

WHITE PAPER

CIO Alert – There is an Application Composition Platform in your Future

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ENTANDO

Entando is an Application Composition Platform that enables fusion teams to better collaborate with business users by composing or recomposing cloud-native applications from shareable, modular business components in a low code application builder, accelerating development, streamlining maintenance, lowering total lifecycle costs and improving overall business agility.

The platform is based on trusted open technologies to provide a cohesive and streamlined developer environment for the low code creation of modular business components, a library to share and discover components, and a low

code environment to enable fusion teams to collaboratively assemble business components into applications. Teams can leverage multiple popular runtimes, frameworks, architectures, and best-of-breed enterprise software within the same low code application builder allowing greater flexibility and improving business resilience.

Entando is available in open source with available enterprise support and services. Begin developing on the platform today, or get a quote to see how our team can help your enterprise build better apps, sites and portals – faster.

Introduction

Ultra-business agility is an imperative that CIOs must enable, otherwise their organizations may not survive in the current, highly unpredictable, fast changing business environment. The composable application architecture enables IT organizations and business teams to collaborate in order to build, maintain and continuously adapt business-critical applications in a highly responsive way. Investing in these platforms is crucial for CIOs to effectively implement, operate, govern, and manage the life cycle of composable applications, while containing costs, minimizing risks and maximizing success.

Application composition platforms provide the necessary technology foundations for fast adoption of the composable application architecture.



What are composable applications and why CIOs should invest in them.

We live in an era of uncertainty. Nowadays, organizations must address an unprecedented set of challenges: inflation, geopolitical instability, rising interest rates, skills and labor shortage, supply chain disruption and ongoing pandemic waves. Those issues are strictly correlated and their interplay determines a business environment where conditions change by the week, if not by the day.

In such a scenario, your priorities as a CIO also keep changing. In 2020 CIOs' focus was on moving to digital as quickly as possible to enable their organization to deal with their constituencies (clients, partners, citizens, students, patients and employees) even if everybody was in lockdown. As, in 2021, the economy bounced back and the "great resignation" kicked off, it was all about enabling fast growth, customer experience and employees' retention. Most recently CIOs attention shifted to efficiency and cost savings due to skills shortages, high inflation and rising interest rates.

What should CIOs expect over the next three years? Nobody knows. We may enter a recession, but will it be deep and long or short and shallow? Will inflation continue to gallop, or will it slow down? Will COVID-19 be finally tamed, or will new virus variants disrupt the economy again? Signals are contradictory and long-term business planning is futile, if not impossible. To adapt to a rapidly and unpredictably evolving business environment, organizations will have to get used to constantly adapting their processes, products and services, and even their business models. This is not new: profound, even disruptive business transformation already occurred many times in the past. However, the pace and scale of change organizations must respond to now is way faster and more intricate than what most CEOs and business leaders ever faced in their career.

Hence, for you, as a CIO, the only certainty is uncertainty. Business priorities may, and most likely will, change suddenly and unexpectedly. You may have to abruptly downsize, postpone, or cancel strategic initiatives that today absorb your managerial attention (for example, ERP replacement). Maybe you will have to accelerate previously lower priority projects (for example, cloud migration). You may have to kick off initiatives you haven't planned for (for example, automation). And of course, your budget will remain the same, at best grow modestly, if not cut down.

How can you get ready for such scenarios? How can you establish the ultra-agile application environment needed to support the twists and turns of your organization's business strategy, while keeping costs under control, ensuring maximal leverage of your workforce and empowering competitive innovation in products and services for your organization's constituencies?

There are things you could do: implement agile methods, move to the cloud or adopt low code development platforms. However, an emerging concept you should definitely consider is composable applications, an architecture that exactly aims at enabling such an ultra-agile set up. Figure 1 provides a definition of what a composable application looks like.

