WHITE PAPER

How Platform Engineering Principles Can Elevate Developer Skills

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As software development becomes increasingly complex, the industry has responded by attempting to better support developers with simpler, more intuitive workflows. A key concept in this process is platform engineering.

Platform engineering involves building technology and team structures that empower developers and simplify their tool chains. One of its most valuable benefits is that it helps organizations to think differently about the structure of their software development teams and how they support each other. It is based around a concept called Team Topologies that configures and aligns teams for more efficient software delivery.

Andela, a global talent sourcing company, has a deep understanding of the Team Topologies framework which it uses to help source talent as part of a broader platform engineering initiative. It understands the technical requirements needed to support the different types of teams that are critical to the platform engineering approach, helping ensure they are ready to serve stream-aligned teams in their work.

This white paper explains how the principles underpinning Team Topologies can improve the sourcing of developer talent, and how this more efficient talent sourcing can enhance the platform engineering process itself.

Introduction

Platform engineering promises to help solve several problems facing software development teams. These include inadequate team structures. "Often what we would find [were] problems in terms of the way teams interacted or didn't interact, lack of clarity of what was the purpose of a team, and teams [that] were overloaded," explains Manual Pais, who co-founded the Team Topologies concept.

Another problem is tool sprawl, which was the top challenge for software developers in 2023, affecting 27.7 percent of them. A lack of standard tooling makes consistent coding practices difficult to enforce. Tools are often incompatible because no one is at the helm evaluating them in a broader context. This in turn can inhibit collaboration and knowledge sharing between developers.

The toil of using different tools can also hinder centralized control. It is difficult to ensure that all tools meet corporate security standards, making compliance more costly and difficult.

Cost management challenges extend to procurement and licensing. Who tracks and optimizes spending across numerous tools from various vendors when no one is in control of purchasing, for example?

Tool sprawl can kill developer productivity. Time spent configuring them detracts from coding, affecting both output and job satisfaction. Developers may also be less productive when having to constantly train on new sets of tools.

The challenges extend beyond tools management to talent management where organizations face ongoing obstacles in recruiting enough skilled software engineers to quickly build, test and distribute new applications and drive business expansion.

These include:

- **Skill shortages**:
  In-demand skills like AI/ML, cloud, and specialized languages are in short supply globally. "A typical AI project requires a highly-skilled team including a data scientist, data engineer, machine-learning engineer, product manager, and designer," states McKinsey in an analysis of the AI talent landscape. "There simply aren't enough skilled professionals available, even with the recent contraction across the technology industry." This makes scaling development teams problematic.

- **Time-to-fill roles:**
  Traditional hiring can be lengthy, taking months on average per role, according to several reports referenced by the BBC. This stems from several issues, including variations in regional regulations around recruitment, bureaucratic processes — especially in larger companies — and the use of multiple, structured interviews involving predefined, standardized questions to to find the right candidate during the recruitment process. All of these things slow product development and delay business initiatives.
- **Sourcing niche skills:**
  Less common and emerging skills needed for strategic projects, such as data science and advanced knowledge of algorithm optimization can be difficult to source through standard methods.
- **Flexible resourcing:**
  It can be challenging for companies to quickly adjust engineering headcount up or down based on shifting business needs, leading to high costs when permanent employees are 'benched' between projects.
- **Compliance overhead:**
  Managing a globally distributed workforce at scale often requires significant administrative overhead for tasks like onboarding and auditing.
- **Lack of expertise:**
  Companies may lack internal expertise in specialized domains like AI, requiring external hiring that takes even longer.

What is platform engineering?

Platform engineering helps solve some of the problems outlined in section two. In its Top Strategic Technology Trends 2024 report Gartner defines it as the discipline of building and operating internal self-service platforms that support their users by creating intuitive interfaces with complex sets of tools and processes. The research company identified multiple such platforms, each managed by a separate product team, that layer together to create a full-service stack.

Platform engineering can be especially useful to support software development, which has evolved over the last 20 years to become more strategic and complex. Pre-DevOps, infrastructure teams historically worked separately from developers, but in the 2010s they began collaborating more to improve automation and provide internal tools.

DevOps and cloud computing then spawned infrastructure as code, which closed the gap between developers and their resources by automating provisioning. This helped developers take on more responsibility for running what they built.

However, innovation has a way of creating more complexity. While cloud-enabled DevOps abstracted infrastructure management into code, the complexity of the tools increased. Configuring and using them took up more developer time. Platform engineering can address that problem by making these tool sets more digestible. It refines them into a strictly managed set of technology assets that serve the developer, enhanced by educational and support services.

