Orium + commercetools + CONTENTSTACK + Google Cloud + netlify

2024 WHITEPAPER

Composable Commerce Reference Architecture

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Foreword

While all organizations want simplicity, the unspoken reality of enterprise software is complexity. This tension presents a challenge for brands: While simplicity is a nice idea, it does not reflect the complex reality of a large-scale organization. By nature, enterprises have a large spectrum of needs, including:

- Unifying customer experiences across channels, products, and markets
- Supporting different business models for multiple brands
- Managing acquisitions and the challenges associated with mergers and acquisitions, including retaining employees

Instead of simplicity, enterprise organizations should prioritize efficiency— the ability to scale and adapt solutions quickly for the realities of a modern commerce business.

Enter the Composable Commerce Reference Architecture. From front-end experience through promotions, to operations and data warehousing, Orium's updated architecture sets a North Star for digital infrastructure that can be used as a critical roadmap for ongoing evolution and innovation. Even when gross margins are shrinking and cash flow is a priority, the ability to innovate is essential. Efficient innovation requires great technology, people, and processes working together to achieve business goals over the long term. Growing the business using innovative solutions within limited resources is a pragmatic form of future-proofing your technology that can be easily achieved. This resource can help you do just that.

Your digital architecture can either be an enabler of efficient innovation, or it can just get in the way. In the face of natural business complexity introduced by channels, countries, customers, brands, and business models, understanding where to begin and how to use the modular technologies that enable adaptability is your best bet. I hope you'll join me in exploring this Composable Commerce Reference Architecture as a starting point for your digital innovation journey.

Rick Watson, CEO & Founder, RMW Commerce



Overview

We first published the Composable Commerce Reference Architecture in 2023 to support CIOs and technology leaders using an all-in-one or homegrown commerce platform to evaluate a move to a more modular, composable platform built around a MACH technology architecture.

Much has happened over the course of the past year. More traditional brands are now embracing composable commerce, not only for retail, but for B2B, healthcare, and many other industry verticals. Over the same period, there has been an expansion of MACH technologies available through the Google Cloud Marketplace, now including technologies like headless CMS, loyalty and promotions, frontend deployment, and more.

The 2024 edition of the Composable Commerce Reference Architecture is updated to reflect these changes and is now more comprehensive. We have also revised the report to showcase that while composable commerce continues to be best for brands facing business complexity, the richness of a brand's business model and customer expectations should not necessarily lead to an overly complex or unmaintainable commerce architecture. Greater composability is achievable without a full replatform: by following a progressive path, brands can de-risk their transition and gradually enhance their system's adaptability and scalability.


Part 1

Part 1: The Evolution of Traditional Commerce Platforms

For brands facing growing complexity in business models and customer expectations, all-in-one and homegrown solutions could impede the ability to remain competitive in a fast-moving market and quickly adapt to changing business and market needs. Whether your business model is primarily DTC, B2C or B2B, customers now expect exceptional omnichannel experiences that are personalized and seamless across all touchpoints. But working within the confines of all-in-one or homegrown platforms makes this much harder—sometimes even impossible—to achieve.

Let's take a quick look at both options for traditional commerce platforms.

All-in-One Commerce Platforms

When all-in-one commerce platforms were first introduced, they greatly simplified the process of setting up and managing an online store by providing businesses with a unified solution, pre-made integrations, and template-based designs. However, the lack of complexity in these platforms is also their biggest drawback.

As the commerce industry has evolved and customer expectations have changed, a lack of focus on any single functionality and the inherent limitations of the platforms have made it increasingly challenging for businesses to adapt and create new multi-brand, multi-channel experiences. This is why nearly all enterprise brands have found it necessary to augment these platforms by adding in more modern technologies like headless CMS, search and product discovery, product information management, and more, often leading to a so-called "Frankenstack", the result of haphazard implementations of disparate solutions without a long-term plan for success. In truth, many of these brands have started down the path of composable commerce, often without even knowing they have taken the first steps.

Homegrown Commerce Platforms

Homegrown platforms were the best alternative to the constraints of an all-in-one for a time. They provided brands with the freedom to create anything they wanted, but they came with challenges of their own.

Homegrown platforms typically come with a much higher development cost and the accrual of technical debt. Over time, this forces developers to spend more time maintaining the platform than launching new business models and creating new experiences.

In addition, homegrown commerce platforms are usually developed for specific business use cases and pain points, without considering future extensibility or scalability. This results in a lack of domain expertise, weaker governance and documentation standards, and difficulty ensuring backward compatibility. As such, businesses may face increasingly complex integration work, poorly written code, bugs, inconsistent performance, and a codebase that can become spaghetti code over time.

Similar to brands using an all-in-one platform, brands with homegrown platforms often find it necessary to augment their

platform with specialized tools to deliver capabilities that the team cannot deliver internally, effectively starting the brand down the composability path.

For a comparison of all-in-one commerce platforms, homegrown commerce platforms, and composable commerce, refer to the table in Part 2.


Part 2

Part 2: The Rise of Composable Commerce and MACH Technology

Over the last few years, composable commerce has emerged as a practical alternative to all-in-one and homegrown commerce platforms. Gartner coined the term "Composable Commerce" in early 2020, though the concept of headless frontends and modularity in digital experience and commerce platforms is over a decade old. With the nudge from Gartner, active thought leadership from the MACH Alliance, technology vendors, and system integrators, along with continued investment in best-in-class composable technology solutions, composable commerce is becoming a widely accepted solution for delivering highly scalable and functional customer experiences.

What Is Composable Commerce?

Composable commerce centers around the idea that businesses can significantly improve their focus, efficiency, and adaptability by using several highly specialized and flexible services that work together across all channels. This approach contrasts with relying on a single solution that tries to do everything and is typically designed to focus on only a single channel (e.g., web, in-store, or mobile).

In recent years, an ecosystem of proven vendors has emerged, building products and businesses explicitly for composable commerce, which helps enterprises dramatically reduce the time and cost to deploy a composable architecture. Composable assembles best-of-breed services or pre-packaged business capabilities (PBCs), where each service provides a distinct functionality (e.g., promotions, order management, content, and search) to meet business goals. These services often pre-integrate with each other, and many are available via cloud marketplaces such as Google Cloud.

