# Cloud-native composable banking: a guide for courageous leaders

How banks can innovate
with speed and stability

/thoughtworks

# Executive summary

**"Banking is necessary; banks are not"**
**Bill Gates**

Fintechs and challenger banks have emerged to meet growing consumer demands for digital products and services that eliminate the friction associated with traditional banking. They operate more like tech companies than financial institutions, with a single-minded focus on continuously delivering customer value.

As younger generations raised on frictionless digital experiences begin to dominate banks' customer bases, incumbents must focus on their core differentiation to maintain their competitive advantage.

In this new world, banking will become composable, assembling best-of-breed technology, people and processes from loosely coupled capability blocks sourced from vendors or built in house. This will enable on-demand computing, automation, unlimited scaling, lower costs and greater resilience.

Furthermore, successful banks will rely on the public cloud to provide the undifferentiated heavy lifting of infrastructure and commoditized services. They'll focus their efforts on building differentiated capabilities that deliver customer value with speed and stability. And they'll participate in financial services ecosystems that offer new routes to market and additional revenue streams.

This guide brings together the combined experience of Thoughtworks and Amazon Web Services (AWS) to explore what cloud-native composable banking is, why it's so essential and the strategic and practical considerations for becoming a composable business.

# The future of banking is already happening

Anyone who's worked in the financial services sector over the last decade has seen the relentless shift from physical to digital banking. While the pandemic accelerated this change by forcing customers to move away from in-branch banking and cash payments, the transformation of banking was already well underway. In the UK alone, branch numbers fell by 34% between 2012 and 2021 and cash use declined from 45% to just 17% of payments between 2015 and 2020[1].

While we may never see a totally cashless and branchless banking system, the direction of travel is clear. Customers in all demographics want the convenience and simplicity of digital experiences. Many banks also have initiatives to actively encourage more customers to move to digital. Barclays' Digital Wings programme, for example, combines expert support, online courses and community volunteers to help more of its customers use digital banking[2].

However, it's the demands of younger generations that will define the future of banking. Millennial and Gen Z customers don't want to spend time engaging with financial services providers; they simply want digital access to innovative financial products and services — without any friction.

So, they prefer to use fintechs and challenger banks that offer the frictionless, personalized experiences they're looking for. Unconstrained by legacy technology and business models, these new competitors can respond quickly to emerging customer demands. They're building their brands — and their market share — through a relentless focus on delivering customer value.

**Composability enables resilience and growth**

In response, financial institutions have implemented digital banking initiatives such as mobile apps and virtual assistants that help customers manage their finances more easily.
But these initiatives are often hampered by traditional backend technological approaches that can't support the continuous delivery of innovative experiences.

To stay competitive, incumbents must adopt more flexible approaches that will help them create innovative products and experiences more quickly. With feedback, early and often, they should be able to pivot quickly to optimize their products. They must also participate in ecosystems with competitors and fintechs that enable 'coopetition' and accelerate innovation.

One of the most powerful ways traditional banks can meet these demands is by adopting cloud-native composable banking.
It's an approach that's enabled the rapid growth of many challenger banks and fintechs and in this guide we'll explore:

- What composable banking is and why it matters
- Why cloud-native and composable approaches complement each other
- Strategic considerations for cloud-native composability
- What composable banking looks like in practice and how to get started
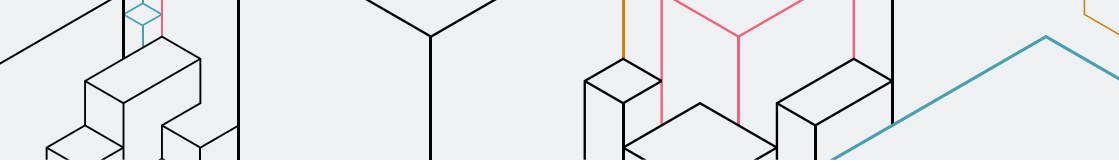
# What is cloud-native composable banking?

