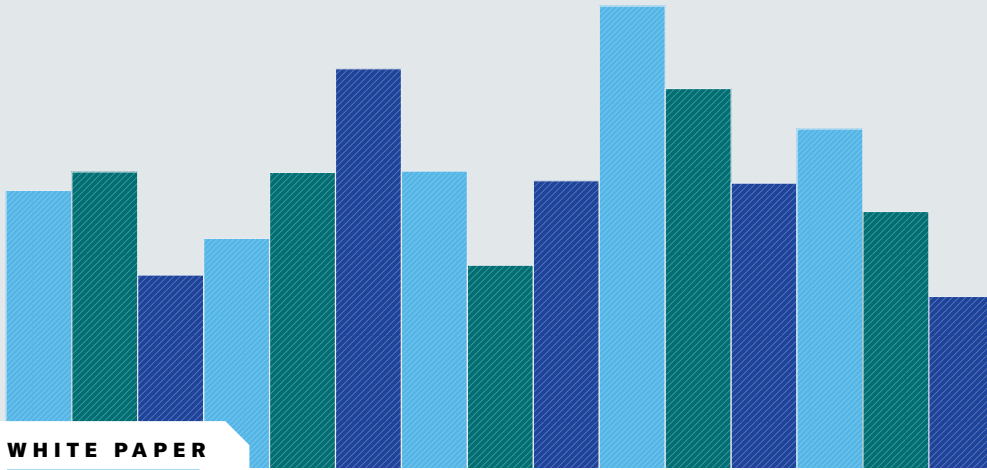**Harvard Business Review**

ANALYTIC SERVICES

On Solid Ground for AI-Everywhere

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kyndryl.

The business world has experienced more than a year of exuberance for generative AI (gen AI), and by now some assumptions can be made.

We can assume your competitors are testing it—if not already integrating solutions. At Kyndryl, we're well into proofs of concept and pilots with customers in banking, engineering, manufacturing, and other industries to explore how generative AI can drive business impact at scale.

We can assume your competitors and customers are curious how gen AI can be used to improve the customer experience, as that's one of the most explored areas for use cases.

We also can assume your colleagues still have concerns—whether about intellectual property rights, data privacy, bias, sustainability, or regulatory issues.

That's the dilemma of such transformative technology. Generative AI dazzles with an ability to synthesize data, speed processes, and perform creative tasks. But to ensure the benefits and minimize related risks of activating it at scale, generative AI demands thoughtful planning, governance, ethics, and more.

Research from Kyndryl found only 10% of organizations had a documented plan for enterprise-wide activation of generative AI with no related concerns. The research found only 14% were confident their organizations had the skills available to establish and support enterprise-wide gen AI. Only one in five were very confident their company's IT infrastructure can support enterprise-wide use of generative AI.

Yet, while exuberance continues to rise for the potential of generative AI, there's still a gap between aspirations and capabilities. Companies must scale from a digital foundation encompassing robust data governance and security, the right talent, and other essential building blocks.

The companies that will reap the most from gen AI will be those that solve for a digital foundation. They will map desired business outcomes and tailor operating models and technology to those outcomes. They will connect, integrate, and automate across apps, data, and infrastructure. They also will activate robust resiliency programs to mitigate inherent risk.

This report explores how chief information officers across industries are navigating the challenges of integrating enterprise-ready gen AI solutions into their IT operations. It also reminds us that with the great power of gen AI comes great responsibility. I hope the discussion and suggested best practices prove valuable to you as your company prepares for the AI-everywhere era.

Nicolas Sekkaki
Global Applications,
Data and AI Practice Leader
Kyndryl

On Solid Ground for AI-Everywhere

Few technologies have raced to mainstream adoption as quickly as generative artificial intelligence (gen AI). The enormous productivity gains promised by the technology—and its potential to transform customer experience and the nature of work itself—mean the pressure on businesses to move fast is coming from the very top levels of organizations.

But while executive excitement (and worry) is certain, the roadmap for turning gen AI potential into strategy and then execution is far less clear. The technology is still new. There are risks and regulatory issues to navigate. Talent is scarce or unavailable. And the costs of innovating with gen AI are not yet at all clear.