Composable commerce offers a highly adaptable, scalable, and efficient commerce solution that allows businesses to easily adjust to changing market needs. It also enables tech teams to concentrate on launching new business models and creating new customer experiences, rather than maintaining large and complex systems.

> "The composable, headless commerce approach enables dev teams to not only create new features but also connect other commerce components with less effort, which is critical when responding to evolving business trends. The critical benefit enterprises receive from headless commerce is owning and controlling the frontend for an engaging customer journey as well as quickly launching new experiences.
>
> Logan Vadivelu, Global Lead, Retail Solutions GTM & Engagement, Google Cloud

Below is a side-by-side comparison of composable commerce, all-in-one commerce platforms, and homegrown commerce platforms.

	Composable Commerce	Monolithic Commerce Platforms	Homegrown Commerce Platforms
Security	• More secure because attack surface is distributed • Each service maintains its own security, including PCI compliance	• Security concerns due to larger, more concentrated attack surface • Single point of failure: if any part of the system fails, the entire system could go down • Difficult to update, often requiring manual upgrades to address new security vulnerabilities	• Security concerns as the business is responsible for code and infrastructure, as well as lack of stringent governance
Talent	• Utilizes ubiquitous tech, so it's simpler to find suitable talent and skill sets	• More difficult and costly to find trained or willing talent to work on these platforms as they become outdated or reach end of life	• Cap on long-term value of learning proprietary code leads to low motivation and high turnover among team members • Increased costs associated with hiring, training, and retaining tech teams
Development	• Decreases time-to-value • Allows businesses to focus on development instead of software updates or infrastructure • Services provide knowledge through ever-expanding feature sets	• Customizability restricted to platform capabilities • To overcome platform limitations and provide new experiences, businesses often resort to patchwork and band-aid solutions • Accumulation of tech debt and poor business agility	• Steep learning curves for understanding the unique tech stack, which slows development • Time lost maintaining systems and managing tech debt
Data	• Consistent set of services storing data and offering functionality across all channels • Businesses can gain deeper insights into customer behavior and preferences	• Data is often siloed by channel, leading to a fragmented or incomplete view of customers and products	• The business is responsible for maintaining its own data infrastructure and protocols
Multi-channel, Multi-brand, and Omniretail	• API-first and headless services make it easier to configure multiple brands and channels, and provide customers with consistent experiences across channels	• Harder or impossible to provide multi-channel, multi-brand, and consistent omniretail customer experiences because of platform limitations	• Providing multi-channel, multi-brand, and omniretail experiences is possible, but it comes at a higher development and maintenance cost because the platform is typically not designed for these use cases upfront

What Is MACH?

The MACH (Microservices, API-first, Cloud-native, Headless) framework is the technology foundation of the composable commerce ecosystem. It is a modern architectural approach that emphasizes the use of APIs on microservices to deliver omnichannel customer experiences.

Because MACH services are cloud-native, they are infinitely scalable and can be accessed by any channel via their APIs. They are "headless" in the sense that they are not restricted to a particular front-end and can be used in any context. In fact, all front-ends—including websites, social media, mobile apps, in-store interfaces, and more—use the same APIs, which facilitates the offering of a multichannel customer experience while dealing with the same sources of data.


Part 3

Part 3: Example Composable Commerce Services

To exceed the functionality found in all-in-one or homegrown platforms, businesses select and integrate specialized services as part of a composable commerce solution. If you're used to working with an all-in-one or homegrown platform without clear delineations between functional domains, Forrester's Function-First Tech Buying Framework can help you understand which services are necessary for a composable commerce solution. This framework standardizes the core functions for each category of composable commerce technology, making it easier for businesses to identify which services they need to achieve their business goals.

The following are examples of services that may comprise a composable commerce solution. Some businesses will need fewer specialized services, opting to leverage features built into a core commerce platform or other multi-feature services. Others will require specialized services that are not represented in the following pages. Several reference architecture diagrams, visualizing the relationship between services, can be found in Part 4.

We have organized the services that are primarily used for improved customer experience, core commerce capabilities, and improved multi-brand and multi-channel operations. Additionally, we cover hosting and integration solutions that allow all of these services to operate seamlessly and efficiently together, meeting the diverse needs of modern commerce systems.

Customer Experience

Search and Product Discovery (Bloomreach Discovery)

Search provides the ability for shoppers to find products by using a search function or search box through a commerce site or mobile application. Meanwhile, product discovery enables customers to explore and find products through alternate paths like product recommendations and categories.

According to research conducted by Google Cloud, when shoppers are successful at using the search function, 92% end up purchasing the item they were searching for. In contrast, unsuccessful search leads more than half (53%) to abandon their carts and go elsewhere if they can't find at least one item they were searching for.

AI-driven search and product discovery services, like Bloomreach Discovery, enhance results with context detection—to distinguish between "chocolate milk" and "milk chocolate", for example—and will further personalize search results based on the customer's activity on the site.

In addition, business users can use these services to enable product merchandising; for instance, they can boost seasonal products or criteria higher up in search results, and customize the results even further without needing the help of developers.

Omnichannel Marketing Automation (Bloomreach Engagement)

An omnichannel marketing automation platform streamlines marketing activities across multiple channels. It accomplishes this by gathering data on customer behavior, using that data for customer segmentation, automating targeted marketing campaigns, and monitoring the effectiveness of these campaigns.

As a leader in this category, Bloomreach Engagement can process all customer, campaign, and product data from online and offline sources to automatically retarget customers who have abandoned their carts, engage those who haven't purchased in a while, and execute other marketing campaigns across multiple channels in real time using the latest in AI and predictive capabilities. In leveraging these capabilities, brands can create relevant, personalized customer interactions, which increase engagement, customer satisfaction, and ultimately lead to better business outcomes.

Digital Experience Analytics (Quantum Metric)

Integrating with a digital experience analytics platform, such as Quantum Metric, gives businesses the ability to gain insights into customer behavior, conduct real-time and historical data analysis, and continuously optimize digital experiences across all channels.