Composability allows financial institutions to redesign banking at speed. By using a platform to assemble modular, decoupled business capabilities — either custom-built or already available as SaaS or software products — banks can consume best-in-class capabilities through open and secure APIs.

This approach enables institutions to quickly 'compose' a new banking application by assembling existing capabilities, allowing them to rapidly launch innovative products and services.

Reducing time to market by combining bespoke and commodity services helps banks keep up with emerging customer demands. But perhaps even more importantly, it enables banks to focus on customer value and continuously deliver it.

And banking on a public cloud makes sense for several reasons. Banking is cyclical and seasonal with demand peaking at specific times. On premises, banks overprovision infrastructure to meet these peaks. This increases costs and wastage. On a public cloud, they can scale economically to accommodate peaks.

Public cloud relieves banks from the burden of building and managing data centers, enabling them to focus on delivering customer value. Cloud providers also offer services for management, monitoring and control of custom systems and applications.

The shared responsibility model ensures that the cloud infrastructure and platform are secure and compliant. This means that banking systems on public cloud will always be at least as secure and compliant as on-premises systems, if not more.

**Composable banks innovate faster**

Composability eliminates the wasted time and effort of developing commoditized, undifferentiated technology and business capabilities. For example, if a bank wants to launch an innovative payments scheme, it can get the ledger with deposit and withdrawal capabilities off the shelf and focus on building the payments capability.

There's no need for lengthy re-engineering projects; by combining existing and new capabilities through APIs in the cloud, banks can dramatically reduce time-to-market. A composable architecture also offers extensibility and reversibility, so banks can scale successful products and services at speed and easily remove, replace, or pivot less successful capabilities.

Mambu and Thoughtworks helped Bluestone, an Australian non-bank lender, transition their business from a mainframe to a distributed cloud-native composable architecture in just seven months. The first loan was settled within 11 days and the lending teams and brokers realized the improved value of the new platform, saving over 11 person hours per day across an average of 30 loan applications per day[3].

The public cloud offers many best-in-class services that remove the undifferentiated heavy lifting that slows transformation and innovation.

Banks can refocus in-house IT skills on what matters most — offering customers the best products, services and experiences.

**Faster time-to-value**

**Composability and cloud-nativity complement each other**

**Customer centric IT**

**Composable architecture**

**Elastic scalability**

Successful cloud-native architectures are based on modular, decoupled services aligned around business domains, with open and secure APIs to support composability.

Banks gain the scalability and resilience to cost-effectively handle monthly demand cycles and seasonal peaks without building or managing the infrastructure themselves — all while providing a consistent customer experience.

# Composable banking in practice: strategic considerations

It's important to remember that composability is not the same as modularity.

Many banks have recognized the value of investing in SaaS offerings and microservices and as a consequence, they've introduced modularity into their technology architectures. But without an overarching design, this modularity has often led to more complexity in operating and managing the technology stack.

In composable banking, deliberate modularity is accompanied by decoupling, where loosely coupled business capabilities are consumed through APIs. This combination of modularity and decoupling by design — not by accident — enables banks to compose new products and services at speed.

When full-service non-bank lender Bluestone was building a new digital lending platform, it intentionally combined modularity and decoupling to create an exceptionally efficient, fast and flexible foundation for its services. Working in partnership with Thoughtworks and AWS, Bluestone composed its platform from numerous new bespoke business capabilities, including an innovative solution that took the place of a CRM.

The solution enables Bluestone to plug in an external app to manage customer service activities with guided workflows. The app sits in AWS and uses a series of API calls to trigger activities in the core platform — giving Bluestone full control of its processes and accelerating journeys for its customers.

Composable banking is a deliberate, proactive strategy that breaks the business down into its constituent capabilities to offer capability 'blocks' to the rest of the enterprise as a service.

This enables banks to manage each composable block independently. Every capability block can bring in best-of-breed technology, develop reusable and repeatable processes and hire or train the best people for that specific capability, who then own and drive it autonomously.