And even if these hurdles can be surmounted, there's a bigger question at play. Are businesses ready for generative AI—and AI more broadly—in terms of their digital foundation? Or, put differently: Do they have the technology infrastructure and organizational culture needed to leverage gen AI to its maximum potential?

The people tasked with navigating this messy interplay of potential and pragmatism are often today's chief information officers (CIOs). Unsurprisingly, many are feeling incredible pressure to act. Dion Hinchcliffe, vice president and principal analyst at Constellation Research Inc., a technology consultancy in Silicon Valley, says this pressure is what makes generative AI different from every technology that has come before.

"In all our conversations with CIOs in the last year, what's become very evident is that the board is putting a lot of pressure on them to deliver gen AI. They see it in the news; they are using it themselves. And they see that if their business doesn't do something meaningful with it soon, a native-born AI company is going to come along with a product or service that's much cheaper or better than theirs and replace them."

HIGHLIGHTS

More than a decade of **digital transformation** has demonstrated that **challenges related to talent**, **culture**, **and operating models** still stand between many businesses and the promises of transformational technology.

Even when there are clear value-adding use cases and minimal regulatory constraints, technology leaders must **ensure their organizations have the digital foundation needed to leverage generative artificial intelligence (gen AI)** in a safe and scalable way across the business.

Chief information officers and technology leaders are being tasked with the difficult challenge of **bridging the gap between what the business wants to do with gen AI and what it can practically achieve** with its existing digital foundation.

Are businesses ready for generative AI—and AI more broadly—in terms of their digital foundation? Or, put differently: Do they have the technology infrastructure and organizational culture needed to leverage gen AI to its maximum potential?

To stave off these competitive threats and ready their organizations for the "AI-everywhere" future, businesses are planning substantial investments in generative AI and the associated digital infrastructure. International Data Corporation (IDC), a Needham, Mass.-based research firm, predicts that global spending on gen AI software and related infrastructure and IT services will grow at a compound annual rate of 73.3% between 2023 and 2027, when it will reach an estimated $143 billion.[1]

However, money alone won't build the digital foundation needed to create readiness for gen AI and AI more broadly. More than a decade of digital transformation has demonstrated that challenges related to talent, culture, and operating models still stand between many businesses and the promises of transformational technology.

This paper explores how companies are readying themselves for the "AI-everywhere" future by creating the digital foundation needed to put technology at the center of strategy, innovation, and operations. This digital foundation encompasses both the technology infrastructure and the culture of a business—with both factors determining the speed at which organizations can move on generative AI.

The Industry-Transcending Power of Generative AI

Such is the transformative potential of generative AI that it is difficult to think of a business function or industry that won't be impacted in some way. A January 2024 report by the International Monetary Fund found that 60% of jobs in advanced economies are exposed to impacts from gen AI.[2] Some studies put that number even higher.

Even sectors less typically thought of as "early adopters" of new technology are actively exploring and experimenting with gen AI. Marc Kermisch, chief digital and information officer at CNH Industrial NV, a global manufacturer of agricultural and construction machinery headquartered in London, United Kingdom, believes it is "an imperative and an obligation" to actively explore its potential in his business. "We are very anchored into determining how we can leverage this technology to continue to push the boundary of how we serve our farmers and construction operators," says Kermisch.

Like many businesses, Kermisch explains, CNH Industrial is categorizing generative AI use cases into three core areas. "One is customer impact—how can we use gen AI to provide access to knowledge or tools that make it easier for customers to use our products and interact with us? Second is employee productivity. How can we leverage our partners' tools or a gen AI directly to drive productivity in our employee base? And lastly, how can gen AI help us design and develop our products, both in terms of software and vehicle architecture?"

Another industry commonly associated with a slower pace of technological innovation in recent years— telecommunications—is also moving surprisingly quickly on generative AI. Nik Willetts, chief executive officer of TM Forum, a membership association of more than 800 global telecom companies, admits he is surprised by just how fast many of the very large companies in his network have been able to move with this technology.

"We've studied how telecoms around the world are using gen AI, and the research we published a few months ago showed that 94% of executives in this space believe gen AI is going to have a meaningful effect on their business within the next five years. And there are some good reasons for that. Some of the early adopters are generating meaningful savings and productivity improvements on the back of AI," explains Willetts.