Quantum Metric gathers extensive behavioral data, including page scrolls, rage clicks, API errors, and other obstacles to a seamless customer experience. This detailed insight also covers backend business metrics, such as cart abandonment rates and total cart value, offering a holistic view of the customer journey. With the capability to simplify complex digital interactions into actionable insights, Quantum Metric empowers businesses to identify and remedy specific user challenges, thereby enhancing the digital experience and ultimately improving business results.

Loyalty (Talon.One)

Loyalty platforms enable businesses to foster stronger relationships with customers by rewarding consistent engagement and purchases with discounts and points, helping to cultivate long-term customer loyalty and increased lifetime value. These platforms are designed to be adaptable and interactive, ensuring that businesses can respond effectively to customer needs and preferences.

Talon.One enhances customer experience by offering a flexible, code-free environment for creating personalized loyalty campaigns that span multiple channels. Its seamless integration capabilities allow businesses to centralize customer data, facilitating sophisticated, data-driven strategies that cater to individual preferences. This not only deepens customer engagement but also drives retention, making it easier for businesses to adjust their loyalty initiatives in response to shifting market dynamics and consumer behaviors.

Headless CMS (Contentstack)

Headless CMS platforms shift the paradigm for how content is managed and delivered, decoupling the content repository from the presentation layer. This separation allows for greater flexibility, scalability, and speed in delivering content across various digital channels without being tied to a specific front-end system.

A leading headless CMS, Contentstack, elevates this model by offering an intuitive, API-first approach that empowers developers and marketers to orchestrate rich digital experiences. Its features include real-time editing, multi-channel content deployment,

and extensive integration capabilities with modern tech stacks, which streamline workflows and enhance productivity. By providing tools that simplify content management and delivery processes, Contentstack helps businesses accelerate their digital transformation, making it easier to manage content at scale while ensuring consistency across all platforms.

Web, Mobile, and Other Frontends (Orium and commercetools)

Headless frontends, especially in the context of web and mobile applications, are designed to separate the front-end presentation layer from content and backend logic. This architectural approach allows for more agile development processes, better scalability, and enhanced performance. Headless frontends can be accelerated through the use of frameworks and libraries that facilitate rapid development and deployment, such as React for building user interfaces or Next.js for server-side rendering.

commercetools Frontend, a Frontend-as-a-Service (FEaaS), exemplifies this approach by providing a robust platform for creating digital storefronts rapidly. It integrates seamlessly with commercetools' Composable Commerce for B2B and B2C, enabling businesses to deploy feature-rich, customized e-commerce solutions efficiently. With commercetools Frontend, companies can orchestrate data from various headless services, develop and manage reusable UI components, and optimize their online presence.

As a system integrator, Orium further accelerates front-end development and delivery through its web and mobile commerce accelerators. Orium's accelerators are prepackaged solutions that facilitate the quick launch of new commerce experiences by providing essential functionalities out of the box. This approach enables companies to get to market faster, with less initial investment in development resources.

Commerce

Catalog, pricing, and cart (commercetools Composable Commerce)

Core commerce services, such as catalog management, pricing, and cart functionalities, are essential components of any e-commerce platform. These services enable businesses to manage product information, set flexible pricing strategies, and streamline the checkout process to enhance customer experience and drive sales efficiency for B2C and B2B.

commercetools Composable Commerce excels in providing robust catalog management capabilities, including the organization of products, variants, and complex configurations within an intuitive interface. This system is equipped with a powerful product catalog capability that simplifies handling large and diverse product data. The platform supports flexible product types, attributes, and variants, making it easy to customize and manage detailed product information across various sales channels.

Pricing in commercetools Composable Commerce is highly versatile, supporting multiple pricing strategies such as tiered, channel-specific, and geolocation-based pricing.

Promotions (commercetools and Talon.One)

Promotion management in e-commerce is crucial for attracting and retaining customers by offering timely discounts, coupons, loyalty rewards, and more. Effective promotion management tools help businesses create, manage, and

track the performance of various promotional strategies across different channels, ensuring they reach the right audience at the right time and with appealing offers.

commercetools offers a versatile promotion management module that allows businesses to implement a variety of discounts and promotional strategies directly within their digital commerce platform. This module supports simple percentage-based discounts, buy-one-get-one-free offers, and more complex promotions that can be tailored to specific products, customer segments, or purchase conditions. commercetools' promotion engine is designed to integrate seamlessly with the rest of its commerce features, providing a unified approach to managing sales and marketing efforts efficiently.

For businesses requiring advanced promotional capabilities, Talon.One provides a powerful extension to promotion engines like those of commercetools. Talon.One specializes in creating complex promotional scenarios that may not be supported out-of-the-box by other platforms. This includes capabilities for dynamic pricing, location-based offers, and highly personalized promotions that consider customer behavior and attributes. Talon.One's API-first approach allows it to integrate smoothly with existing systems, enhancing the promotional capabilities of e-commerce platforms by enabling more targeted and effective marketing strategies.

Tax

Tax management in e-commerce is a critical function that involves calculating, applying, and reporting sales taxes across various jurisdictions. Effective tax management ensures compliance with local tax regulations, which can vary widely between different areas and levels of government. This includes determining whether taxes should be applied on shipping and handling, dealing with tax exemptions, and applying different tax rates for different products or services. The complexity increases with the geographical reach of a commerce business, making robust tax management systems essential for automating these processes and reducing the risk of errors.

Advanced e-commerce platforms incorporate tax management systems that automate the calculation of taxes based on the latest rates and rules. These systems are capable of handling complex scenarios, such as sourcing rules that determine tax rates based on the location of the buyer, the seller, or the shipped item. They also manage to integrate with various accounting and ERP systems, ensuring that tax reporting is accurate and timely. This automation is crucial for maintaining compliance with tax regulations and for providing a seamless checkout experience for customers, who expect clear and accurate pricing information, including tax calculations.

