

## THE ERA OF API-FIRST CONFIGURE-PRICE-QUOTE SOLUTIONS

### Abstract

In a world where digital experiences are becoming increasingly immersive, and the attention span of users is becoming increasingly diminutive, every website, app, and billboard is constantly struggling to attract attention and keep it. E-commerce is just one of the parties in this struggle, and with a much larger stake than most due to the revenue that is generated from digital channels increasing consistently over the years. But, while the race for better digital sales is paramount, the accuracy of products and pricing is also imperative for customer satisfaction. That is where Configure-Price-Quote (CPQ) solutions step in to provide a stable framework. A holistic enterprise architecture needs to account for both aspects for success.

## Introduction

According to a study, the average attention span of a website visitor is approximately eight seconds. In a world teeming with digital interactions, that translates into a major war for user attention, with each app or website trying to minimize their bounce rates. E-commerce websites and apps are no exception. This has generated

constant disruption and innovation in the e-commerce space as businesses try to maintain or improve on the digital revenue attracted by websites or apps.

The core of e-commerce, however, is two-fold: the digital shopping experience and the catalog/pricing engine. While the digital

experience part is under constant flux to innovate, the catalog/pricing engine part is built for reliability and stability to ensure catalog availability, accurate pricing, and precise order creation. Typically, the former is handled by e-commerce portals, and the latter is where Configure-Price-Quote (CPQ) solutions play a critical role.

## Configure-Price-Quote (CPQ) Solutions

### What is a CPQ Solution?

A CPQ solution is a sales tool that produces accurate quotes based on a pre-defined product catalog, established prices, accurate discounts, and transactional configuration. It allows a user to choose an eligible offer, which is available based on defined conditions, configure it based on the needs, see accurate pricing with applicable discounts, and subsequently generate and email a quote document that is considered legally binding for both parties.

CPQ solutions are imperative for avoiding pricing errors using enterprise-wide pricing

and discounting definitions. They also ensure that the eligibility and availability of products are considered to avoid order fulfillment issues at later stages. And, while providing mechanisms to bind quoting into a defined framework, they also provide avenues for negotiations and adjustments done by agents at a transaction level and subsequent approvals for checks and balances.

### Key Components of a CPQ Solution

The key components of a CPQ solution typically include the following:

1. Product catalog
2. Product bundle /offer definition
3. List price entries
4. Discounting array
5. Pricing engine
6. Rules engine for availability, eligibility, and adjustments
7. Manual per-transaction adjustments and approvals
8. Document generator
9. Order generation