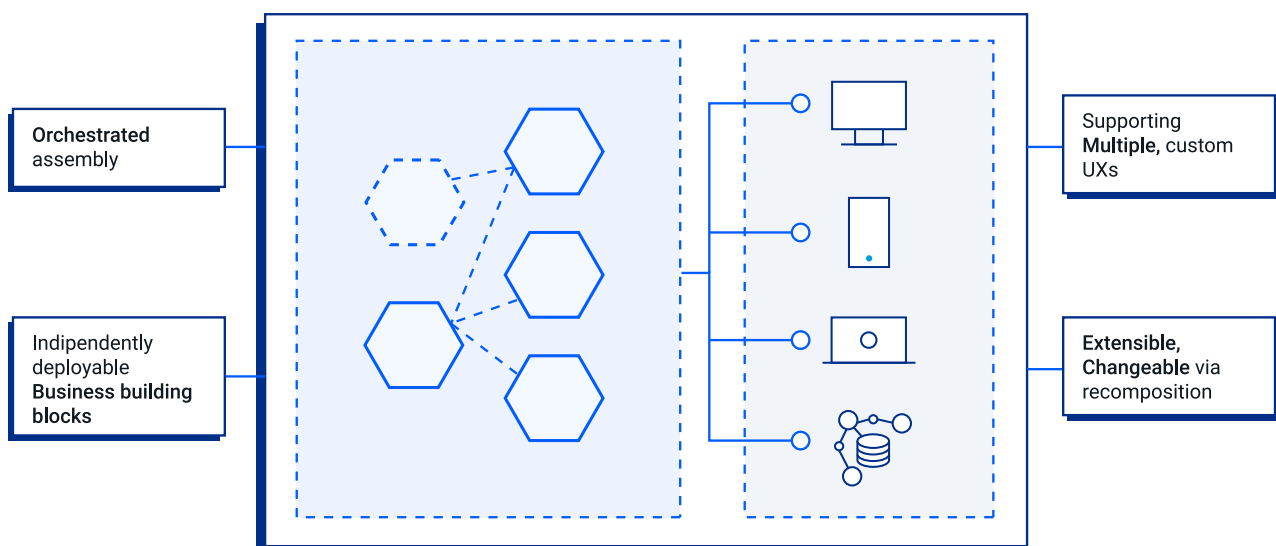


Figure 1 – Composable Application Defined.

The key principles of composable applications can be summarized as follows:

- **Modular set of business functionalities.**

Organizations' application portfolio consists of reusable, coarse granularity business building blocks (at times referred to as packaged business capabilities [PBCs]) each implementing a well-defined, self-standing and autonomous business function (e.g., tax calculation, shopping cart, pricing management, etc.). They expose well documented APIs and event channels, so that they can be easily assembled with other components. Typically, enterprise architects logically aggregate these building blocks in "collections", "domains", or "platforms", providing the functionalities needed to support a certain business function (for example, HR, Tax, Logistics, Finance, Pricing and Inventory)

- **Multi-sourcing.**

Organizations often custom develop building blocks in house, but also carve them out of established, "legacy" systems (e.g., ERP, CRM, HCM, SCM, student information systems, core banking systems, insurance policy management systems) by encapsulating their functionalities into APIs and event channels via integration technologies and techniques. They may also opt to outsource the implementation of custom building blocks to external providers. Additionally, they can purchase building blocks from business application providers in the form of API-driven ("headless") SaaS.


- **Orchestrated end-to-end functionality.**

Developers "compose" applications, which are what end users ultimately deal with, by orchestrating together building blocks and appropriate multichannel user interfaces, typically by leveraging low code development and orchestration technologies.

- **Multi-persona, collaborative development.**

In principle, professional developers implement the "homemade" building blocks by leveraging pro-code tools, integration platforms, open-source frameworks and a range of tools. Often the actual act of application composition is a responsibility of multidisciplinary teams, mixing business and IT peoples. These teams are referred to in many, different ways, such as "fusion teams", "digital product teams", "digital delivery teams" or "digital pods".

The composable applications concept has been around for years, but only recently the need for ultra-agility became so compelling as to foster a great deal of interest in the industry. Many organizations, in multiple vertical industries and of different sizes, have successfully adopted this architecture to meet their business goals. Nike, Ally Financials, City of Antwerpen, Air France, KLM, Kamera Express, Merchants Fleet, Mc Donald's China, University of South Florida, Michelin, Nestle, Italian Army and the Sardinia Region, are among them. In the final section of this document, we provide you some recommendations on how to start your composable applications journey.