Checkout (commercetools Composable Commerce)

The checkout process in e-commerce is a critical conversion point that can occur across multiple channels, enhancing flexibility and convenience for customers. Modern e-commerce platforms accommodate a variety of checkout scenarios, such as traditional cart-based checkouts, instant purchases via "Buy Now" buttons on product detail pages (PDPs), or direct links from promotional emails or text messages. This multichannel approach caters to varied shopping behaviors, allowing customers to complete purchases seamlessly from different starting points, which can significantly boost conversion rates by reducing steps and simplifying transactions.

commercetools Composable Commerce for B2C provides a hosted checkout capability that supports a comprehensive range

of checkout scenarios and is designed to integrate with multiple Payment Service Providers (PSPs) and payment methods. This flexibility allows businesses to offer various payment options and configure rules that determine the availability of these options based on factors such as customer location, order value, or chosen delivery method. commercetools Composable Commerce can accommodate everything from credit card payments to digital wallets, ensuring a tailored and secure payment experience for each customer.

Operations

Data Warehousing and Visualization (BigQuery + Looker Studio)

With composable commerce, a great deal of data is generated and stored across multiple services, making it more challenging to find the information the business needs. A data warehouse can be used to consolidate and integrate data from multiple sources, such as product and customer data from the commerce service, and order data from the OMS.

By aggregating data in a single location, businesses can more efficiently query information, gain a deeper understanding of their customers and operations, and identify trends and patterns to inform business decisions.

BigQuery, an industry-leading cloud-based data warehousing solution provided by Google Cloud, is designed to handle massive volumes of structured and unstructured data from a variety of sources. It's an ideal source of data for analytics and machine learning applications.

Hand-in-hand with data warehousing is data visualization, which ensures businesses can accurately see and interpret their data.

Looker Studio is a cloud-based business intelligence and data analytics platform from Google Cloud that integrates with BigQuery. It enables users to explore and analyze data with a drag-and-drop interface for creating reports and dashboards, making data accessible to all users.

Order Management Systems

The order management system (OMS) helps businesses manage and process orders from multiple sales channels and fulfillment centers. It serves as the source of truth for all order data. In a composable commerce architecture, when a customer places an order on the online store in any sales channel, the commerce service will create the order within the OMS.

The OMS manages all order operations from that point forward, such as processing payments, shipping, returns, and refunds. It can also enable more advanced omnichannel experiences, like Buy Online Pickup In-Store (BOPIS), Buy Online Return In-Store (BORIS), and fulfillment from both warehouses or retail stores with smart order routing logic.

As a source of truth for order data, the OMS is typically integrated with the commerce service to ensure real-time inventory is made available to all sales channels, avoiding overselling and stockouts. The OMS also offers advanced reporting and analytics capabilities, allowing businesses to track order volume, shipping costs, and other key performance indicators (KPIs).

Product Information Management (PIM) (Akeneo)

Product Information Management (PIM) systems play a crucial role in e-commerce by centralizing and managing all the product data across multiple sales channels. Companies often use external PIM systems separate from their commerce platforms to enhance flexibility, improve data quality, and streamline workflows. An external PIM allows for better control over the enrichment, management, and quality of product data, making it easier to adapt to different market requirements and manage extensive product catalogs efficiently. It also facilitates seamless integration with other systems, such as ERP and CRM, ensuring consistent product information across all customer touchpoints.

Akeneo, as a dedicated PIM solution, excels in these areas by providing robust tools to collect, manage, and enrich product information, distribute it across sales channels, and ensure high data quality. It is particularly beneficial for businesses that deal with large numbers of SKUs and complex product structures. Akeneo supports multiple languages and locales, enabling global businesses to localize their product descriptions and details for different regions. Additionally, it offers versioning and publication workflows to ensure that the product information is accurate and up-to-date, which is critical for maintaining brand integrity and compliance across different markets.

Moreover, Akeneo's ability to integrate seamlessly with various e-commerce platforms, marketplaces, and marketing channels enhances its utility. It includes features like advanced rights management, which allows businesses to control access to different parts of their product catalog. This can be crucial for companies that operate on a global scale and need to tailor their product offerings to diverse consumer bases. Akeneo's focus on usability with its intuitive interface helps to reduce the time and resources needed for product information management, enabling companies to focus more on strategic activities like product development and customer engagement.

Customer Identity Management (commercetools)

Authentication and authorization are crucial components of customer identity management in e-commerce and other online platforms, ensuring that customer interactions are both secure and personalized. These processes involve verifying the identity of users (authentication) and determining their permissions (authorization), which are essential for safeguarding user data and providing a tailored user experience. Effective management of these functions helps businesses protect sensitive information and comply with data protection regulations, while also facilitating a smooth customer journey across different services and touchpoints.

commercetools offers robust capabilities for handling authentication and authorization, allowing businesses to secure their e-commerce platforms while providing a seamless user experience. It is based on standard authentication protocols like OAuth 2.0, ensuring that customer identities are managed securely and efficiently. commercetools also allows for fine-grained access control, enabling businesses to define specific roles and permissions for users accessing the commerce platform. This is particularly useful for businesses that need to manage complex customer interactions across various parts of their e-commerce ecosystem.

For enhanced security and flexibility, businesses often augment commercetools' native capabilities with specialized identity management services. By integrating such tools, businesses can leverage advanced features such as multi-factor authentication,

single sign-on (SSO) across multiple domains and applications, and user management dashboards that provide deeper insights into user activities. These identity management services also help dynamically adjust security measures based on user behavior patterns, enhancing overall security without compromising the user experience.

Additionally, these tools simplify the migration process from older systems by providing a streamlined pathway to upgrade legacy authentication systems to modern, standards-based platforms. This not only ensures a higher level of security but also reduces migration complexities and enhances the user experience during the transition phase. This combination allows businesses to not only secure their platforms effectively but also customize the user journey, making it more secure and user-friendly.

Cloud, Hosting, and Integrations

Cloud platforms, like Google Cloud, play a crucial role in enhancing the reliability, security, scalability, and performance of these architectures. Leveraging Google's robust infrastructure and advanced networking capabilities, businesses can ensure that their commerce operations are highly available and resilient against disruptions. Google Cloud's global network of data centers provides low-latency access to applications and services, which is vital for maintaining a swift and responsive customer experience. Additionally, the ability to scale resources on-demand allows enterprises to handle varying loads effortlessly, ensuring performance remains consistent even during peak periods.