The approach demands that organizations manage these assets and the development processes they support properly. It recasts them as integrated products, delivered via APIs or self-service portals, aligned to business outcomes.

Gartner describes platform engineering as a combination of components and teams. At the bottom of the stack sits the complex infrastructure that developers traditionally provisioned themselves via infrastructure-as-code practices. In the middle sits a set of platforms that translate that infrastructure into more digestible services and build the appropriate workflows and disciplines around it. Those platforms can provide a range of assets:

- **Reusable software components:**
  These could include microservices to handle common tasks such as currency conversions or job scheduling.
- **Software tools:**
  Integrated development environments, testing suites, and static analysis tools.
- **Platform services:**
  This could include services typically provided in a PaaS

environment, ranging from databases through to machine learning APIs.

- **Knowledge:**
  One of the most valuable services of all is also one of the most overlooked. Collecting implicit and explicit knowledge in easily parseable ways is a highly valuable platform opportunity.

Each platform contains its own team that develops, manages, and continually improves the platform to increase its value to developers. For example, a knowledge team might experiment with semantic indexing and large language models to create a more intuitive, powerful option for developers, elevating it far beyond a traditional knowledge base and directly integrating code suggestions into developer tool sets.

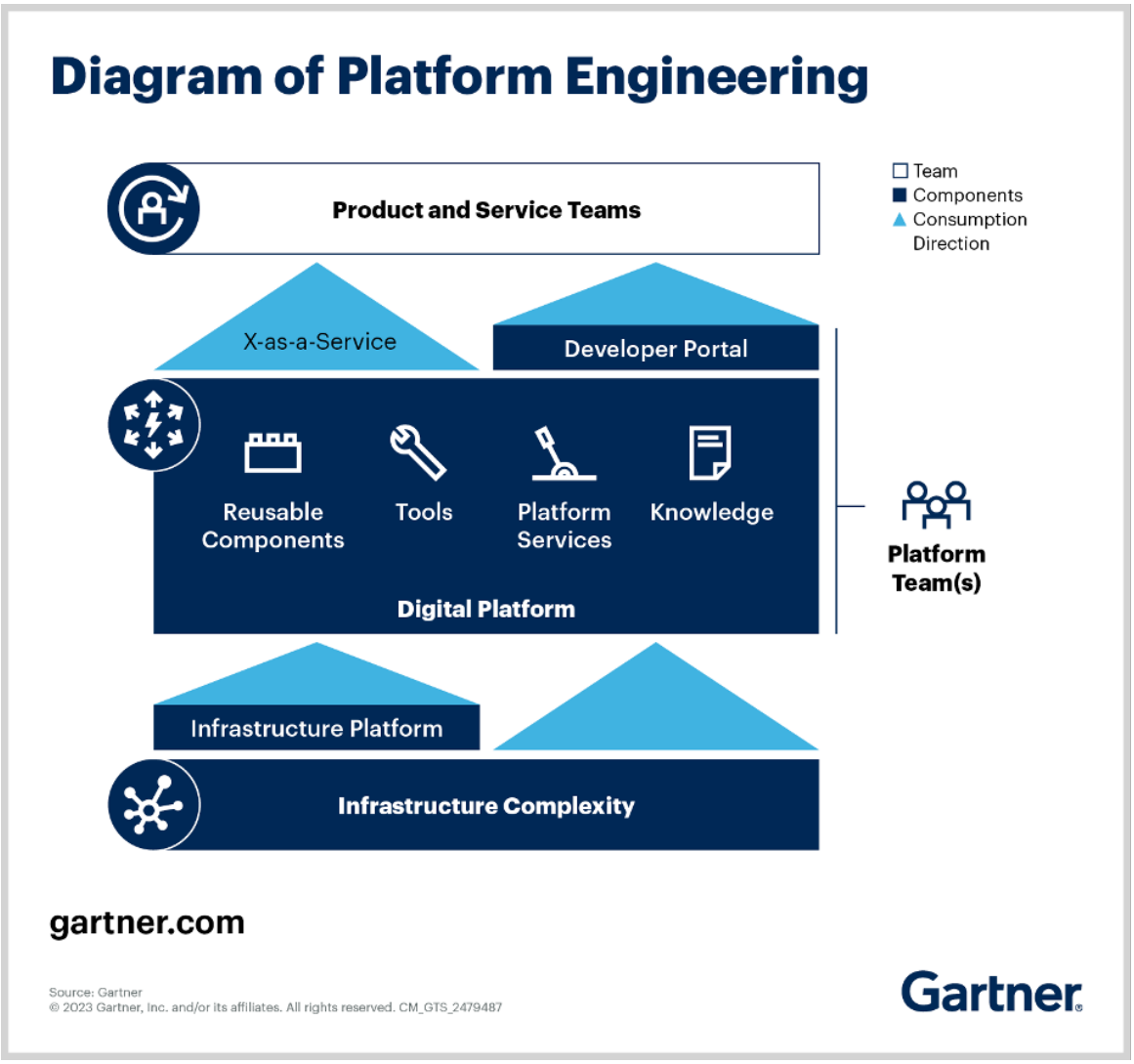
Under the Gartner model, all of these platforms can then be made available to the product and service teams at the top of the stack via external Anything-as-a-Service (XaaS) tools which can be quickly scaled up or down to meet requirements on a pay as you go basis, and/or internal developer portals which provide central repositories of available components and services within individual organizations.

