The Future is Composable:

How APIs, Microservices and Events are
reshaping the next-gen Enterprises

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Introduction

2020 was a year of massive disruption for businesses and individuals everywhere. The world has changed forever; business processes and customer touch points, embedded in organisations for decades, are being swept away by online and app-based companies – powered by Cloud, APIs, data analytics, mobile devices and social media.

Some of the key requirements for this new era are resilience, flexibility and agility.

To keep pace with technological innovation, organisations are rethinking their architecture strategies and taking a more modular approach, maximising their ability to build, assemble and reassemble core business elements to rapidly seize market opportunities and respond to disruptors and threats, while maintaining resilience. To do this, organisations must understand the concept of and reinvent themselves as Composable Enterprises.

In this paper we'll show how a Composable Enterprise architecture embraces and compliments API use, and through the assembly and mixing of Packaged Business Capabilities, delivers the required business outcomes.

Start your journey, it's time to compose the future!

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Summary

What is Composable Enterprise?

According to Gartner, a Composable Enterprise is:

"An organization that delivers business outcomes and adapts to the pace of business change. It does this through the assembly and combination of packaged business capabilities (PBCs). PBCs are application building blocks that have been purchased or developed." - Gartner: [Future of Applications: Delivering the Composable Enterprise](#)

With many organisations struggling to fully embrace digital transformation, a Composable Enterprise framework could be their route to success. But what is it?

Composable Enterprise means using interchangeable building blocks - software - to create, innovate and adapt business operations, enabling them to respond to external (or internal) factors. Put simply, it gives businesses the agility to evolve and grow.

Constructing a Composable Enterprise architecture requires in-depth collaboration between stakeholders, particularly as it blurs the boundaries between business and IT, enabling organisations to give their customers more unique and customised application experiences.

Gartner says the **4 principles of composable business** are:

- **Faster pace of change:** in order to respond to the fast pace of business change, organisations need to innovate and adapt quickly.

- **Greater agility through modularity:** organisations need to change their customer interaction, making it more modular and consumable through different delivery channels and touchpoints, responding to modalities. This requires architectural improvements.

- **Better leadership through orchestration:** leaders must rethink their business models and include in their growth strategies the purchase, implementation and maintenance of applications.

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- **Resilience through autonomy:** business continuity plans are designed to address the challenges of the past, preparing for disruptions to resources and processes. What they don't recognise is the threat from outdated business models. To ensure operational continuity, it's vital business models are resilient to external disruptors.

During times of disruption, these principles help organisations survive and flourish, yet it's not just the CIO's role to promote the concept of a composable business; the whole leadership team must change its business thinking and adopt new architecture and technology

So how does a Composable Enterprise architecture work?