Many composable technology vendors, like those referenced in Part 3, trust Google Cloud as the platform upon which they deliver their cloud-native SaaS solutions. Along with the inherent technical benefits of Google Cloud, procuring composable commerce solutions through the Google Cloud Marketplace offers significant benefits. The marketplace features vetted, ready-to-deploy solutions that integrate seamlessly with existing Google Cloud services. This integration simplifies the management of underlying infrastructure and reduces operational burden, allowing businesses to focus more on innovation and less on maintenance. Moreover, solutions available on the marketplace are easier to procure through single-source contracting and typically count against a brand's committed consumption on Google Cloud.

Frontend Hosting

When deploying the front-end (head) of composable commerce solutions, platforms like Netlify, available through the Google Cloud Marketplace, offer considerable advantages over traditional self-hosting. Netlify simplifies the deployment process through automation and pre-built templates, significantly speeding up the time-to-market. Its global Content Delivery Network (CDN) ensures that static assets are served quickly to users from the nearest location, minimizing load times and improving overall site performance. Additionally, features like atomic deploys and instant rollbacks enhance the reliability of deployments, providing a robust foundation for delivering seamless user experiences.

The productivity benefits of using platforms like Netlify cannot be understated. Developers can focus on building features rather than managing servers, as Netlify handles scaling, security, and performance optimizations automatically. The platform's integration with modern development frameworks like React and Next.js and its support for serverless functions allow developers to create more dynamic, interactive web applications without the overhead of server management. This shift not only boosts development efficiency but also empowers teams to innovate with greater agility.

Integrations

In the realm of backend integrations for composable commerce, connecting various technologies like commerce platforms, Order Management Systems (OMS), Product Information Management (PIM) systems, and search/product discovery tools are essential. These integrations enable a unified view of operations and customer interactions, which is critical for delivering personalized shopping experiences and efficient service. By ensuring these systems can communicate and share data effectively, businesses can enhance operational efficiency and adapt more quickly to market changes or customer needs.

Vendor-Specific Integration and Automation

Vendor-specific integration solutions are tailored to enhance the functionality and interoperability of specific software platforms by facilitating seamless connections with other systems and services. Two notable examples are commercetools Connect and Contentstack Automate, both of which provide a host of benefits for retailers, in particular, by eliminating the need for managing hosting and infrastructure concerns.

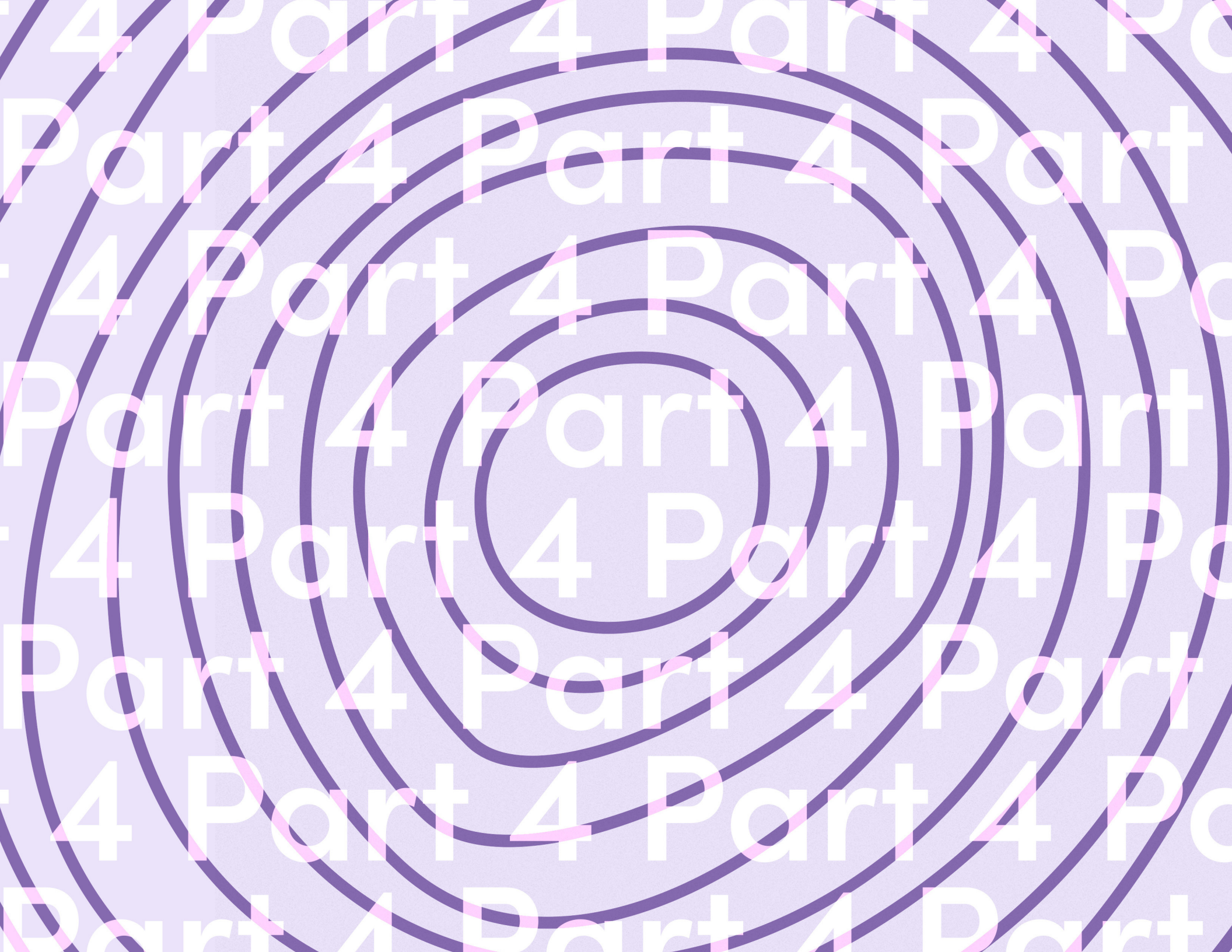
commercetools Connect provides robust APIs and middleware solutions designed for technical integrations across commerce systems. This platform is ideal for developers looking to build highly customized commerce experiences that require deep technical integration with existing IT ecosystems. On the other hand, Contentstack Automate focuses on automating workflows for business users. It allows non-technical users to orchestrate complex processes across various systems without needing ext-ensive programming knowledge, thereby enhancing business agility and reducing reliance on IT departments for daily operations.