Other sectors, like banking, are full of opportunity for generative AI solutions, but face constraints in how fast and far they can go with the technology while the regulatory landscape catches up. Still, a few financial institutions are actively exploring the potential of gen AI in less-sensitive areas of their business, where there is more freedom to innovate.

"The first wave of opportunities will focus on areas that are low risk to data privacy, bias, legal, and regulatory concerns," says John Wei, executive vice president and chief technology officer at Integreon, a Fargo, N.D.-based global provider of business services to law firms, banks, and professional services firms. Firms within the banking industry are looking at a number of low-risk use cases that can drive productivity, including contract risk scoring, legal review of documents, fraud detection, ideation in the marketing department, and conversational IT service management tools, among others.

But banks are taking a cautious approach, exploring as much as they can within the limitations of their sector. "We view generative AI as a complementary tool for our workforce," explains the chief information operations officer of a major Canadian bank. "But we are a highly regulated business, and before people dive into it too much, we need to make sure we have the associated guardrails and risk frameworks in place."

Technology and Culture as the Digital Foundation

Even when there are clear value-adding use cases and minimal regulatory constraints, technology leaders must ensure their organizations have the digital foundation needed to leverage gen AI in a safe and scalable way across the business. George Westerman, a senior lecturer at MIT Sloan School of Management who coauthored *Leading Digital: Turning Technology into Business Transformation* and who co-chairs the MIT Sloan CIO Leadership Awards, says companies that are more successful at building this foundation share a focus on technology and leadership.

"Our research has found that there are two capabilities that companies we call 'digital masters' do better than other companies they compete with," says Westerman. "One is they are better at using technologies in their customer experience, employee experience, business models, and operations. That's their digital capability. The other side is their leadership capability. They are better at developing the capability to innovate and change over time."

For Integreon's Wei, the digital foundation is akin to the brakes on a sports car. "If I asked you to build a sports car, most people would start by thinking about the biggest engine they can put in that car. But those who have designed a sports car before will start by designing the brake, because the most powerful brake you can put in the car determines the size of the engine."

From this point of view, Wei believes the digital foundation should include security measures alongside enabling infrastructure. "A solid digital foundation needs to include cybersecurity defenses; a strong network backbone to enable composable architecture of application delivery; and cloud—both as an economic model that enables infinite scalability and cost effectiveness and as an innovation model to tap the vast ecosystem of gen AI models now available," he says.

Access to organizational data is fundamentally important, too, given that data is what feeds the generative AI machine. Hinchcliffe from Constellation Research believes that how organizations think about and organize their data may determine who succeeds on this gen AI journey, and who fails. "I have studied a lot of organizations that have successfully transformed their business, and the ones that have done it much faster, or succeeded eventually, tended to have a

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different view of the data in their organizations. They fixed both the cultural and technical obstacles in getting data to where it needs to be," he explains.

Hinchcliffe affirms that digital leaders such as Nordstrom, Disney, and Nike have all managed to dismantle the traditional data "fiefdoms" that exist within organizations, where the marketing department or sales team, for example, feels ownership over their data and systems. "These organizations are clear that data belongs to the whole organization and must be used to serve the customer, wherever they may be interfacing with the business. That's a hard cultural change and a hard technical change to make, but without it you're going to go nowhere fast with AI," Hinchcliffe says.

For some organizations, the cultural aspects of their digital foundation may actually be a greater challenge than the technological ones. At UCLA Anderson School of Management in California, CIO Howard Miller has a job to do convincing faculty members to get on board with his plans to innovate using gen AI. Despite a clear mandate from the dean to position the business school as a generative AI thought leader and innovator, Miller still faces pockets of resistance.

"We've got a handful of faculty members that are in, but most of them want no part of this. That's going to be the biggest barrier to success. There's an organizational change management issue to navigate, and that's a risk with anything

> "There's an organizational change management issue to navigate, and that's a risk with anything we do with technology, because you can't always control the human element required for change," says Howard Miller, chief information officer at UCLA Anderson School of Management in California.

