGPT, GitHub Copilot, and Dall-E into our existing workflows and processes. We are training our creative team from a creative standpoint and engineering from an engineering standpoint regarding how we use these daily in our business.

People often ask me, "Do you have a Gen AI task force or a SWAT team? The straightforward answer is No. It is applicable to every single employee of ours. It reminds me of the 2003-04 era when my first company ran sessions on how to Google Right. As Google emerged as a dominant search platform, the trick was to ask the right questions. With an understanding of the underlying technology, I always knew how to frame my queries to get precise answers. Similarly, with ChatGPT today, the essence lies in knowing what to ask and how much context to provide, for it to respond to what you are precisely looking for.

Photon's POV

Prompt engineering is now the industry term, and we're actively training, retraining, and upskilling our 7,000-strong workforce to harness its potential. We've entered the operational phase, and for digital leaders like you, I recommend starting operationalizing this from both technology and digital product engineering standpoints.

Over the next 12-18 months, it will become an institutional part of every organization to adopt and extend these use cases.

TREND 5

Big Data and Analytics, Foundational Plumbing for AI

Data analytics is the foundation for AI. Think of it as the essential plumbing when building a home. Without data, AI can't exist. First and foremost, understanding the significance of data quality, data efficiency, and data quantity in this context is imperative. Data and Analytics is one of the fastest growing service lines in Photon.

Data lake, warehouse implementations, and next-generation analytics have been core to our recent projects. For instance, we are implementing these initiatives along with Google BigQuery and Looker for our customers. This service line has witnessed rapid growth, and I foresee its acceleration as AI becomes more integral to business strategies. Most of our clients are now in the operational phase.

What we are seeing right now is that single largest case for many clients has been taking traditional SQL server data warehouses, shutting them down, and moving to the cloud. There is a lot of interest, still in its early stages, but it is towards institutionalizing data-driven decision-making at an organizational level.

Photon's POV

In the next 12 to 18 months, becoming a truly data-driven organization will be optimized. The desire for these enabled use cases will primarily drive this shift.

TREND 6

Good Cloud, Bad Cloud

Reflecting on the trends we've discussed in the past, it's evident that the industry has been transitioning to the cloud for nearly a decade. Today it is not a question of whether to move to the cloud, but the question is Public, Private, or Hybrid. There is an industry discrepancy when it comes to cloud adoption. For example, it is a more private or hybrid cloud in banks compared to other sectors.

We have seen a pattern of underutilizing the committed infrastructure on the cloud, leading to overspending. Cloud and SaaS have caused a few issues, such as significant overspending on the cloud compared to traditional licensing. However, primary driver is the agility offered by shifting to infrastructure as code, which promises more efficient operations but sometimes it doesn't pan out.

In sectors like CPG and Retail, the public cloud is prevalent. One of our prominent clients is currently in the rationalized phase on the private cloud, yet they are simultaneously investing in the public cloud. In financial services, due to regulations, there's often more investment in on OpenShift or Pivotal Cloud Foundry (PCF).

Photon's POV

Currently, many are in the optimization phase with their cloud strategies. As time passes, I would say it will go into rationalizing phase given that many people have mostly committed to X amount in cloud spend and therefore, clawed back Y amount to actually do it.

In the next 12-18 months, rationalize and look for ways for clawing value back from the past investments on Cloud.

TREND 7

Innovations in Martech

Martech has been a super-fast-evolving space. It's been a big driver for us. The desire for real-time access to consumer data to determine the next best action vs. classical campaigns – We believe this is a significant driver.

The rise of Customer Data Platforms (CDP) has become an essential component of this stack. Traditional campaigns are transitioning to more personalized strategies, which we see as a major driving force. The term 'CDP' has transitioned from being a nascent idea around the last PhotonWorld event in 2020 to an industry staple now – leading the way and emphasizing the importance of customer loyalty.

We are seeing tremendous traction around loyalty for many of our clients, especially in the Quick Service Restaurant sector. This sector is, in fact, one of our fastest-growing verticals. We're actively reimagining loyalty for leading brands in the QSR sector. Loyalty programs are key drivers in martech and taking one step further, you start having conversations around subscription services.