Custom Integrations and Event Stream Processors

Custom integration solutions often make use of APIs and serverless computing platforms such as Google Cloud Functions. These platforms allow developers to execute code in response to events, without the need to manage servers. This approach offers scalability and cost-efficiency, as serverless functions scale automatically with the demand, and costs are only incurred during execution time. This model also accelerates development by allowing developers to focus on coding specific to their tasks, free from server management burdens. For more complex scenarios, where real-time dynamic data is crucial, event stream processors like Confluent—available in the Google Cloud Marketplace—are instrumental. They handle large volumes of events generated by digital commerce activities and provide immediate insights and responses, essential for real-time personalization and operational efficiency.

iPaaS

Integration Platform as a Service (iPaaS) is a comprehensive cloud service that enables organizations to develop, execute, and manage integration flows between disparate applications, data, and services. iPaaS solutions are especially effective in projects that include both cloud and on-premises components, using tools that manage these integrations from a unified platform. Cloud providers like Google Cloud offer iPaaS solutions tailored to their infrastructures, such as Google Cloud Application Integration, which streamline data flows and improve efficiency within their ecosystems. Alternatively, standalone iPaaS platforms leverage no-code to offer simplified integration, while supporting a broad range of integrations across various environments.

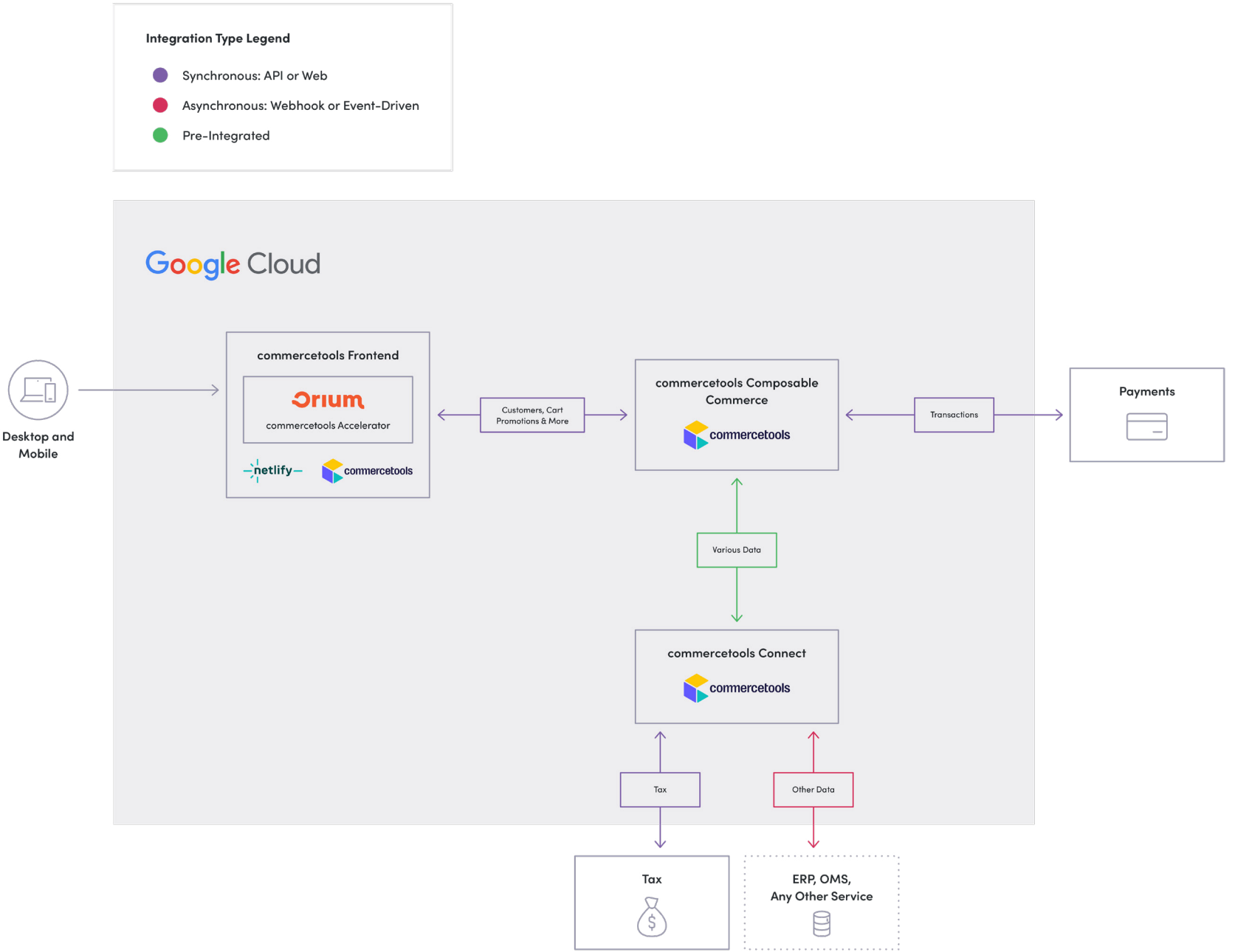

Part 4

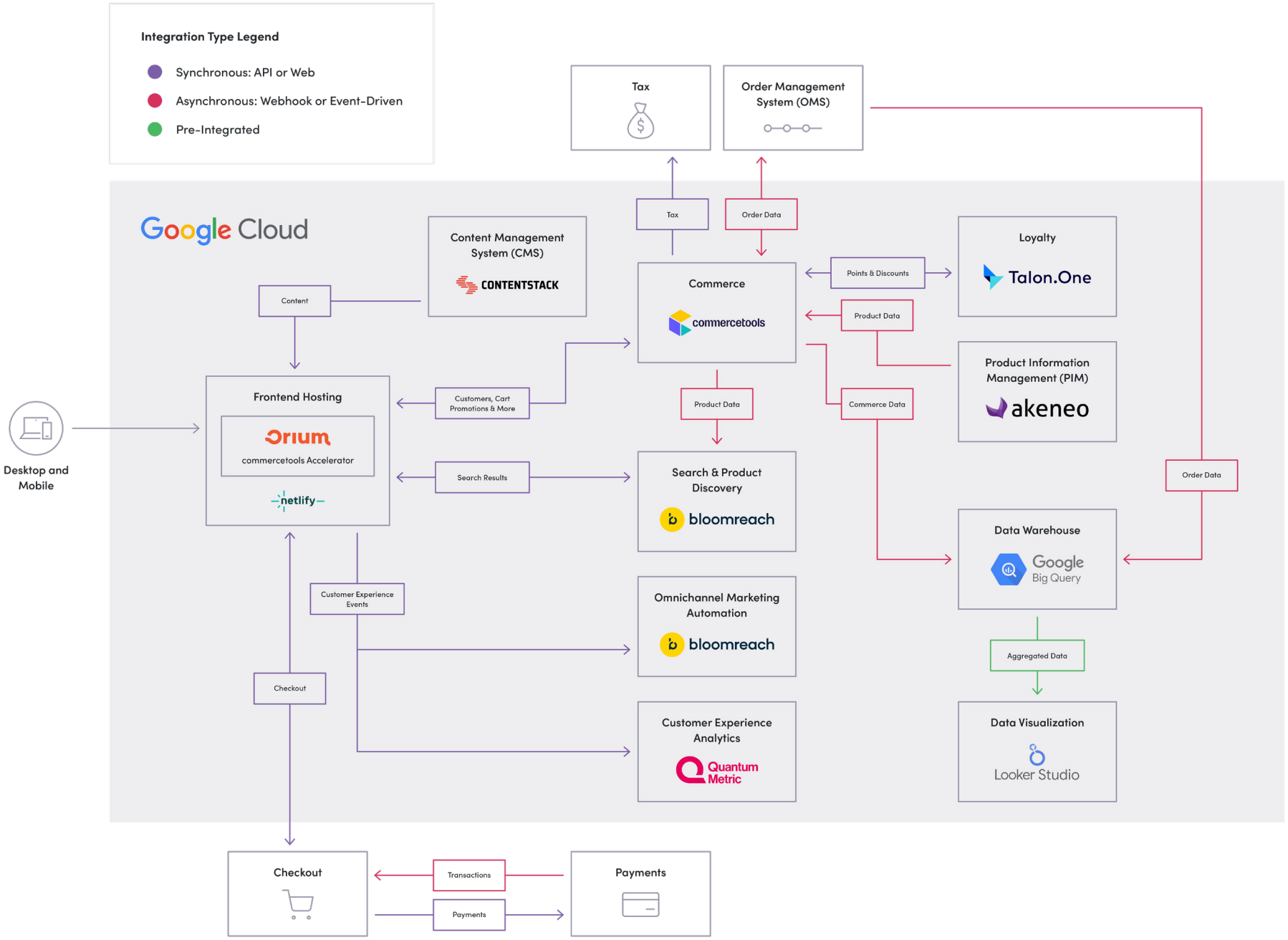
Part 4: Reference Architecture

The following reference architecture diagrams were created to help visualize how the components of a composable commerce framework fit together. Each of the services can be integrated within the broader system and maintained, substituted, or eliminated as the needs of the business change.

The first diagram features commercetools Foundry, a pre-composed solution that simplifies and accelerates the implementation of composable commerce. It provides a suite of pre-integrated applications, connectors, store launchpads and tailored blueprints for B2C and B2B that streamline commerce technology deployment and integration. This allows businesses to quickly customize their platforms, reduce development time, and accelerate time to market, while ensuring scalability and adaptability to evolving demands.