For example, a financial crime and risk capability can be built, run and owned by financial crime and risk experts using the most appropriate solutions and then consumed by the rest of the business as a service. This leads to true autonomy, scalability and the ability to prioritize and invest in the right people, process and technology (PPT), depending on the bank's business strategy and goals.

Partition the business into small, independent domains of capability — loosely coupled, but with high cohesion.

Keep partitioned domains independent from each other by minimizing dependencies and enabling individual decision-making.

**Modularity and decoupling**

**Autonomy**

**The four principles of composability**

**Orchestration**

**Discoverability**

Prescribe and negotiate interactions between components to enable recomposition and construction of processes.

Ensure the ability to discover and understand design opportunities and components, so banks can guide, track and secure change while evolving components and composite systems.

N26's[4] cloud-native transformation is a classic example of adopting these four principles. They organized themselves into 15 cross-functional domain-aligned teams that owned between them over 60 microservices sliced from their legacy monolith. These teams have the autonomy to use the necessary tools and processes to achieve their outcomes. Their tech stack, though lean, contains the necessary tools to facilitate orchestration and discovery of containerized services.

**Why see capabilities this way?**

The value of building a bank as composable capability blocks goes beyond the initial benefits of agility and efficiency. Banks gain this agility and efficiency because they're no longer building the same capability (such as money transfer) in each business line (such as loans, payments, or mortgages). Instead, banks build the capability once and offer it throughout the business, removing the time, cost and duplicated effort of constantly redeveloping it.

The technology entanglement in monolithic systems creates dependencies between multiple teams and projects, so conflicting priorities hinder teams' agility. Due to the potential impact of changes, lengthy regression testing is also needed to ensure the latest changes haven't broken anything else.

In a composable system, autonomous blocks have high locality and high cohesion. The features of each capability are closely related and banks maintain a single backlog where true prioritization can take place, removing conflicts with non-related projects and reducing testing cycles. This composability allows banks to orchestrate between best-of-breed technology, people and processes in decoupled capability blocks.

**Drive growth through differentiated capabilities**

Composable banking allows banks to use Banking as a Platform (BaaP) services, so they can stop investing disproportionately in technology for undifferentiated business capabilities. In the BaaP model, banks can take advantage of commoditized capabilities built by technology companies (that don't have a banking license themselves) and focus their efforts on developing differentiated capabilities.

Composability also enables financial institutions to enter the lucrative world of Banking as a Service (BaaS). The capability blocks initially offered within the bank can be sold externally. Other financial institutions can use these capabilities to augment their own services and non-banking businesses can use BaaS to offer relevant financial products to their customers without needing a banking license.
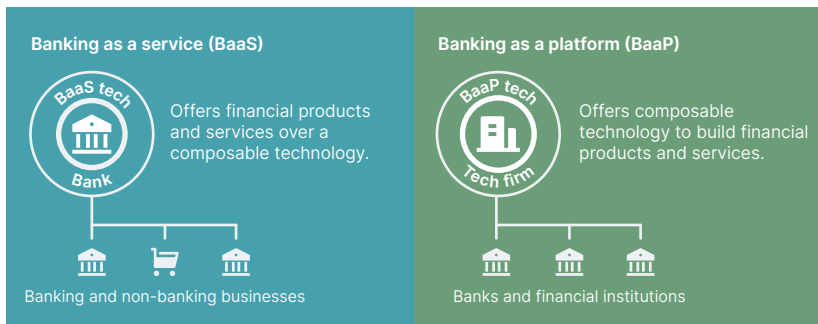