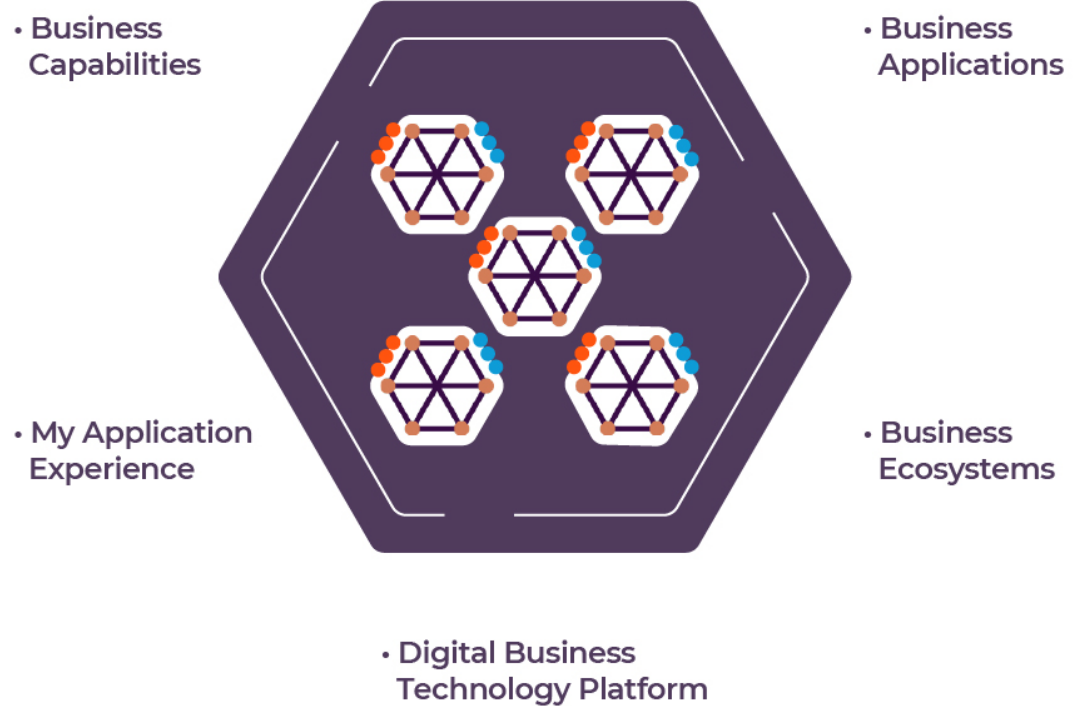The **three building blocks of a composable business** are:

1. **Composable thinking** boosts creativity. Anything is composable. When the principles of change, modularity, orchestration and autonomy are combined with composable thinking, it provides a framework and timeline for idea conceptualisation.

2. **Composable business architecture** ensures greater organisational flexibility and resilience. By enhancing their structural capabilities, businesses will have mechanisms to adapt and repurpose their offerings.

3. **Composable technologies** are the tools for today and tomorrow. These interconnected pieces drive technology to support product design goals and the concept of composability.

A critical component of a successful composability journey is the **Packaged Business Capability** (PBC).

According to Gartner, *"PBCs are software components representing a well-defined business capability, functionally recognizable as such by a business user"*. Technically, a PBC is a bounded-collection of database schema, a set of services, APIs, and event channels.

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The Composable Enterprise

● APIs   ● Event Channels

- Business Capabilities
- Business Applications
- My Application Experience
- Business Ecosystems
- Digital Business Technology Platform

Source Gartner
ID: 464148_C

PBCs expose APIs and event channels and can be coordinated and scaled, by architects, across a complex digital enterprise.

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Breaking monoliths with Microservices

The main drawback of monolithic applications is their inability to evolve quickly in line with business needs. When a change is necessary, it requires a single coordinated deployment, which cannot take advantage of the Cloud's flexibility. By breaking the monolith's hold, every Microservice becomes an independent deployable component that can be scaled to address particular needs and updated without disrupting the whole system. This brings flexibility when programming languages and supporting underlying technologies. In contrast, it can also create challenges when communicating between Microservices as they may not necessarily be in the same network and developers often underestimate the complex network issues that can occur between them.

Rewriting a monolith application with Microservices delivers performance and economic gains. It enables users to integrate their operation with the Cloud, modernise their applications and develop greater agility. When considering this new approach:

- Don't throw away a monolith, however don't add anything else to it;

- Start with the least dependent or most decoupled services;

- Have a clear roadmap - rewriting a monolith is not an easy task.

APIs - the standard communication format

APIs, although not a new concept, represent a revolution in the construction of modern and scalable applications. In this new connected world, business systems' integration is fundamental. APIs simplify integration by guaranteeing the exposure of services and making their consumption by third-party applications easier.

One key advantage of APIs is that they standardise communications. While it's important to share services, it's more important to focus on how they are shared. Third-parties that encounter unfriendly interfaces or difficult coupling processes will have to overcome connection barriers. APIs deliver a RESTful interface which allows easy onboarding, making development cycles shorter. This is crucial when considering the speed of value delivery to clients or partners, whether they're consuming resources to develop an app or connecting to a business ecosystem.