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Kermisch from CNH Industrial foresees similar cultural obstacles: "In terms of our readiness for generative AI, I would say there is a lot of curiosity and skepticism at the same time. Getting some of our engineers to experiment with generative AI to drive productivity has been a challenge, for example. There is also this expectation among the workforce that they will see immediate success with generative AI, but like any new technology, it takes practice. The more explicit and specific your prompt is, the better the result you're going to get."

Like any cultural change program, it needs to start with leadership, says Willetts from TM Forum. "Data and infrastructure are always the base challenge, but you also need a culture that's ready for AI. And that means being led by leaders who are positive towards it but also acknowledge the risks."

Willetts explains that culture is not only about receptiveness to change, but also about how the business is set up to work together. "A lot of the issues we are seeing stem from siloed processes. Those companies that are making progress on generative AI have a joined-up strategy that spans HR, legal, technology, data, and regulatory issues, and where the CEO appoints an AI council spanning those functions to act as a problem-solving group. I have yet to see a company making real progress on gen AI without that CEO mandate," asserts Willetts.

The Twin Challenges of Talent and Cost

Closely linked to the cultural and technology aspects of the digital foundation are the twin challenges of talent and cost. Even organizations that have a receptive culture and robust technology infrastructure are likely to face hurdles in finding the people and money to innovate in a meaningful way with generative AI.

"Talent and dollars are always going to be constraints," says Kermisch. "Talent is probably the number one challenge. Do I have the talent that's got the expertise needed to deliver on gen AI? If I had a magic wand, I'd love to hire 10 to 15 super-smart engineers whose only job is to become experts in gen

AI and machine learning. But that's not a reality I can execute on because we don't have an open checkbook."

The current scarcity of gen AI talent means that even a blank checkbook might not be enough to solve the talent issue, according to Hinchcliffe. "Talent is the number one issue that CIOs are facing, not just in gen AI but in everything," he says. "There's this huge gravitational pull coming from tech companies who are willing to pay whatever it takes to be the AI winner, which means they'll pay any salary. That is hollowing out the whole talent base for AI, and regular firms just can't compete with that."

The investment question is causing major headaches for CIOs, too, adds Hinchcliffe. "I'm doing a lot of workshops for CIOs where we're putting these gen AI budgets together, and it's not clear yet what this will cost. We've recently gone through a number of waves where technology was really cheap. Just look at Covid-19—we saw a huge transformation of work, but it didn't cost that much. In fact, it probably saved money for some businesses. But gen AI is not like that. This is more like the bad old days of spending $100 million on enterprise resource planning," he says.

Miller from UCLA Anderson School of Management worries that the cost factor could end up closing the door on gen AI before it really takes off: "One of the risks with this technology is that the cost to do what you want to do with it at scale is just prohibitive. Yes, this may be the best technology, and it may be the best solution to a business problem, but if the true answer is that it just costs more than we can afford, is that worth it?"

The Changing Role of the CIO

CIOs and other technology leaders are shouldering pressure to innovate quickly while trying to resolve the many issues across technology infrastructure, organizational culture, talent, and cost. And they are doing this all while navigating a changing role within their organizations. As technology conversations shift into the strategic heart of the business, questions about how the organization operates and what technologies it uses are becoming inextricably intertwined. Technology leaders are therefore leading the business in a

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"Now the CIO is this chief 'influencer' officer where the only way they can control anything is by convincing people their way is better … We're seeing CIOs becoming much more communicative, much better at guiding the organization instead of telling the organization what they can and cannot do," says Dion Hinchcliffe, vice president and principal analyst at Constellation Research Inc.

more strategic manner, while their fellow C-suite executives are becoming more involved in digital strategy.

Westerman makes the point that many good CIOs have already made the shift into a more strategic role: "Some CIOs do still struggle to be recognized by their peers at the top table, but many have already figured out how to be part of that strategic conversation. For those CIOs who haven't succeeded in this shift yet, generative AI could be an opportunity to start that conversation."

While the opportunity to be more strategic is enticing, in practice the shift can be daunting for CIOs, claims Hinchcliffe, who oversees Constellation Research's 1,300-strong CIO network. "The whole role of the CIO is changing like I've never seen before," he says. "The two big shifts are [first] the move away from chief infrastructure officer to chief 'innovation' officer, which requires them to apply technology at the forefront of the business—which is not what the CIO used to do; they used to be more of an order taker. That's a hard shift for CIOs to make because most are still chief infrastructure officers at heart."