How to get started in platform engineering

Effective platform engineering involves the following steps:

Start with culture, not technology

The first step does not start with technology choices.



Technology tools can easily join a pile of unused products that are difficult to implement. Instead, the first consideration should be cultural. One common reason that developers drown in tools and services is an organization's own culture. Consider Conway's law, created by computer scientist Melvin Conway: "Any organization that designs a system (defined broadly) will produce a design whose structure is a copy of the organization's communication structure." This creates problems when communications are siloed and disjointed, because software development tool sets and other services can become the same.

Poor support for software engineers can also stem from historical misconceptions. In its discussion of how software excellence fuels business performance, McKinsey argues that while some forward-thinking companies now see software development — and therefore developers — as a foundational and strategically important part of the business, others have yet to make that leap. They haven't unleashed the power of software development to unlock their value. McKinsey gives examples of development empowerment in finance and retail industry verticals where technology innovation and disruption have taken hold, but warns that the majority of businesses still see software development spending as a "black box."

Human misconceptions like these make platform engineering, at least initially, a people problem. Which means that organizations should concentrate on building a culture that includes open communication and collaboration, both between team members and the end users they serve.

Structure before you build

Effective culture often relies on thoughtful organizational structure. Examine your existing structure, watching in particular for siloed departments that labor in isolation from each other, with team leaders reporting to different line-of-business managers. Check to see how well incentives for each team align with business goals.

Plan a transition to an organizational structure where software teams are integrated and business goals more aligned. Integration can create opportunities to simplify and deduplicate previously disjointed workflows. This is also the time to examine team composition and individual roles, then introduce new collaborative processes as appropriate. Not all teams in a platform engineering environment will be the same. They must be layered, working together to cover all of the software developers' needs.

Platform engineering: A natural discipline for hiring developers

Platform engineering is designed to streamline and normalize more than just developers' software tools. It can also embrace other critical disciplines affecting software development, especially talent management.

Software teams have traditionally struggled to find the talent they need. Academics at Stanford were sounding the alarm about this as early as 1997. Almost three decades later, companies are still struggling to fill software developer seats in a sector that innovates at a rapid pace, with the Bureau of Labor Statistics reporting 500,000 unfilled job openings for developers in the UK in 2016. The problem isn't going away, with the Bureau of Labor Statistics predicting an average of 153,900 open software development jobs per year between 2022 and 2032 arising from the need to replace workers who transfer to different occupations, retire or exit the labor force for other reasons.

As those teams increase their development cadence thanks to initiatives like agile development, microservices, and DevOps, they need to pivot and find the appropriate technical skills more quickly than ever before.

Platform engineering's structural principles enable software development teams to understand the skills that they need. They can use the same ideas that underpin Team Topologies to strategically assign skills and resources to projects based on their business goals.

The Team Topologies framework, created by Matthew Skelton and Manual Pais, is an organizational structure that focuses on achieving common goals in software design. It advocates for four teams that work in unison:

Stream-Aligned Team

These are the developer teams that all other teams support. A single stream-aligned team has end-to-end responsibility for an entire project from concept to retirement, such as an e-commerce, as per the AP style guide site or a microservices-based AI recommendation system. Its members work shoulder-to-shoulder from business concept to implementation and beyond, always focused on the business's ultimate objectives. Tool procurement and configuration should not get in their way.

Enabling Team

These teams manage the underlying tasks that enable the stream-aligned teams to concentrate on their work. If a stream-aligned team needs a developer collaboration process or a specialized knowledge base, an enabling team would make it happen.