Time for you, as a CIO, to adopt the composable application architecture to drastically improve your organization's ability to successfully tackle the challenge of the uncertainty era.

Benefits of composable applications vs. traditional approaches.

Whenever new systems, architectures, or technologies are introduced into your IT environment, your top management wants you to justify them in terms of their business or IT benefits. The justification process is often focused solely on savings, such as in the early days of cloud adoption when CIOs expected reduced IT costs. However, it is important to consider a broader set of strategic benefits when making these decisions. In fact, fifteen-plus years into the cloud era we realized that its benefits are more related to agility, fast access to innovation and operational convenience than to IT cost reduction.

As we'll see, composable applications can help you reduce some IT costs, but a complete business case should consider several other, possibly more important, advantages stemming from their core characteristics. Those benefits include:

- **Support for ultra-business agility and faster time to value.**

Assuming the availability of the appropriate building blocks, assembling a composable application is much faster than developing a functionally equivalent conventional application. Therefore, you can significantly accelerate time-to-value for the new system.

Moreover, changing a composable application is much easier. It may only imply replacing a building block with a more powerful or functionally richer one. Or modifying its user interface (for example, extending it to “yet another channel”). Or adjusting the orchestration to reflect a change in the supported business process (for example, to remove a now unnecessary management approval step).

- **Faster and scalable innovation cycle.**

Composable applications fast time to value implies that you can very quickly deliver innovation in terms of products, services, or business processes. Often the same team that originally conceived the innovation itself can do the job. Moreover, your ability to innovate is a lot less constrained by IT professionals' availability. Business technologists (that is, business people with enough IT skills) in the functional units can compose innovative applications by themselves, with some help and support from your IT professionals. This results in a much more pervasive approach to innovation for your organization.

- **Consistency of user experience.**

All too often users (whether customers, employees, or other constituencies) notice inconsistency in their experience when they access a certain business functionality (for example, a product catalog) via different channels. This typically happens because that functionality was implemented in slightly different ways by different teams to support the diverse channels. If, instead, your team implemented the functionality as a building block reused across all channel applications, user experience for product catalog would consistently be the same.

- **Greater business/IT alignment.**

Business and IT teams can collaboratively work together, typically in a fusion team, not only when designing the new application, but also in the composition phase. This way “lost in translation” issues are minimized and business teams can provide feedback (or change their mind) while the application is being developed and not after the fact, once the application is done.

- **Facilitated multi-sourcing.**

As discussed above, composable application architecture emphasis on modularity and loose coupling via APIs and event-channels favors a multi-sourcing approach. For example, you could buy some building blocks or outsource implementation of the most complex, or less differentiating ones to one or multiple service providers by retaining to



your team functional definition, quality control and governance. In this way you can focus your scarce and precious software engineers on building the most differentiating and innovative building blocks. In certain cases, the multi-sourcing opportunity has been a key driver to composable applications adoption.

- **Lower implementation and maintenance costs.**

Building blocks are, by definition, reusable across multiple composable applications. But, in principle, everything in such an architecture is reusable: UI components, orchestrations, process models and the applications themselves. This requires that the appropriate governance processes are in place and the “components” (or “assets”) are documented in a searchable catalog (also called marketplace or hub). Duplication of software is, in this way, minimized and maintenance costs are also reduced (for example, if you fix a bug or add a feature in a reusable asset, all the applications sharing that asset automatically inherit it).

Composable applications enabling technologies.

Developing composable business applications requires a notable set of technical capabilities including: application development tools to implement building blocks and UIs; integration technologies to encapsulate established, monolithic applications in reusable building blocks; and an orchestration functionality to “compose” the reusable assets.

These capabilities must take advantage of a common metadata-driven, microservices-based, and API-enabling, event brokering and data-enabling infrastructure, which also includes security; identity management and authentication; and monitoring, management and administration capabilities. This infrastructure increasingly also includes AI technologies (e.g., ML, NLP and chatbots) to assist composable applications development, deployment and operations.