The second diagram describes a more comprehensive architecture that directly leverages MACH services, focusing on the use of commercetools and the Connect framework alongside various headless services. This setup illustrates how commercetools integrates with other specialized services to create a robust, scalable commerce system that supports complex, multi-channel retail strategies.


Integration Type Legend
Synchronous: API or Web
Asynchronous: Webhook or Event-Driven
Pre-Integrated
Google Cloud
Desktop and Mobile
commercetools Frontend
Orium
commercetools Accelerator
netlify
commercetools
Customers, Cart Promotions & More
commercetools Composable Commerce
commercetools
Transactions
Payments
Various Data
commercetools Connect
commercetools
Tax
Other Data
Tax
ERP, OMS, Any Other Service


Integration Type Legend
Synchronous: API or Web
Asynchronous: Webhook or Event-Driven
Pre-Integrated
Tax
Order Management System (OMS)
Google Cloud
Content Management System (CMS)
CONTENTSTACK
Content
Tax
Order Data
Commerce
commercetools
Points & Discounts
Loyalty
Talon.One
Product Data
Product Information Management (PIM)
akeneo
Commerce Data
Desktop and Mobile
Frontend Hosting
Orium
commercetools Accelerator
netlify
Customers, Cart Promotions & More
Product Data
Search Results
Search & Product Discovery
bloomreach
Order Data
Data Warehouse
Google Big Query
Customer Experience Events
Omnichannel Marketing Automation
bloomreach
Aggregated Data
Checkout
Customer Experience Analytics
Quantum Metric
Data Visualization
Looker Studio
Checkout
Transactions
Payments
Payments


Part 5

Part 5: Migrating to Composable Commerce

Whether because of a risky migration strategy, an inefficient tech stack, or a lack of preparedness for the paradigm shift and change management involved with composable commerce, businesses can sometimes struggle with a shift to composable. However, with the right planning and partners, a seamless migration is achievable.

There are two aspects of migrating to composable commerce to focus on: Demonstrating value quickly and effective change management.

Demonstrating Value Quickly

Quickly demonstrating value can help identify issues and challenges early on, avoid large and risky changes, and increase buy-in from internal stakeholders to help secure additional resources and funding for the migration.