A single enabling team might support multiple stream-aligned teams as internal customers, not just by marshaling underlying platform tools but by educating the stream-aligned teams in their use. These teams are critical in removing technology barriers for stream-aligned teams through problem solving and process automation.

Complicated Subsystem Team

This team also supports the stream-aligned team by focusing on more complex, specialized subsystems where necessary. These will often be forms of proprietary IP requiring deeper expertise, such as writing a custom media codec or codifying a complex quantitative trading algorithm.

Platform Team

The platform team builds and maintains the underlying infrastructure platform that enables the other teams to deliver value. These include reusable components. This team also has a governance role, creating and maintaining standard coding and architectural practices.

Curate and build internal platforms

With these team structures in place, it's time for the supporting teams to build platforms for the stream-aligned teams. Treat each of these platforms as a product in its own right, complete with accountable service providers and service level agreements for internal customers. The platform includes not just the technology component but also processes for educating and supporting stream-aligned teams in their use.

Consultation with stream-aligned teams is crucial when building these platforms. Robust requirements gathering will help platform engineering teams to build products that support stream-aligned teams' needs.

Connecting with Andela

Platform engineering's Team Topologies approach is a powerful way to address the shortage of appropriate software development skills. As outlined by Skelton and Pais in their book Organization Dynamics with Team Topologies, companies can use these topologies to reduce a team's overall cognitive load, making each team member more productive. They can deconstruct large teams that do not communicate efficiently into smaller teams that support more effective communication.

Andela's expertise in Team Topologies positions it perfectly to source talent to enhance platform engineering environments, fitting individuals to specific tasks.

When a company needs a certain skill, Andela works to quickly match them with a qualified technologist from its global talent marketplace. Companies can then manage the hiring process, onboarding, and ongoing work through Andela's proprietary platform.

Andela aims to reduce the time to fill roles compared to traditional recruitment while enabling companies to scale teams up or down as needed. The platform can help address skill shortages by providing a structured way for companies to access specialized talent.

Aligning with platform engineering

Working with a third party to secure the right person to work with a platform engineering initiative can deliver several benefits:

- **Flexibility:**
  Companies can avoid the fixed costs of permanently employing specialists, instead paying only for the engineers and skills they need for as long as they need them. Andela's adaptive hiring approach can serve clients with both long engagements and short, onboarding and off-boarding as needed.
- **Specialization:**
  Andela's extensive marketplace provides fast access to niche skills, which can speed up recruitment in difficult-to-staff disciplines. This is especially useful for complex subsystem teams.
- **Cost management:**
  Andela can save companies money compared to traditional sourcing methods like agencies by sourcing talent 70 percent faster at between 30-50 percent less cost.
- **Faster time to value:**
  Andela has honed its online platform to streamline administrative processes related to hiring, onboarding, and ongoing contractor project management. It can provide the first relevant candidate in as little as 10 seconds compared to an average of 72 hours for more traditional hiring, for example. This gets enabling teams access to skills more quickly, which can lead in turn to faster product launches and earlier revenue generation.
- **Accurate skills matching:**
  The AI-driven talent matching algorithms embedded in the Andela platform aim to match candidates' skills to companies' objectives for talent placements with a high success rate.

Andela understands the technical requirements needed to support the different types of teams which are critical to the platform engineering approach, helping ensure they are ready to serve stream-aligned teams in their work.

Advocating for platform engineering

As with many foundational changes to software development practice, some skepticism and pushback is common in platform engineering projects. Companies can mitigate this by courting stakeholder support. Here are a couple of techniques:

- **Education:**
  Teach the underlying principles of platform engineering. An education program would typically rely on workshops and training sessions, which are on offer from the original creators of the Team Topologies concept.
- **Identifying benefits:**
  Identify tangible benefits to developers and other stakeholders such as the business functions they serve. For example, platform engineering helps developers avoid mundane configuration work and focus on creative outcomes, while business managers get software deliverables more quickly. More consistent, universal software development practices prevent compliance creep, satisfying legal and compliance executives.

Solving the AI skills challenge

Organizations are struggling to find skills in particular areas, including AI, where demand is skyrocketing. AI skills are the most in-demand skills in the UK job market, with 40 percent of 500 businesses singling them out according to recent reports.

Andela looks well-positioned to help source the necessary skills for AI design and development through its global talent marketplace. Its recruiting experts have deep experience identifying and assessing AI engineers with skills in areas like machine learning, deep learning, computer vision, and natural language processing, for example. Andela elevated its assessment capabilities in March 2023 with the acquisition

of Qualified, the leading technical skills assessment platform.