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APIs also have additional security benefits. They manage and protect payment data, access control, authorisation and authentication issues - giving peace of mind to regulators, the business and its customers. This elevates APIs from a core technology element to a strategic business tool.

Events when asynchronous is better

Event Driven Architecture (EDA) uses state or programme changes (events) to trigger asynchronous communications and is common in modern Microservices- based applications. Events are specific actions that impact a business, for example when a customer makes an online purchase. Here this action is immediately detected and automatically responded to, without the need for validation via a request/response cycle, relieving the pressure on the computer's resources.

When considering events and asynchronous communications, the key focus should be how EDA instantaneously responds to customer activity. By being able to react quickly to specific events within a customer journey and trigger an action, in real-time, businesses are better equipped to meet users' needs. This is particularly important in the payment and retail sector, where decisions made in fractions of a second can totally change customers' journeys.

And while the perception may be that other technologies can provide this service, none can manage and streamline the communication process in the same way. The number of systems wanting to capture customer information (banks, acquirers, marketplaces, ERP etc), creates additional layers of complexity. Event Notifications however, use a single tool to capture activity, such as a purchase, and notify only the systems interested in this transaction, firing a GET to the relevant recipients.

Once an EDA is in place, business systems can identify specific user actions and target customers accordingly, whether it's a quick purchase confirmation, or offering products and promotions directly related to an event. The business response will not only be more accurate and offer a better experience, it ensures less dependence on remarketing activity, which can be costly and invasive for customers.

EDA goes beyond taking advantage of real-time customer activity, such event monitoring and instant triggers provide excellent opportunities for scalability and real business gains.

Supporting modern integration trends

Businesses that adopt new integration strategies pose a threat to those taking a more traditional approach. To keep pace

with change, software engineering leaders responsible for integration must enable self-service, capitalise on existing APIs, implement a hybrid integration platform and use embedded integration sparingly.
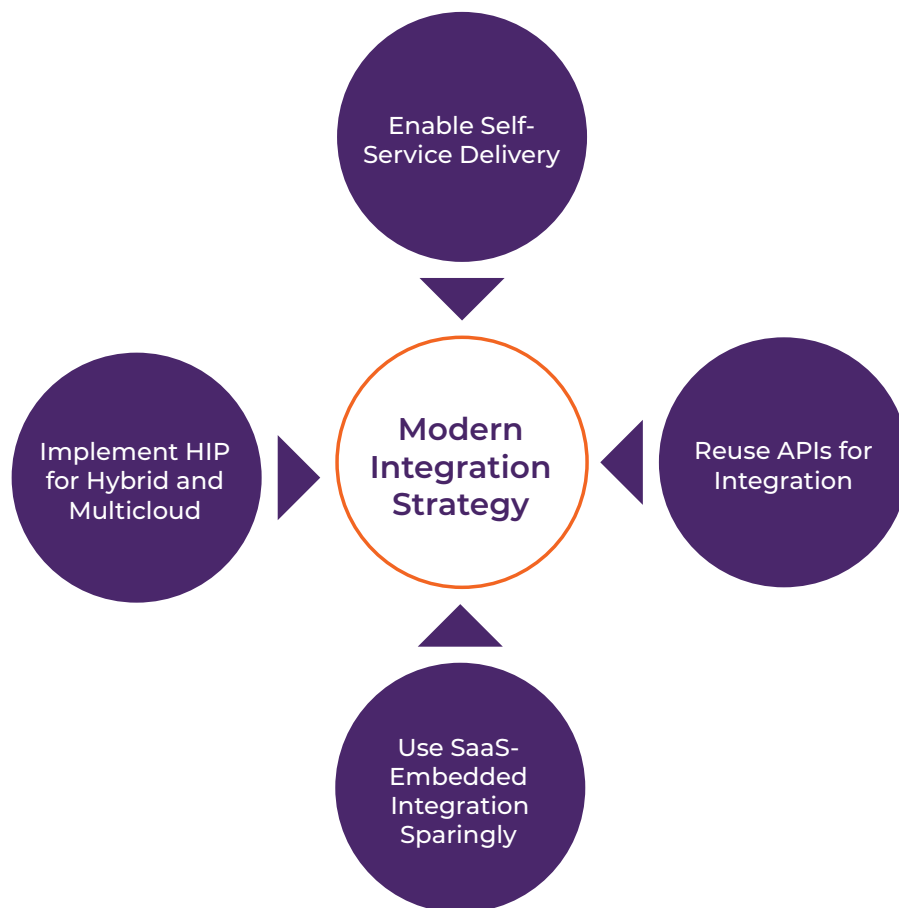
Following these modern integration trends, and using ad-hoc integrators, ensures faster scalability, but it can also introduce significant governance, consistency, security and compliance risks, and increase technical costs.