A crucial capability of this infrastructure is the asset catalog, which is used to:

- **Support the composition process by** enabling fusion teams to search and retrieve the reusable assets they need to implement new applications.
- **Manage the life cycle** of the reusable assets.
- **Track, manage, support, secure and govern** the individual reusable assets and the composable applications themselves.

This set of capabilities, including the catalog, constitutes the **composable application technology foundation**.

Notably, the technology foundation, must support a range of personas (also called contributors) with different needs and skills that must collaboratively work together:

- **Enterprise architects**, who produce business capabilities maps and value streams that provide the conceptual foundation for the notion of building blocks and their aggregation into collections/domains/platforms.
- **Creators**, that is, system engineers implementing the reusable building blocks.
- **Composers**, application developers, whether professional or business technologists, orchestrating new (and modifying and evolving established) composable applications.
- **Curators**, who are responsible for managing and governing the catalog. In principle, an asset (building block or else) can be stored in the catalog, thus becoming “reusable”, only through the curators.

The Emergence of the Application Composition Platform.

Pioneers in composable applications adoption have typically aggregated their technology foundation by combining cloud and containerization technologies with a best-of-breed, typically multi-vendor, collection of traditional technologies like BPM tools, low-code application platforms, integration PaaS, API management platforms, event brokers, RPA tools, metadata management and others. Putting together such a custom technology foundation, however, requires skills, money, time and efforts that only by the most technically astute and deep pocketed organizations can afford. Are composable applications only for “the few”, then?

Fortunately, this is not the case. An alternative to such a highly customized approach has emerged in the market in the form of a new class of technologies, which are often referred to as **Application Composition Platforms** (or ACPs, for brevity).

These are cloud services (or software products) providing the application composition-enabling capabilities discussed above in the form of a single, fully integrated collaborative and multi-persona development, integration and orchestration platform. ACPs also provide the necessary infrastructure capabilities (e.g., API, events and data management support) as well as operations, administration, management and governance functionalities, and, last but not least, the critical asset catalog.