Photon's POV

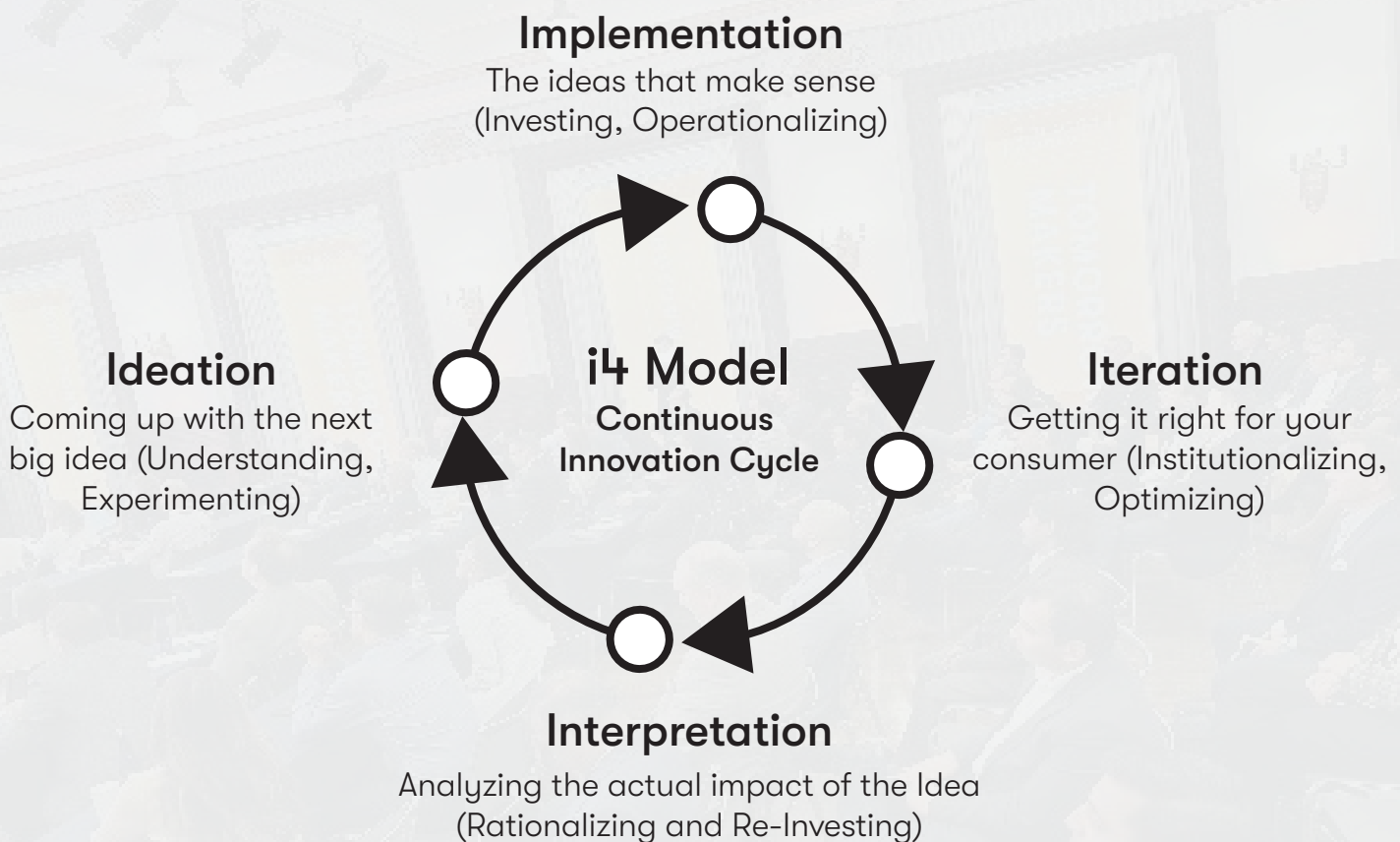
Martech is currently in the invest and operationalize phase. It is time to identify proofs of concept to experiment and put new experiences in the hands of your consumers. **Institutionalizing technology in the marketing organization will be an essential component in the next 12 to 18 months.**



TREND 8

Core Digital

And finally, where does it leave us with core digital—Websites and Mobile Apps? Is this a commodity now? Has the innovation stalled? I don't believe so. In the larger digital world, there's an essential reason why this becomes almost a self-fulfilling prophecy. We believe that digital is not done. It is all about continuous innovation. We call it the Photon i4 Engagement Model.



Innovation is an ongoing journey, exemplified by the constant evolution of Apple and Google's operating systems. With each new feature they introduce, fresh user behaviors emerge, providing fertile ground for continued innovation.

Photon's POV

The propositions from a digital standpoint will continue to grow — maybe not as rapidly as the early days of the mobile app era. However, innovation never stalls and digital is not done!



The Call-to-Action Framework

In this playbook, I've explained Photon's POV on the digital trends that will be pivotal in shaping industries.

To grasp the actionable insights from these trends, we have designed a new **call-to-action framework** that will evolve for each trend. Our framework presents a seven-step journey: Understand, Experiment, Invest, Operationalize, Institutionalize, Optimize, and Rationalize.

If you're keen on understanding how these trends will materialize in your business or how we are implementing this call-to-action framework for our global customers, please get in touch with us at sales@photon.com to connect with our digital experts.

To request access to Mukund's complete PhotonWorld 23 session, [click here](#).

ABOUT THE AUTHOR



Mukund is the Co-Founder & CTO at Photon. His strategic thought and technology leadership drives the innovation that Photon provides to its Fortune 100 customers. As a trusted technology advisor, he guides and advises CIOs on their evolving digital strategy. He was previously VP - Product Development at WebMethods, a leading middleware technology firm. Prior to that, he was Co-Founder and CTO at Infravio Inc, a Valley-pioneer in the Web Services and SOA Infrastructure space. Mukund has served as an active member and adviser to several standards organizations such as XML Schema, W3C Web Services architecture, and Open-Source web services. Mukund is an alumnus of Stanford University and is a Bachelor of Technology (B.Tech) from the Indian Institute of Technology, Madras.

A handwritten signature in black ink that reads "Mukund". The signature is stylized with a long horizontal stroke extending to the left and a vertical line extending downwards from the end of the name.

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Co-Founder & CTO, Photon

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