Many other businesses will be happy to use robust, fast, best-of-breed services developed by banks for onboarding customers, conducting know your customer (KYC) and anti-money laundering (AML) processes, or orchestrating peer-to-peer payments, for example. It's a significant revenue opportunity; the BaaS market is expected to grow to almost $75 billion by 2030[5].
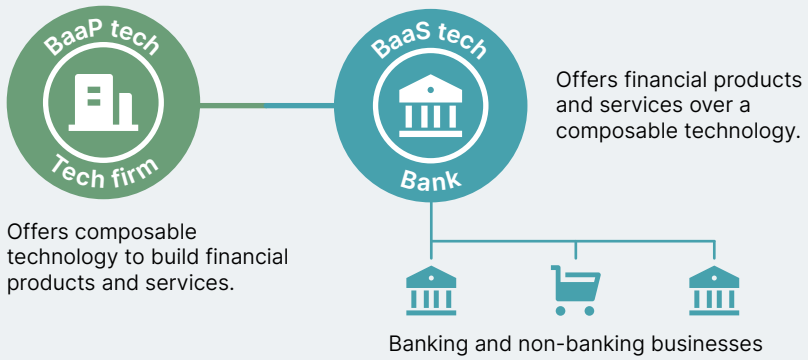
The BaaS opportunity unlocks new revenue streams in a similar way to Amazon's expansion into providing technology infrastructure and services. Amazon took a traditional cost center — its internal technology capabilities — and turned it into an important revenue generator by selling those capabilities as AWS.

The Chinese tech giant Alibaba has had similar success, packaging its proven ecommerce best practices for customer acquisition, relationship management and order fulfillment into a business platform sold as Alibaba Zhong Tai. The Zhong Tai approach is now widely used by Chinese technology companies, which involves delivering encapsulated business models with the ability to plug in customizations. This enables small businesses to deliver high-quality services without the infrastructure costs and allows existing organizations to bring innovative services to market at speed.

In the financial services world, Starling Bank in the UK is taking a lead with BaaS by offering its Engine platform to enable other institutions to reduce time-to-market for innovative services of their own. For example, Standard Chartered used Engine to launch a new platform for investment in sustainability projects[6].

HSBC now offers its foreign exchange (FX) capabilities through Finastra's  banking capabilities marketplace platform, FusionFabric, as BaaS, allowing mid-tier banks to offer new FX services to their customers. As a result, smaller banks can now use HSBC's liquidity and risk management capabilities without any additional technology integration[7].

There's a clear opportunity for banks to use BaaP to run their business more efficiently and cost-effectively while also acting as BaaS providers to open new sources of revenue. HSBC's use of Finestra's FusionFabric platform is a demonstration of the same.



**BaaP tech**

**Tech firm**

Offers composable technology to build financial products and services.

**BaaS tech**

**Bank**

Offers financial products and services over a composable technology.

Banking and non-banking businesses

# How to apply cloud-native composable banking: practical considerations

Not all composable businesses look the same. The size and number of capability blocks will vary, but to realize the benefits of composability, banks must start by designing their operating model from a capability focus.

Once a bank has defined its existing and target capability models, it can identify the organization's capabilities and how it wants them to operate. The bank can then define its composable blocks, grouping or splitting apart the capabilities based on several factors:

**Functional grouping**

- Action: Bring together closely related functionality.
- Benefit: Enable high levels of granularity and cohesion between capability blocks without introducing complexity.
- Questions to ask:
  - Is this function a step in the process of a wider capability?
  - Is it only used in this capability?
  - Does it require autonomy and independence to scale?
  - How will we implement a domain-oriented architecture?

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### Localizing change

- Action: Bring together capability block components that have the same rate of change.
- Benefit: Enable true prioritization and avoid conflicts between fast, continuous innovation and components with more rigid release schedules.
- Questions to ask:
  - How often will we want to deploy changes to this block?
  - How can we achieve maximum automation in deployment?
  - Are the change backlog items naturally progressive or overlapping?
  - Is there a specific team that will use this capability?

### Target operating model

- Action: Ensure the composable blocks resemble the operating model of the business.
- Benefit: Everyone in the business can autonomously use and own the capability in the block they control, without conflict.

- Questions to ask:
  - Is there a specific team that will use this capability?
  - What are our feature teams? Have we aligned our cross-functional teams to the domains they are most expert in?
  - Does it make sense to have this block used and managed by more than one feature team?