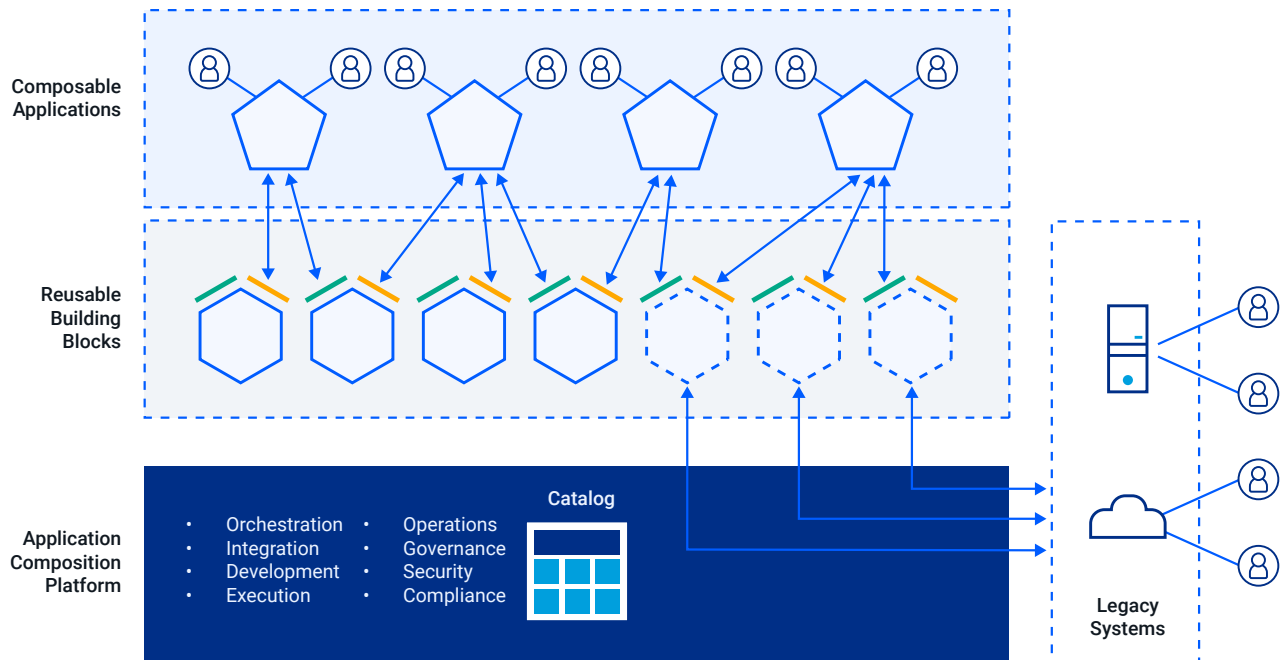


Figure 2 – The Application Composition Platform Role in the Composable Applications Landscape

Adoption of an ACP has notable benefits over the “best of breed” approach to the composite application technology foundation:

- **Lower acquisition costs**

Most likely a single ACP should cost less in terms of subscription or software license than the combination of four or five different products, especially if from multiple vendors.

- **Shorter learning curve**

Both creators and composers will be able to standardize learning for the shared ACP, providing a consistent, possibly AI-assisted UX across the different ACP functionality, instead of needing to familiarize themselves with multiple platforms with inconsistent and unintegrated UXs.

- **Greater productivity/faster time to value**

The single, AI-assisted UX leads to much higher productivity, especially for composers, than by having to navigate cross multiple at variance and partially overlapping products. Moreover, ACP providers are increasingly coming to market with a catalog pre-populated with a rich set of predefined, yet configurable, reusable assets (building blocks, orchestration flows, UI fragments and integration adapters) that composers can leverage to quickly orchestrate new applications in a highly productive fashion.

- **Enhanced business/IT collaboration**

Enterprise architects, creators and curators (both IT people), composers (often business technologists) and consumers (i.e., the business users actually using the composable applications) share the same ACP, including the same catalog. Therefore they can easily collaborate to build or adapt composable applications, by each contributors the ACP functionality via a UX tailored to their needs and skills.