The other major change for CIOs, according to Hinchcliffe, is moving away from having total control over technology. "Everything has been digitized in business and, as a result, everyone is in charge of technology. CIOs went from having 90% of the tech budget in 2000 to having less than half of it now. The rest of the budget is spent by the marketing department, data teams, and other divisions."

"The CIO may still control the core systems, but there are all these edge systems that are out of their grasp. So now the CIO is this chief 'influencer' officer where the only way they can control anything is by convincing people their way is better," explains Hinchcliffe. "That's very interesting, and we're seeing CIOs becoming much more communicative, much better at guiding the organization instead of telling the organization what they can and cannot do."

Miller is feeling this change in his role. "Ten years ago, the CIO used to have to be the smartest technical person in the room. Now, we are really part of the business narrative. I'm expected to deliver business outcomes with technology—and that's how I frame my job. It's not just about technology;

it's about delivering business outcomes with technology," he explains.

This evolution of the role means CIOs are also expected to know their business much better than in the past. At the major Canadian bank, the CIO now has a changed title to reflect this expectation: chief information operations officer. "As technologists we say that we have to understand the business, but understanding the business is different from understanding how the business operates. CIOs are now getting more into business operations, and my role is a good indication of that. I think the change is in direct response to the speed at which organizations execute digitization. You can't really digitize something if you don't understand how it works," he says.

Lessons from a Decade of Digital Transformation

To navigate their changing role and steer their organizations through the many challenges and opportunities of this gen AI technology revolution, CIOs and other technology leaders can draw on the digital transformation experiences of the past two decades, says Westerman from MIT Sloan School of Management. But he also cautions that how companies collectively develop their capacity to innovate is different from what it used to be.

"When digital transformation started, it was a very top-down thing," says Westerman. "You set this in place at the top of the company and create the mechanisms to carry it out. What's happened in the last five or six years is that companies are becoming more emergent in their approach to transformation. They are more able to transform without that strong top-down impetus. That requires moving away from digital transformation being a project that you push, to becoming a capability of the company to innovate."

The other lesson from the past is to avoid thinking about gen AI as its "own thing," Westerman adds. "Your approaches to gen AI should fit into the approaches you've had to machine learning in the past. It should fit into the approaches you've had to IT in general. You don't necessarily want a gen AI

strategy—you want a transformation strategy with gen AI fitting into it."

On the question of strategy, Willetts cautions against looking at gen AI as just a technology problem: "I think where we'll see a big gap emerge between those who genuinely get value out of gen AI and those who don't will be between those who see it as a holistic transformation challenge and those who see it as a digital transformation challenge. We live in a world of continuous technological and economic evolution, and AI is going to power the next wave of this. The challenge is who can bring the whole company on that journey and get past the classical trap of this being a technology problem?"

Such is the potential power of generative AI that Willetts also urges leaders to look across a longer-term horizon, when gen AI is no longer a "bolt on" application, but fundamentally changes the way an organization operates at every level. "We think there's a two-to-three-year horizon of a lot of bolting on, and there's nothing wrong with that," says Willetts. "That's where you get the immediate value and that's what everybody is doing right now. But we as a forum are starting to think on a five-to-ten-year horizon where this really changes how we design technology and how we redesign entire business operating models."

Best Practices for Building a Generative AI-Ready Organization

The technology leaders tasked with building the "AI-everywhere" future are plotting the way to an unknown destination, shaped by a technology that many leaders still do not fully understand. But there are practical steps CIOs and technology leaders can take today to build the digital foundation in preparation for this future, drawing on insights from leaders and experts already immersed in the world of gen AI.

Steer the conversation. Risks are high on the agenda for business leaders, and the CIO has an important role to play in helping the board and C-suite navigate them. "One of the things that good technology leaders can do is help people understand the risks and how they can work within them. What are the right guardrails to put in place, for example?" asks Westerman. "The other opportunity is to offer stories of what competitors are doing and even ideas for what might happen with gen AI. Be ready to talk about how to manage the risks and be ready to talk about interesting use cases."