### Decoupling and reusability

- Action: Decouple blocks to make them reusable by others in a consistent way.
- Benefit: Each domain can focus on its own capability and make use of other domains where needed, avoiding unnecessary duplication of capabilities.
- Questions to ask:
  - Is this capability being duplicated anywhere?
  - Will having this functionality under its own block mean we don't have to rebuild it in multiple places?

### Identifying dependencies

- Action: Provide well-defined contracts for each block to ensure interoperability.
- Benefit: Capability blocks work together seamlessly making them more consumable and composable.

- Questions to ask:
  - Is there another block that can provide the functionality we need here?
  - If no other block exists, should it exist?
  - Do the contracts between blocks make them easier to assemble and consume?
  - Are we using open and secure APIs to increase

When composability is properly designed, each capability block can make 'buy or build' decisions based on its own requirements. Or, more accurately, each block can decide how much to buy and how much to build, as there's almost always an element of each needed to achieve the right functionality. The key to a composable approach is to buy the undifferentiated heavy lifting and build the differentiated innovation (or buy it to get to market quickly and augment it later).

Last but not least, standardization greatly facilitates composability. This helps build a shared understanding of what these capabilities are and the APIs for their consumption. One such standardization is provided by BIAN[8], the Banking Industry Architecture Network. BIAN is an independent association to promote a common architectural framework to enable banking interoperability. BIAN standards range from the definition of banking domain data types all the way to service and API definitions. Aligning capabilities and API definition to BIAN definitions can greatly enhance composability.

**Navigating the transformation challenge**

Transforming a traditional bank into a composable business is a major modernization challenge. So, rather than modernize legacy banking systems and operating models, many incumbents have launched independent digital banking units, starting with a blank sheet of paper from a technology and business perspective.

The idea is to have the agility of a challenger with the market footprint and customer base of an incumbent (NatWest's Mettle and JP Morgan's Chase UK are good examples). But will running a 'two-speed bank' be feasible in the digital-first future as the legacy bank sees fewer customers and becomes disproportionately expensive to operate?

If a bank has established a <u>digital twin</u>, the best path forward is to gradually transfer the parent business across and eventually decommission the existing monolithic architecture, using the strangler pattern approach to reduce risk[9].

A good example of this approach is HSBC's Kinetic, which converges its business banking services with an app, offering small businesses the plug-and-play simplicity of a fintech with the market-leading capabilities of a large bank[10].

If a bank has taken the courageous step of embarking on modernization programs to transform a legacy institution into a digital native, it can incrementally strangle business capabilities from the monolith into new composable capabilities. The bank can decide which capabilities to strangle across, which to buy off the shelf and which to retire, using API gateways and service meshes to provide interoperability between composable capabilities and the legacy technology estate.

**Modernizing to enable effective, continuous change delivery**

The scale and complexity of modernization programs are immense. To deliver change at speed while maintaining stability, banks need to combine technology, in the form of a delivery infrastructure, with an operating model that gives autonomous delivery teams lightweight guidance and governance.

A delivery infrastructure automates end-to-end provisioning and structuring of environments, followed by building, testing, delivering and deploying systems. This automation ensures consistency and efficiency as you migrate, transform and procure system components.