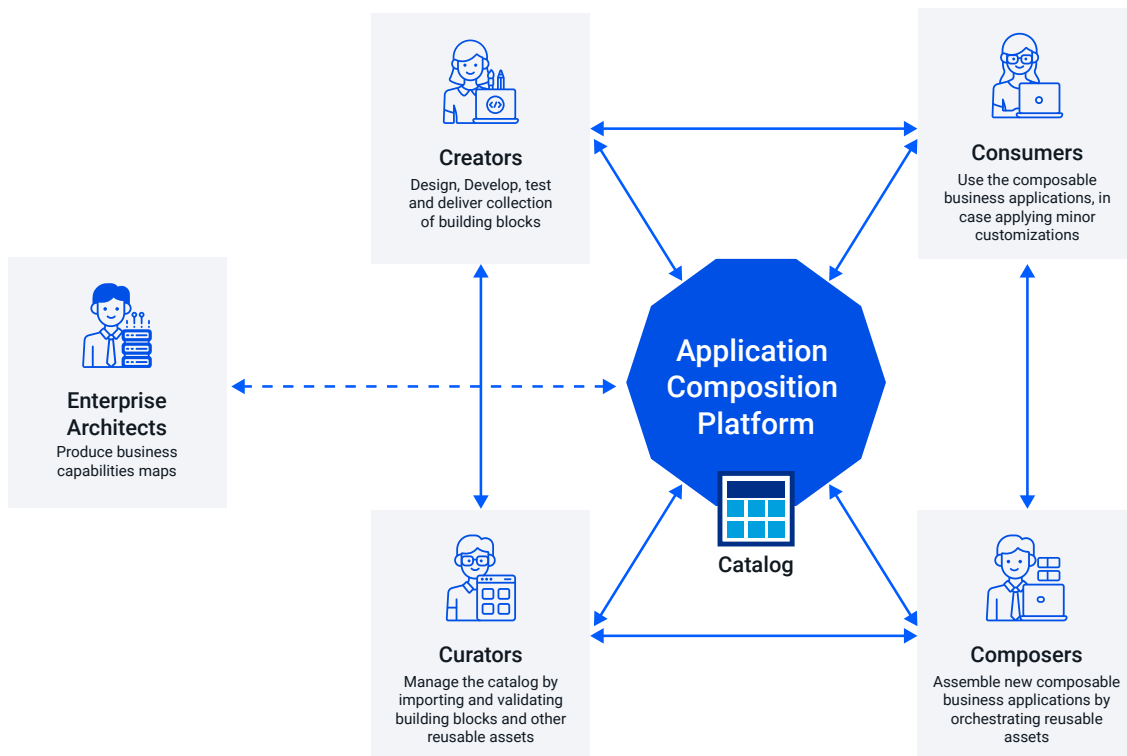


Figure 3 – Building Composable Applications via Business/IT Collaboration

For example, enterprise architects define the business capabilities map for a certain domain. These capabilities are then developed by a team of creators as reusable building blocks, which the curators store in the catalog. Thus, composers can retrieve these building blocks and assemble them with other assets in yet another composable application, which curators deploy by marking it as “in production” in the catalog. Finally, consumers find the application in the catalog, maybe customize its UI a bit, and start using it. Throughout this process, curators enjoy full observability and governance of both the individual assets and the final applications.

Every player has its own perspective, but they collaboratively work on the same set of assets.

Reduced operating costs

Expectedly, operating an ACP (i.e., monitoring, managing, administering, securing and enforcing compliance), which provides a unified UX for curators, is much easier and cheaper than dealing with a hodge-podge combination of discrete products, each operated through its own, specific toolset.

Often CIOs report operations as the most troubling aspect of a best-of-breed, multivendor composable application technology foundation.

Enhanced governance

As for operations, if all the contributors share the same infrastructure - including the catalog - it is relatively easy to enforce common governance policies. Creators can define data access policies. Curators can establish which composers can leverage which reusable assets and can track their use, readily detect and address errors and malfunctioning, and effectively support all the contributors.

In many cases, governance turned out to be the most overlooked, yet more crucial aspect of an application composition strategy in terms of actually achieving the expected agility, shorter time-to-value and faster innovation cycle benefits.

Ultimately, an ACP lowers the barriers to entry to composable applications and makes them affordable and accessible to a much wider range of organizations than the custom, best-of-breed technology foundation approach.

Thanks to ACPs, mainstream organizations, including midsize, can now experience the benefits of composable application at a reasonable cost, by leveraging their available skills and by spending a justifiable amount of effort.

How to get started with composable applications.

As a CIO, you cannot ignore composable applications anymore. Over the next five and beyond, their impact will be as profound as digital technology has been over the past five years. Composable applications will enable your organization to tackle the challenges of the era of uncertainty with unprecedented business agility.

But how do you get started? What should you do to introduce composable applications maximizing chances of success and minimizing risks?

There are three fundamental actions you should take:

Build up competencies and skills about composition by identifying new initiatives that would benefit from a much closer business and IT alignment, possibly in the context of a fusion team. Good candidates are new applications meant to support business innovation, requiring short time-to-value and expected to change frequently to meet evolving business requirements.

Adopt an ACP, rather than a best-of-breed technology foundation. Although ACPs are products that hit the market relatively recently, they will help you quickly jump on the application composition bandwagon by reducing risks, optimizing costs, accelerating time-to-value, fostering distributed business/IT collaboration, and centrally enforcing operations and governance.

These invaluable benefits will quickly offset the risks of adopting a still fast evolving platform and will magnify your organization's competitive differentiation.

Deliver tangible, short term business value. Selling the composable application concept to the business side of the house purely on a theoretical basis is mission impossible. It is much easier to prove the value by addressing an application with the characteristics mentioned above. To minimize risks, it is advisable to choose an already budgeted for application, which is not too technically complex, but which is not trivial either. This way you will test the ACP in a reasonably business critical scenario and your teams will start climbing the composable application learning curve. However, to prove the business value, the selected application should provide significant and measurable business benefits in a relatively short time, say within the next six to nine months.

If you went through these few pages, you are ready to get started with composable applications. Don't wait, though. Meanwhile your organization's business priorities may have already changed!



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