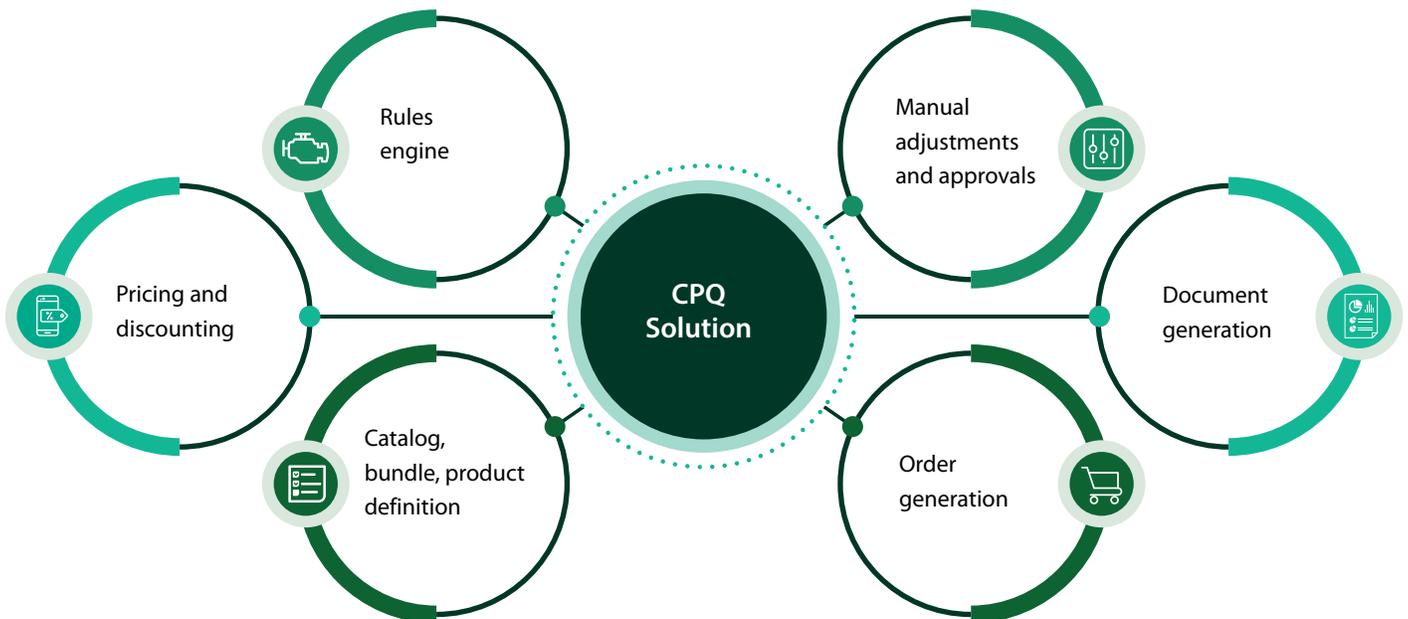


Fig 1. Components of a CPQ Solution

Apart from this, some CPQ solutions also offer features like taxation, amendments and renewals coupled with contract management, supplemental order creation, Move-Add-Change-Disconnect order creation, recommendations engine, etc.

## API-first CPQ Implementation

### Why API-first Designs are Needed

The key focus of CPQ solutions is building faster, more accurate pricing engines—not the digital experience of users. With more enterprises opting for a modular enterprise architecture, the de facto for digital experiences has become

e-commerce portals, which integrate with CPQ solutions for catalog maintenance, product availability and eligibility, pricing, discounting, and quote document generation. This creates a need for CPQ solutions to be built in a CPQ-first manner

or to at least offer API-driven interaction capabilities for a headless/touchless implementation that can achieve the same functions as the CPQ user interface with the added benefit of state-of-the-art e-commerce user experiences.

### Typical Implementation Architecture

When implementing a CPQ solution in headless/touchless mode, the following is the typical architecture:

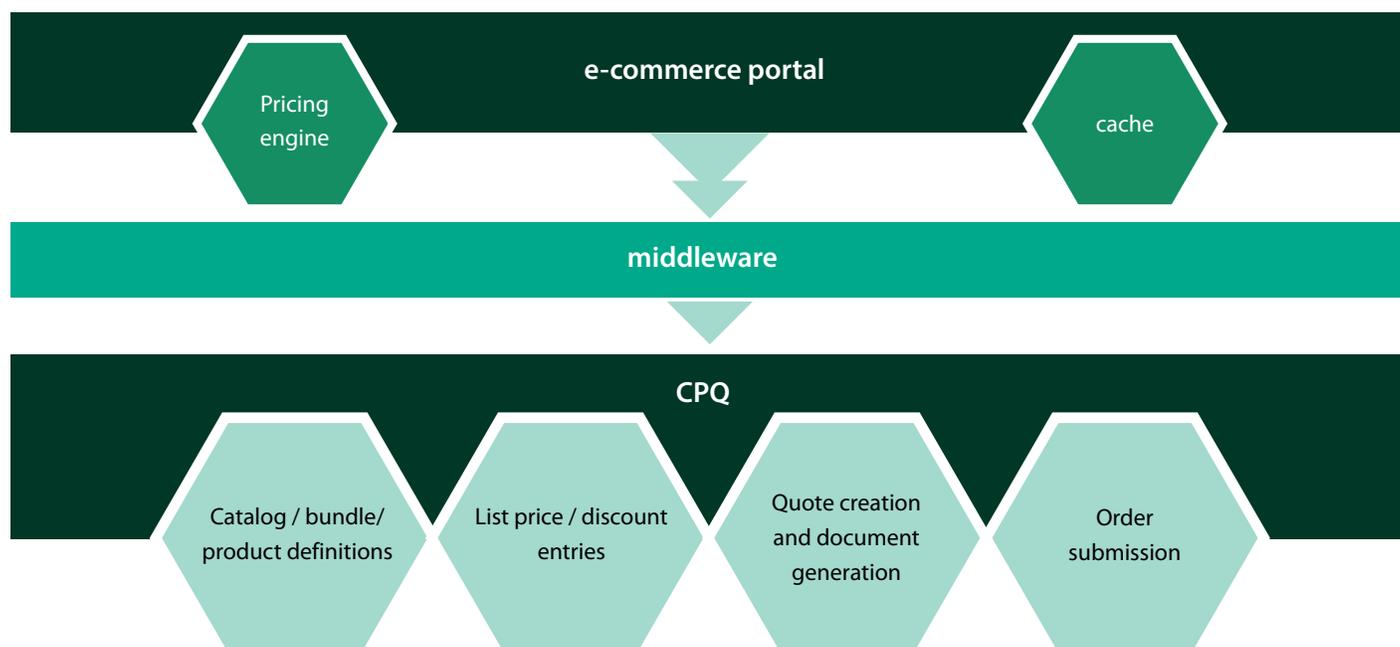


Fig 2. Typical Headless/Touchless CPQ Implementation Architecture

Though middleware is optional, it is strongly recommended to use a middleware to ensure more robust, traceable interactions between the e-commerce portal and CPQ. The capability to track and retrigger

integrations, allow multiple patterns for integrations, and handle transformations of data make middleware an essential element. Most middleware products come with pre-built connectors to common CPQ solutions and e-commerce portal solutions.

Both the pricing engine and cache for non-transactional data are also optional elements, but they are each strongly recommended for maintaining a sleek user experience on the portal side.

## Typical Implementation Approach

When implementing a CPQ solution in headless/touchless mode, the following is the typical approach:

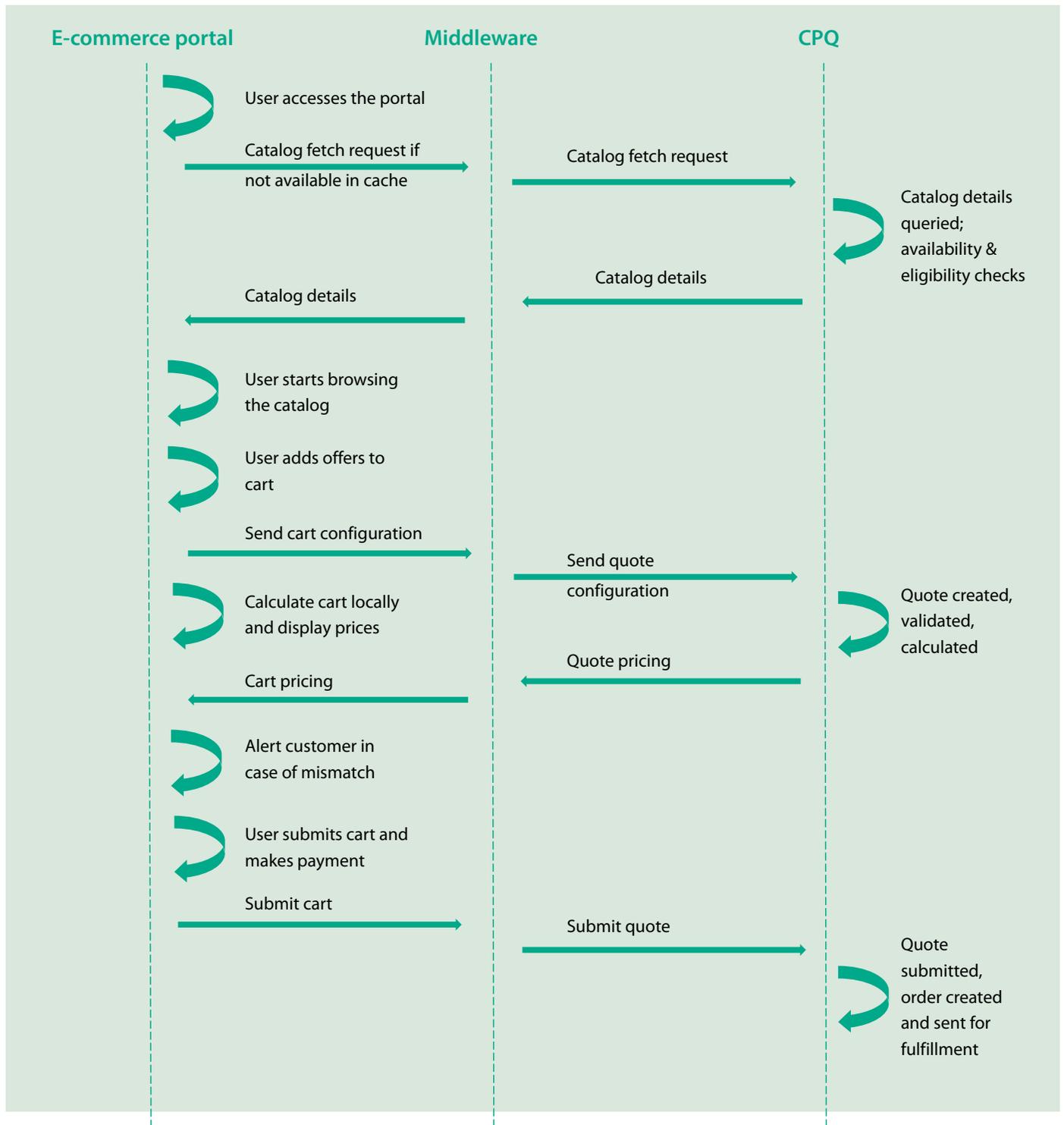


Fig 3. Sequence Diagram for Typical Implementation Approach

## Implementing Security and Access Control

Even though the e-commerce portal and CPQ solution are decoupled, and each is expected to have its own level of security and access control mechanisms, the integration between the two should also adhere to strict security and access control regulations.

A common pitfall in the integration approach is to utilize a principal user for authentication across systems, typically an integration user created specifically for the purpose of data exchanges. This poses the risk of bypassing security or access control setup in one or both systems.

### Per-User Integration Approach

To mediate that risk, the ideal approach to integrations between e-commerce portals and CPQ solutions is to utilize the per-user integration approach. This requires each user to be set up with the correct permissions and access in both systems, typically using a common directory of users to keep users and user groups in sync across both systems. Having an integration call between systems authenticated using an individual user ensures access to the correct data and provisions to perform only the allowed actions, enabling detailed auditing for each user and timely addition/removal of access based on the user directory sync.

### Handling Personas

When implementing e-commerce portals with CPQ solutions for an enterprise, determining the key personas utilizing each system is paramount. It is imperative to understand that not all personas will utilize the e-commerce portal or that not all personas must have access to the CPQ solution via a user interface. Below are some of the typical personas that should be considered and their typical handling:

#### End Customer

An end customer is the one who consumes the products/services sold by the enterprise and is the core of the solution definition from an e-commerce perspective. End customers need to have access to the e-commerce portal via multiple channels, like website, mobile app, etc., to ensure they can browse and purchase products/services at any time of day. The functions an end customer performs are typically limited to browsing, configuring, and purchasing products / services, followed by order tracking.

#### Partner

A partner is an umbrella persona for external sales enablers. A partner can be a reseller, dealer, distributor, retailer, etc. A partner typically buys products/services in bulk on behalf of end customers and then resells those via their own enterprise or other channels. This implies that the partner has access to the e-commerce portal for browsing, configuring, and purchasing products and services. Typically, the pricing and discounting mechanism for partners varies in the CPQ solution to encourage bulk selling, so partners might have more control over product configuration as compared to an end customer.