First, businesses need to assess the current state and understand their biggest pain points. It's useful to identify business problems that have quantifiable value. Then, using a "Strangler Pattern" (replacing old functionalities with new ones, piece by piece) a brand can transition their technology in a less disruptive manner. This allows businesses to make incremental changes to their architecture and demonstrate value through the transition, which can support the end goal of a full transition to composable commerce.

Pursuing an incremental change, especially early on in a migration process, has a host of benefits, including:

- Establishing a foundational architecture with a cloud platform and an understanding of its managed services
- Anchoring major components of the architecture into place, including the commerce vendor and web front-end
- Mitigating risks by targeting just one opportunity for change, therefore limiting the change management
- Quantifiably demonstrating the solution to a real business problem
- Helping to secure more support for future phases of the migration

Adopting the Strangler Pattern approach can be an effective method for transitioning to a composable commerce architecture, allowing businesses to prioritize critical issues and implement incremental changes that significantly de-risk the project.

It's worth noting that although composable commerce lends itself to a multi-phase approach, it can result in a higher overall project cost. However, making errors while trying to accomplish too much, too quickly can also be costly— and discouraging. It's better to plan for a slightly bigger spend to minimize the risks of a much costlier mistake.

Effective Change Management

Effective change management is crucial to a composable commerce migration, as new services and tools will have a direct impact on team structures, operations, and even roles.

Seek perspectives on pain points from the impacted teams directly, involving them during the relevant vendor selection process to obtain buy-in. Have open discussions on what changes they should expect, and how those changes will benefit them and improve their lives, rather than only emphasizing the benefits to the business's bottom line.

Development Teams

Working with a traditional commerce platform, development teams become highly specialized in the all-in-one or homegrown platform their organization uses. This means they deliver functionality exclusively through that platform, which leads to poor technical depth and a lack of specialized expertise beyond the platform.

With composable commerce, it's better to organize teams by functional areas (front-end vs back-end), instead of around a particular product/service. This helps the development team gain more technical depth and expertise, making it easier to implement new customer experiences as you enhance your offerings through the years.

Organizing development teams in this manner at the start of a composable transition can lay the groundwork for long-term success, but you still need to support development teams in making the transition. Offer training relevant to the new technologies required; provide opportunities to test drive the new tech and get excited about the change; and explore options to have development teams work side-by-side with an experienced partner to accelerate upskilling.

Product Managers

With an all-in-one commerce platform, product managers typically stay up-to-date on the new features released by the platform, and when it benefits the business, plan development work around the implementation. While predictable, it's not typically conducive to innovation or the development of creative solutions to business challenges.

In a composable commerce architecture, product managers become accountable for planning and releasing new features because virtually any customer experience can be implemented. This results in a more creative, innovative, and cross-functional approach, giving product managers greater freedom and control over the customer experience and business outcomes.

In addition, product managers are often required to hone their abilities in balancing business requirements and technical effort because they will now have increased accountability in both areas.

Business Users

With an all-in-one commerce platform, marketers, content writers, and other business functions have limited control and are largely governed by IT teams.

In contrast, composable commerce provides unprecedented control and flexibility, empowering business users to do more faster, without the need for developers. For example, a marketer could log into the CMS, design a brand new landing page, and

deploy it the same day, without ever having to interact with a development or design team.

Greater control and freedom means teams can act faster to generate results. But it also means a higher risk for brand-impacting mistakes. As a result, IT teams need to prioritize the implementation of guardrails to prevent business users from inadvertently overstepping.

Conclusion

As the landscape of digital commerce continues to evolve, composable commerce has emerged as a strategic choice for brands seeking proven results and a future-proof architecture. This shift is evident in the increased adoption of MACH technologies across various industry verticals, now readily accessible through platforms like the Google Cloud Marketplace. The reference architectures presented in this report reflect these developments, providing a roadmap for brands to leverage modular technologies effectively. While transitioning to a composable commerce model involves careful planning and execution, it is a crucial step for brands aiming to enhance their technological capabilities and meet diverse customer expectations.

We encourage brands to collaborate with technology vendors to tailor the composable architecture to their unique operational needs, ensuring a smooth integration into their existing systems. To that end, our team at Orium would be happy to assist you on your digital transformation journey.

About Us

Orium is the leading composable commerce consultancy and systems integrator in the Americas. We work with best-in-class technology partners to set strong composable commerce foundations that support how brands serve their customers across channels.

commercetools, inventor of headless commerce, is a digital software provider that empowers organizations to embrace innovation and thrive by providing flexible APIs that enable an agile, customizable commerce infrastructure at scale. Relied on by some of the world's most iconic brands, commercetools enables continuous innovation by connecting digital channels to physical stores, and optimizing every new channel, from in-car and video content to AR/VR and voice to IoT-enabled machines, as well as future devices yet to be developed.

Contentstack – the Composable DXP leader – empowers marketers and developers to deliver composable digital experiences at the speed of their imagination. Contentstack has the industry's highest customer satisfaction rating and is a founding member of the MACH Alliance, advocating for best-of-breed composable technology that is Microservices-based, API-first, Cloud-native SaaS, and Headless.

Interested in learning more?

Composable commerce unlocks a world of possibility for brands. This guide is the first step on the path to turning big ideas into reality, but the support and guidance from expert practitioners and technology leaders ensures you'll be able to do more, faster, and with less risk.

Reach out to your Orium, commercetools, Google Cloud, or Contentstack Account executive today, or email sales@orium.com to learn more.

Google Cloud accelerates every organization's ability to digitally transform its business. We deliver enterprise-grade solutions that leverage Google's cutting-edge technology – all on the cleanest cloud in the industry. Customers in more than 200 countries and territories turn to Google Cloud as their trusted partner to enable growth and solve their most critical business problems.

Netlify is the platform used by developers to build highly performant and dynamic websites, ecommerce stores, and applications. As pioneers of the Jamstack movement, Netlify brings together all modern web frameworks, serverless functions, and edge computing into one platform to deliver unmatched user experiences. Millions of developers and businesses build with Netlify, from Fortune 500 companies like Unilever and Verizon, to companies changing our digital experiences like Peloton and Twilio.


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