To continue supporting the demands put upon digital businesses, software integration managers should:

- Design low-code integration platforms, with different personas, and develop robust operational and governance models. This will help shorten time to value and support rapid innovation.

- Reduce time spent building additional APIs for integration and instead reuse the existing APIs that are interface entry points.

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- Combine APIs and Microservices (a Mesh architecture) to manage and support North-South and East-West communication. This will simplify and speed organisational responses to hybrid and multi-Cloud integration challenges.

- To reduce technical and governance issues, only use multiple SaaS-embedded integration tools when there's a significant, demonstrable reduction in time to value.

Modern Integration Trends

Enable Self-Service Delivery

Implement HIP for Hybrid and Multicloud

Modern Integration Strategy

Reuse APIs for Integration

Use SaaS-Embedded Integration Sparingly

HIP = hybrid integration platform

Source: Gartner

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Make that change

A composable business doesn't replace a digital business. A modular approach allows business functions and units to become autonomous, independent and mixed & matched to orchestrate proper outcomes. Composable supports innovation and anticipates change, ensuring a business is adaptable and resilient in the face of uncertainty.

Composable Enterprise is the route to future growth. At Sensedia we suggest its long-term success is dependent upon identifying the composability opportunities within the customer journey and the technology needed to take full advantage of them, agreeing on target outcomes and having a workforce and vendors who are prepared to innovate.

Case studies

Over the past year, companies have had to move to homeworking and quickly adapt their processes, maintaining agility, transparency and value for clients.

Our clients' stories show how they have achieved this.

From POS provider to tech innovator

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Cielo - leader in the e-payments industry in Latin America - wanted to transform itself from a simple POS provider to a widely-recognised technology innovator and enabler. To do so, in 2014 the company embraced a new open innovation strategy with an API Management platform.

Open Finance is changing the way people use and move money. Its goals - to prompt innovation, increase competitiveness and help businesses/consumers better understand and utilise their finances – are also key objectives of Cielo, Brazil's leading electronic payment provider.

Alongside these objectives, Cielo wanted to transform itself from a simple point of sale (POS) payment provider to a widely-recognised tech facilitator and innovator. To do so, in 2014 the company moved onto an API Management platform, supported by API specialist firm, Sensedia.

Since then, Cielo has gone from strength to strength; at its core an Open Innovation strategy with projects delivering change at an unprecedented rate.

The projects

Cielo first changed its business model and architecture supporting online solutions. This included programming languages, adopting microservices and APIs, cloud-data processing, using big data providers, rolling out developer apps and ensuring teams could work within a more agile environment.

Its teams developed a business platform to enhance the digital end-to-end customer experience, using analytics and big data to support informed decision-making, helping customers predict sales figures and trends.

Portable machines with QR code reading and

NFC technology, intelligent terminals and new payment and transfer solutions were introduced and Cielo provided white-label technology for brands with digital wallets, such as Bitz and Bradesco.