Banks can also embed relevant access and compliance controls in various stages of the delivery pipeline and in the operational infrastructure. Achieving 'compliance as code' in this way further enhances the efficiency, effectiveness and consistency of change approval processes.
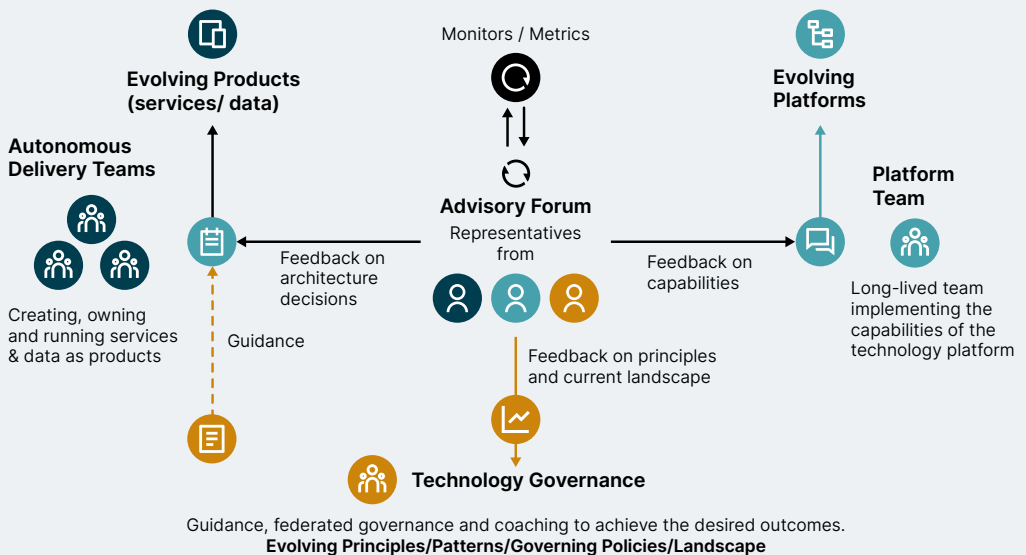
With multiple cross-functional, autonomous teams delivering modernization programs, it's important to provide guardrails to maintain alignment and avoid divergence. Otherwise, modernization programs can see escalating complexity and technical debt, which add costs and risks.

Banks can enable this alignment with a technology governance and guidance function that provides principles, patterns, policies and standards for teams to adopt and remain aligned and converged.

**Managing modernization scale and complexity**

- **Delivery infrastructure** to enable automation for increased efficiency and consistency
- **Access and compliance controls** for security and regulatory compliance
- **Cross-functional, autonomous teams** to enable rapid innovation
- **Guardrails** to ensure alignment between teams and avoid technical debt

However, if banks approach technology governance with a unidirectional, top-down focus, they may struggle to get teams to adopt the recommendations. Effective guidance and governance needs federation, which requires feedback loops, as shown in the operating model below.

Monitors / Metrics

**Evolving Products (services/ data)**

**Evolving Platforms**

**Autonomous Delivery Teams**

**Platform Team**

Creating, owning and running services & data as products

**Advisory Forum**
Representatives from

Feedback on architecture decisions

Feedback on capabilities

Guidance

Long-lived team implementing the capabilities of the technology platform

Feedback on principles and current landscape

**Technology Governance**

Guidance, federated governance and coaching to achieve the desired outcomes.
**Evolving Principles/Patterns/Governing Policies/Landscape**

In this model, team representatives regularly meet with the guidance and governance function to share their experiences and get feedback on their architectural and technology decisions.

This is also an opportunity to provide feedback to the guidance and governance function and assess the effectiveness and relevance of the principles, patterns, policies and standards.

Finally, banks' delivery and operational metrics should make guidance and governance more objective and lightweight. The best approach is to collect a few meaningful metrics frequently, with as little management overhead as possible and make them transparent across the organization.

# Innovate banking with speed and stability

In the new world of digital-first, hypercompetitive banking, speed to market is critical. But many incumbent banks will need help from their technology partners to transform monolithic technology into modular, decoupled and composable capabilities.

By combining our expertise, experience and technologies, Thoughtworks and AWS help banks realize the potential of cloud-native composability. Thoughtworks has an established track record of building domain-driven, evolutionary architectures that are the foundation for composable businesses. We work alongside AWS to use its market-leading cloud platform, and draw on its extensive ecosystem of technology partners to help banks accelerate innovation while maintaining stability.

**Start your journey to cloud-native composable banking**

To understand how composable banking could speed up your transformation journey, get in touch with one of our experts at partnerships@thoughtworks.com

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# Appendix

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