



CONFIGURE-TO-ORDER MANUFACTURING

Multi-Modal Industry Brief

Configure-to-Order (CTO) manufacturers create or select products by using combinations of validated features, options, values, or attributes. Configuration rules ensure product integrity. Final configurations create unique manufacturing bills of material, routings, costs, and prices for customer quotes and sales orders.

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Exceed Customer Expectations with Rules-Based Product Configuration and Personalization

Many products are available in varied configurations. Architectural products like doors, windows, and cabinets have different dimensions and are manufactured using varied materials and finishes. High-end bicycles are built to order with many options for seat posts, handlebars, braking systems, wheels, and other optional components. Configuration is common in other manufacturing industries, including automotive products, electronics, home goods and furnishings, machinery and equipment, and instruments and medical devices.

Companies with limited product variation may use matrix items to define finished goods when few configuration options are available. Conversely, other manufacturers require rules-based product configurators to manage interdependencies and formulas for complex products. The result is thousands of possible variations based on a variety of options.

Product configuration is becoming more mainstream as consumers and business customers demand personalized products. Commerce storefronts give people self-service power to build the exact products they need without assistance from the manufacturer.

Known today as configure-price-quote (CPQ), product configuration has evolved to include parametric visualization where users can see product variations as they select or deselect options and attributes.

This industry brief explains configure-to-order manufacturing with an overview of ERP technologies and features. Discover how leading manufacturers thrive with a modern ERP platform designed for configure-to-order manufacturing.



CPQ applications are common in sales and quoting processes. The CPQ application often acts as a product selector to find pre-defined items using option and value definitions. However, few CPQ applications are designed for manufacturers due to complex calculations for bill of material requirements, labor operations, and detailed manufacturing information stored in the ERP application.

How to Choose the Right Application for Variable Products

Acumatica provides several options to streamline sales for variable products—matrix items, a native product configurator application, and a connected CPQ application for advanced configuration functionality.

Acumatica's matrix item feature uses attributes such as size, style, and color to generate inventory items with unique identification numbers, descriptions, and prices. Matrix items are useful for managing raw materials or purchased products such as hardware, fashion, or home goods. Users can select items for quotes, sales orders, or purchase orders using attributes to identify the correct matrix item or groups of items.

Manufacturers with traditional configuration options leverage the Acumatica Product Configurator, one of the most robust and affordable rules-based configurators available. Web API endpoints enable manufacturers to connect the Acumatica Product Configurator with external systems such as web-based configuration tools. Advanced configuration requirements are available in connected apps like [Revalize Configure One Cloud](#).

Acumatica Matrix Items

- Create items and descriptions based on multiple attributes like size, style, and color.
- Find items for quotes, sales orders, or purchase orders by attribute.
- Select multiple items for orders using matrix grids.

Acumatica Product Configurator

- Create configuration rules to generate unique finished goods based on features and options.
- Generate manufacturing bills of materials, costs, and pricing for configured products.
- Calculate required materials, costs, and prices.

The screenshot shows the Acumatica interface with a 'Configuration Entry' window open. The window title is 'Configuration Entry' and it shows a tree view of components for a 'SHOWERKIT - Shower Kit'. The components listed are SHOWERTRAY, AMF150/0900, FLOORGLASS, CSM450 2, HOB, and CON010. The 'AMF150/0900' component is expanded, showing a table of included items:

Included	Label	Description	Qty	UOM
<input type="checkbox"/>	Xircon 1000 Shower Base ...	CSM600 1000 Wide	126.00	MM
<input checked="" type="checkbox"/>	AMF150/0900	AF150/0900 Wall Angels	36.00	MM
<input type="checkbox"/>	AF150/1000	AF150/0900 Wall Angels	36.00	MM
<input type="checkbox"/>	AF060/1000	AF060/1000 Front Angels	26.00	MM

The interface also shows a sidebar with navigation options like Favorites, Data Views, Time and Expenses, Finance, Banking, Payables, Receivables, Sales Orders, Purchases, Inventory, Production Orders, and Dashboards. The top navigation bar includes a search bar, user profile, and system information.

Create unique finished goods and manufacturing bills of material with Acumatica's native, rules-based product configurator.



Many CPQ applications are designed exclusively for the guided selling of non-manufactured products. They do not create manufacturing bills of materials, calculate manufacturing costs, or generate configured CAD files. Pay close attention to manufacturing integration points between the CPQ application and your ERP. Design systems to ensure a seamless transition of data for production. Advanced features are available with Revalize Configure One Cloud for Acumatica.*

Configuration Parameters

CPQ apps enable users to build simple or complex configuration rules. For example, a product may only be available in certain colors, and specific size options may limit color options. Configuration rules can be complex, such as shelf or rack configuration, which may have several layers of nested configurations.



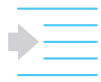
Estimate Conversion Rates



Formulas



Item Number Settings*



Nested Configurations*

Costs and Pricing

The custom bill of material and required labor operations produce a base product cost. Using different costing methods and formulas may be simple or very complex. A base price is typically configured with a targeted markup for sales. However, some CPQ apps support customer pricing with rules to adjust pricing by customer class or other factors.



Base Cost Calculation



Costing Methods



Base Price Calculation



Customer Pricing

Production Standards

The selection of varied options and values builds a custom bill of material. Formulas may be used to calculate material quantities. Further, some CPQ applications can calculate and define required labor operations to build a unique product. Advanced features include CAD file creation based on the configuration.