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Solutions included:

- **Superlink** – for customer's selling goods without a website. Partnered with a logistics company, Cielo delivers ordered goods within 24 hours

- **Checkout Cielo** – adds a payment page to customers' websites

- **Cielo e-commerce API** – for websites/apps with transaction analysis, support features and data intelligence

- **Promo** – systems to create events, gifts, discounts and loyalty programmes

- **Cielo Management** – an online sales app with predictive sales and receipt-tracking functions

- **Cielo Pay** – a digital wallet app focused on a 'long tail' audience, performing all transactions, including debit card issue, via a single application

- **Lighthouse** – analyses activity within a users' peer group, giving insights into customers' income profiles, purchasing behaviour and sales patterns

- **Cielo store** – personalised apps offering: digital web tools, sector specific support, PD Vend (management tracking), POS control tools, Finder (tracking Cielo POS equipment) and media/sales support.

Cielo stats

- **6.9** billion transactions – around 15% of Brazilian householders – captured every year

- Accounts for **9%** of Brazil's GDP

- Covers **99%** of Brazil's territories

- **100%** availability

- Technical capacity to support **14,000** sales per second

- **100%** of sales monitored **24/7**

- Around **50%** of Brazil's online businesses use a Cielo e-commerce solution

- Has capacity to support **8 x** the volume of Brazilian e-commerce transactions

- Uses AI system with machine learning and best anti-fraud tool in the market

Cielo also used in-house teams to run;

- **Innovation labs -** developing proof of concept, testing new tech hypotheses, implementing scalable solutions

- **Open innovation programmes -** developing added-value services with senior management teams mentoring start-ups (140+ registrations from Brazil, Portugal and Costa Rica) and hosting hackathons/developer meetings

- Internal tech content validation.

Developer portal

Having introduced external REST APIs in 2015, Cielo now has a portal with over 15,000 external developers integrating their apps and products. Out of the 60+ APIs in production, 10 are openly documented and include ones for:

- **E-commerce**

- **QR Code payments**

- **Omni-channel payments**

- **A promotions platform**

- **A LIO smart terminal (integrated to a LIO platform)**

Pandemic pressure

When Covid-19 took hold, Cielo's innovation supported customers. During 2020, the company reported a 45% increase in e-commerce revenue, a 1000% increase in QR code payments via Cielo Pay (52 million transactions between March and August 2020) and a 300% increase in demand for Superlink.

Cielo also developed QR codes so its machines could take payments from people receiving emergency Government aid (instead of them having to go to banks to transfer money). Between May and November, **4.5 million transactions per month were recorded.**
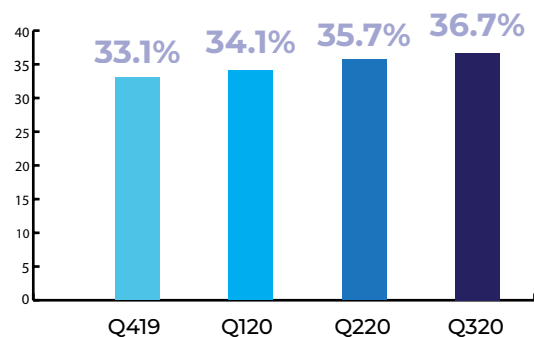
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Future innovation

Cielo is partnering Facebook in its new WhatsApp payment platform, set to trial in Brazil this year, and there are plans to introduce a digital currency, white-label platforms for accounts and wallets, new credit products, more value-added services and innovation events.

Cielo API use
• **15,000** registered external developers
• **60** APIs in production
• **10** freely-documented in open portal
• **300** partners using APIs

Increase in SME income contribution

Today Sensedia manages and runs:

• Cielo's SaaS API Management platform

• The developer experience – via a dedicated team

• An API monitoring service

• API exposure and microservices development consultancy services.

Mission accomplished when it comes to becoming a widely-recognised tech facilitator and innovator.

Find out more about Sensedia and Cielo
sensedia.com | cielo.com.br

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Use BaaS to take the lead in the OB race

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When Brazil's Banco Original adopted a Banking as a Service (BaaS) strategy and opened its Application Programming Interfaces (APIs) to third parties, it reaped the rewards.