These skills are sourced from a large talent pool of professionals that Andela has built up over a decade of connecting organizations to borderless, global digital talent. Beyond providing technical talent, the company's managed solutions operation can serve more complex AI consulting projects and provide the expertise to help guide the entire development process through a team of experienced, advanced engineers.

Elevating talent acquisition with managed projects

Andela goes beyond talent sourcing with its managed projects offering, which provides a comprehensive consulting solution for clients' software and AI projects. As part of this service, the company works closely with clients to understand their goals and technical challenges. Then, it quickly assembles the right multidisciplinary team from its global talent marketplace to implement the solution. Andela's project managers take responsibility for the full delivery of a managed project, allowing clients to focus their resources elsewhere.

Managed projects help clients solve complex problems they may not have the internal capacity for, accelerating their initiatives without the need for lengthy procurement processes. It reduces risks for clients by having Andela take responsibility for on-time, on-budget delivery through experienced project management.

Conclusion

As technology innovation becomes more of a strategic imperative, many companies are placing software developers at the center of the picture rather than viewing them simply as a means of business support. To do so, they must treat developers as internal customers, empowering them through better-managed workflows and tool sets. This is where platform engineering can help by involving not just the connection of technologies into intuitive tool chains for developers, but also demanding a new, more open culture.

This culture in turn relies upon an organizational structure with more breadth and depth; breadth in terms of integrated teams and more joined-up developer collaboration across the enterprise, and depth in terms of a rich, layered set of

Demand for software expertise, 2022-2032

Job	2022 employment	2032 employment (projected)	Growth
Information security analysts	168,900	222,200	32%
Software developers	1,594,500	2,004,900	26%
Computer and information research scientists	36,500	44,800	23%
QA analysts and testers	200,800	241,600	20%

Source: U.S. Bureau of Labor Statistics, "Occupational Outlook Handbook", September 6 2023

Software development is a growth area in the U.S. and further afield. The U.S. Bureau of Labor Statistics' 26 percent projected growth rate for software developers between 2022-2032 far outpaces the 14 percent growth rate for all computer occupations and greatly exceeds the projected three percent growth rate for all occupations across the economy.

The pace of technology development drives a rapid growth in demand across all software development categories. Companies need expert help sourcing talent in areas ranging from mobile app development to legacy system modernization and API design, along with software quality assurance.

support teams to manage underlying complexities all the way down the stack.

Companies are under greater pressure to source appropriate software engineering talent from an increasingly competitive market. The accelerated cadence of innovation also demands more agility in that talent sourcing, because the technology skills that a company needs next quarter might be different from those it needs today.

IT leaders can enhance their talent sourcing by viewing their team structure and workflow through the lens of platform engineering and Team Topologies. This enables them to precisely define the workflows and skills they need and then place them appropriately in the organization to maximum effect.

Andela's ability to scale up in complexity from sourcing individual skills to supporting a more strategic Team Topologies framework allows it to accompany and guide clients as they factor talent provisioning into their platform engineering journey.

If companies find that they need to source some of those skills externally, then Andela is waiting with a wealth of industry expertise.

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ABOUT ANDELA

Andela is a global private digital talent marketplace that employs an adaptive hiring model to help companies rewrite their workforce strategies to include borderless, remote-fluent teams. This approach provides greater flexibility to quickly deploy skilled digital talent based on need.

Andela's adaptive talent marketplace can be accessed through Andela Talent Cloud, a unified platform that uses AI-matching algorithms to pair ideal digital talent to client specific roles and skills. Clients can select for individual roles or engage fully managed teams up to 70% faster at 30-50% less cost than traditional approaches. Andela provides full-service, premium support teams that manage all the groundwork associated with borderless hiring, from compliance and payroll, to talent management.

Andela's diverse talent ecosystem spans more than 135 countries, with 60% residing in regions like Africa and Latin America, offering improved time-zone overlap. The digital talent in the marketplace are highly skilled in advanced and in-demand technologies such as Application Engineering, Artificial Intelligence, Generative AI, Cloud, Data & Advanced Analytics, and Product & Design, which are key to driving digital transformation initiatives forward for global organizations. The Andela Learning Community provides technical training and upskilling programs to ensure continuous skill development.

The world's best brands trust Andela, including GitHub, Mastercard Foundry, and Mindshare. Discover more about Andela here.