A special case within partner persona is a product/service partner—someone whose products/services are sold via the enterprise channels. In such cases, the partner needs access to the CPQ solution either via a user interface or an API to allow for creation and modification of products, prices, and discounts for their product base.

#### Sales Agent

A sales agent is an employee of the enterprise who sells products / services to an end customer or partner. The primary system of engagement for an agent is the CPQ solution, typically coupled with a telephony interface to allow for sales over phone calls. An agent has a high level of control in terms of configuration of the product / service via the CPQ user interface and can typically provide additional discounts as well for pushing a sale through.

Sales agents also have access to e-commerce portals to help end customers or partners in case of any challenges. An ideal e-commerce portal should have multi-persona access to a cart. An end customer should be able to review, modify, and check out a cart created on their behalf by an agent or partner. This also implies that carts should not be shared across customers or partners for compliance and business reasons.

#### Product Manager

A product manager is an employee of the enterprise who is responsible for maintaining the products / services sold via the portal and their configuration attributes, pricing, promotions, and lifecycle. The typical system of engagement for a product manager is the CPQ solution where products, product attributes, offers, bundles, catalogs, prices, discounts, and promotions are all maintained. In some cases, the product / pricing master might be an external system, leading to data updates in the CPQ solution via APIs. The updated data, in turn, reaches the e-commerce portal via integrations.

## Performance Challenges

When implementing an e-commerce portal coupled tightly with a CPQ solution, performance becomes a concern due to the additional latency introduced by the CPQ layer. Given that the key driving factor of any e-commerce platform is to keep the user engaged with sub-second responses, adding the latency of API calls to the mix seems like a counter-intuitive approach. This is where an API-first design of the CPQ solution itself makes a difference when coupled with integration patterns and user experience design to account for performance bottlenecks.

## Handling Long-running CPQ Operations

CPQ solutions will inherently have long-running operations when the pricing engine executes or when the document generation triggers. The key is to design the user experience to accommodate these operations with alternative user engagement or logic replication on the portal side. For example, one of the common practices is to host a pricing engine on the e-commerce portal side as well to reduce reliance on CPQ for getting prices for cart configuration as the user tries out various products and combinations. The final price from CPQ is obtained only once the customer submits the quote and any mismatch in pricing is shown to the customer with an alert.

## Caching

Maintaining a cache on the portal side is an effective measure for reducing latency when dealing with non-transactional data like catalogs, bundle definitions, etc. However, caches are effective only if data in the cache leads to cache hits more often than cache misses, in which case it becomes merely an additional hop. To ensure data availability and the accuracy of the said data, cache warming with heuristic/machine-learning based approaches to refresh data on a periodic basis can be utilized. The cache warming algorithm should consider the most common hits and the most common misses and regenerate the cache periodically to include those elements, leading to higher availability of data in the cache.



## Conclusion

In the fast-paced world of digital experiences, the bedrock of CPQ solutions needs to evolve to provide the accuracy and stability required by e-commerce portals in a predictable, scalable, and efficient manner. E-commerce portals and CPQ solutions are two facets of the digital experience coin, inseparable yet distinct; one cannot sustain an enterprise digital solution without the other. This should be the driver for better product designs as well as better integration patterns and user experience designs, fulfilling the needs of e-commerce while giving leeway to CPQ operations.



## About the Author



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He has more than 11 years of experience in designing and developing Salesforce applications with a keen eye for innovation, optimization, and efficiency within the platform as well as in business processes. He has worked in multiple domains, from banking and insurance to manufacturing and telecommunications. He also has a knack for ideating, designing, developing, and documenting reusable assets and bots to aid in the development and implementation of projects. Pratyush has an overwhelming love for the literary arts and is an author, blogger, and poet when not designing disruptive tech solutions.

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