Ahead of the technology curve

The personal and corporate bank was ahead of the technology curve in 2016, when it was one of the first to connect BOT to its Facebook Messenger, Instagram and Whatsapp accounts. Keen to build upon its reputation as an innovator and expand its technological capacity/customer base, BancoOriginal, launched its BaaS platform in 2019; the same year it launched the first 100% digital account for entrepreneurs and micro-business owners.

Banco Original views a BaaS platform as fundamental to building a partner ecosystem to connect different areas of expertise, which in turn enable it to offer more financial / non-financial products. Italso generates high transaction volumes and customer retention, plus provides an additional revenue source.

Digitalising services however is one thing, but sharing them across a wider ecosystem is another, so when developing its BaaS platform, Banco Original partnered with API specialist, Sensedia.

Sensedia helped Banco Original structure its BaaS model and open APIs for third-parties to connect to. Initially focusing on governance and standardisation of the exposed APIs, Sensedia moved onto migrating APIs and services associated with bill payment, card operations (including BOT-connected systems) and account management. This was particularly challenging, given API management was historically run by different companies.

Framework for the future

Having brought everything onto a single easy-to-operate interface, Sensedia was able to standardise, structure, organise and document all Banco Original's APIs and provide a framework for its in-house teams to maintain existing APIs in the future and build new ones.

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Sensedia's consulting teams helped Banco Original define its BaaS platform and support decision making re; API architecture, modelling, reformatting and structure, and the bank now has an API management platform that's flexible and simple, enabling it to easily expose, manage and document APIs.

In addition to a full-service provision, which includes money withdrawal using QR codes, investment platforms, insurance, mobile phone top-ups and payment machine supply, Banco Original supports PicPay – the largest digital wallet provider in Brazil with 34 million users – and runs an Orignal Hub Unit, managing 50+ partnership arrangements with fintechs using its BaaS platform.

Open competition

Banco Original believes that whoever manages to combine the best, low cost and differentiated customer experience will be ahead of the Open Banking pack. And with regulatory pressure stimulating competition, technology creating new solutions and customers more receptive to new innovations, this sector is a wide open field, ready to accommodate new players.

But only those fastest off the blocks … with technology that gives them the agility to compete, will succeed. Judging by Banco Original's results, the bank is certainly a contender. In January 2019, at the start of its digital journey, Banco Original had 700,000 account holders; at the start of 2021 this had grown to 4 million, an increase of 571%.

Original Bank's five pillars

Close

We combine technology with a personalised relationship, so each account holder feels unique

Innovative

Our modern and innovative practices ensure we always offer an innovative service to all account holders

Reliable

We guarantee your money is looked after responsibly by top professionals you can trust

Simple

We simplify the relationship between people and money with simple processes and language; something unique in the financial market

Transparent

Our goal is to have transparency in relations and our transactions, being open and true communicators with all stakeholders

Find out more about Sensedia and Banco Original
sensedia.com | original.com.br

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About Sensedia

Founded in 2007, Sensedia is a global integration specialist. Sensedia works with market leaders in varying sectors and its solutions enable clients to extend their digital businesses. Sensedia is a market leader, focused purely on its Modern Integration Platform and the provision of Strategic & Professional Services centring upon the full lifecycle of API Management and beyond. Sensedia is recognised by Gartner in its Magic Quadrant as 'visionary' and by Forrester in its Wave as a 'strong performer'.

Find out more at **sensedia.com**

About the author

Kleber Bacili is founder and CEO of Sensedia, a company specialising in APIs. He has a degree in Computer Engineering from Unicamp, an MBA from FGV and tutors in Entrepreneurship and Innovation at Stanford. He is also a partner of Fundo de Capital semente IVP. A technology enthusiast and passionate Palmeirense football club supporter, Kleber has two children, Helena and Hugo.

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