Be a learning organization. Whether your organization is ready to move with gen AI or not, the CIO of the large Canadian bank advises adopting a learning posture. Regulatory constraints are slowing the pace of adoption in the financial services industry, but the bank is still running low-risk pilot projects. "If you just sit on the sidelines, you are going to waste

"Become a learning organization so that you are constantly developing your skill set. That doesn't mean you move things out of pilot into production before you get all the proper risk frameworks in place, but you are at least making sure your workforce is learning these tools," says the CIO of the large Canadian bank.

your time not learning something," says the CIO. "Become a learning organization so that you are constantly developing your skill set. That doesn't mean you move things out of pilot into production before you get all the proper risk frameworks in place, but you are at least making sure your workforce is learning these tools."

Filter and select the best use cases. Surfacing the best ideas and assessing their potential value in your organization is critical for managing limited resources. CNH Industrial has come up with a process for doing this. "We've really had to organize how we funnel concepts and ideas from the business into one list for us to explore. Otherwise, the business would be out there running 50 different experiments that are unstructured and without strong KPIs and objectives," says Kermisch. "We will have as many failures as successes with gen AI—and probably more failures than successes—and that's how you learn. But that can get very expensive if you don't provide some structure around it."

Create a portfolio of innovations. Another way to manage limited resources is to create a portfolio of innovation, says Hinchcliffe. "The reason many digital transformations of the past failed is because leaders made too many big bets and didn't create a portfolio of innovation. Many then learned that the bigger a transformation is, the more likely it is to fail, but then focused instead on a bunch of small transformations—none of which impressed or moved the needle. What you need is a portfolio approach with the right-size set of smaller transformations that are coherently linked to a large transformation, or 'moonshot.'"

> "Traditional companies are so sleepy and have no sense of urgency on the technology side, but the startups know that if what they are doing doesn't work, they'll be out of a job. There is an intensity that you cannot imagine. That's what's really lacking in many companies," says Hinchcliffe.

Leverage vendor partnerships. While organizations are still in the learning and experimentation phase, and the risks are still high, relying on vendor partners can help limit some of the downside, says Westerman. "Some of the risks will probably be avoided by letting your vendors implement gen AI in the tools you already have. Providers up and down the tech stack are incorporating it, so in many cases waiting for your vendors can be a good idea."

Avoid locking in. Cloud transformations of the past decade have also been instructive on how to move forward with gen AI, says Willetts. "We draw a lot of parallels to cloud implementation where people perhaps were quite misled by the hype and then realized it's very expensive. So, we see companies now being much more thoughtful about not being locked in with a particular vendor, keeping control of their own data, and having some control over what their gen AI model is doing. To succeed, companies need to be very smart buyers, which means educating themselves and tailoring whatever they get to their needs."

Conclusion

If 2023 was the year that gen AI captured the imagination of business leaders, 2024 is likely to be the year that many businesses start turning their gen AI dreams into reality. CIOs and technology leaders are being tasked with the difficult challenge of bridging the gap between what the business wants to do with gen AI and what it can practically achieve with its existing digital foundation.

Challenges relating to talent and cost are unlikely to go away anytime soon. In fact, the competition for AI talent and skills will only intensify as more companies start executing their AI strategies. And while the cost of innovating with gen AI is also unlikely to come down, the size of the investment needed may at least become clearer.

Despite these obstacles, technology leaders are being asked to act quickly. To do so successfully, they will need to take on a more strategic role within their organizations—highlighting risks and opportunities and offering practical solutions for the many challenges that lie ahead. They will also need to draw on all the lessons learned from the digital transformation work of the past few years, focusing not just on the technology aspects of major transformational change, but the cultural aspects too.

Doing nothing, in any case, is not an option. And here, companies can learn something from the intensity of startup businesses. "Traditional companies are so sleepy and have no sense of urgency on the technology side, but the startups know that if what they are doing doesn't work, they'll be out of a job," says Hinchcliffe. "There is an intensity that you cannot imagine. That's what's really lacking in many companies. And if the pace of change outside of your company is much faster than inside it, the truth is you probably aren't going to make it."

Endnotes

1   GenAI Implementation Market Outlook: Worldwide Core IT Spending for Gen AI Forecast, 2023-2027, International Data Corporation, October 2023.

2   *Gen AI: Artificial Intelligence and Future of Work*, International Monetary Fund, January 2024.

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