Bill of Materials



Labor Operations*



CAD Models*



Finished Good Part Numbers*

Sales Features

Internal employees historically used CPQ applications. However, modern CPQ applications support omnichannel sales scenarios for business-to-business (B2B) and business-to-consumer (B2C) configuration via sales portals or connected storefront platforms. Visualization provides 2D or 3D parametric configuration where users can see product changes as they select options and values.



2D/3D Visualization*



Quotes and Orders



Guided Selling*



Commerce Storefronts*



The Acumatica [Manufacturing ERP Evaluation Checklist](#) provides a high-level overview of major features required by most manufacturers. The table below highlights specialized features for configure-to-order manufacturers. Some features are natively supported while others may require Revalize Configure One Cloud*.

FEATURE	BENEFIT	PRIORITY	Acumatica		
Matrix Items	Create inventory items automatically for varied attribute combinations such as size, color, and style. Use matrix item attributes to find and select items for sales and purchase orders.		✓		
Configuration Rules Engine	Create configuration rules to restrict features or options based on other selections. For example, large shirts are only available in blue and red.		✓		
Features, Options, and Attributes	Create features, options, or attributes to define selections during the product configuration process. They should provide flexibility for numeric values or ranges, validated lists, and text options.		✓		
Formulas and Calculations	The CPQ system should support formulas for calculating material requirements, costs, and prices.		✓		
Bill of Materials	Configuration options result in a unique manufacturing bill of material using items in the ERP inventory system.		✓		
Configured Costs	Configurations for finished goods create a costed bill of material using raw material costs from the ERP system combined with labor and overhead rates.		✓		
Configured Price	The CPQ system can calculate a base price with a defined markup percentage. ERP pricing rules may be applied to the base price for customer-specific or promotional pricing scenarios.		✓		
Configuration Keys	Configuration keys are saved so users can create orders based on previous configuration settings.		✓		
Quote and Order Creation	Product configuration may be launched from quotes or sales order entry screens.		✓		
Labor Operations*	The CPQ system can add labor operations to the bill of material. Formulas may be used to calculate run times and other operation parameters.		✓		
Part Number Creation*	CPQ applications are available to create new part numbers for inventory using masking with segments based on features, options, values, or attributes. The system can also create custom item descriptions.		✓		
2D/3D Parametric Visualization*	The application provides two-dimensional and three-dimensional visualization of the product during the configuration process with zoom and pan features to view multiple product dimensions.		✓		
CAD Model Generation*	The CPQ application can generate an accurate CAD model with popular engineering design applications.		✓		
B2B/B2C Storefronts*	CPQ apps may be accessed from e-commerce storefronts. The system synchronizes orders, new items, bills of materials, and other data with the ERP system for inventory, order management, and production.		✓		
Document Creation*	The CPQ application can create custom product proposals with cover letters, terms and conditions, multi-line quotes, brochures, and specifications.		✓		
Nested Configurations*	Nested configurations are supported where configured components may be defined within a larger configuration assembly.		✓		



Enterprise resource planning (ERP) systems are essential for configure-to-order manufacturers. Without ERP, product configuration is disconnected from items, bills of materials, prices, operations, and other data required by the CPQ engine to create finished goods. Connected CPQ and ERP applications streamline the sales process, boosting revenue and improving the customer experience.

Grow with a Flexible ERP System Designed for CTO Manufacturers

Armed with the right features, CTO manufacturing leaders have the tools they need to tailor products based on customer needs and wants. Connected applications result in increased sales, improved profits, happier customers, and improved efficiency.

Boost Revenues

Sell more by providing custom products for customers based on varied options and attributes. Leverage native features for up-sell, cross-sell, and item substitutions. E-commerce storefront integration increases configured product sales as customers can self-serve and visualize configuration options in real-time before purchasing.

CPQ integration with your ERP application reduces costs related to manual data entry and hand-written calculations. Streamline the process with rules and pre-built connections to configure products faster and more accurately for improved profits.

Exceed Customer Expectations

Outmaneuver competitors by responding faster to customer requests with an intuitive product configurator. Empower customers to configure items on secured sales portals or connected e-commerce storefront platforms. CPQ apps generate professional proposals with product details, images, and documentation for customers to approve orders.

Improve Efficiency

Eliminate manual processes and errors with connected applications that empower employees and customers with tools to configure virtually any product they can imagine, and you can make.

The screenshot displays the Configure One Cloud interface for configuring a Hydraulic Cylinder. The product is identified as 'Hydraulic Cylinder - 3D' with serial number 'DEMO-32511-C1'. The list price table shows a base price of \$120.00, with various options included or priced as add-ons. The 3D model shows a cylinder with a 10-inch travel length. The configuration options on the right include selecting bore and rod diameters, cylinder length, rod seal material, and stop tube length.

List Price	
Base Price	\$ 120.00
Size Adder	Included
Bore Dia. (in.)	1.5"
Rod Dia. (in.)	.625"
Stop Tube: Yes	\$ 59.50
Length Adder:	\$ 8.50
0.85 (10 @	\$ 0.85)
Mount: No	Included
Mount:	
Rod End: Plain	Included
	\$ 188.00

Product: Hydraulic Cylinder - 3D
Serial Number: DEMO-32511-C1

Travel Length: 10 (0.5-25.0)

Rod Seal Material: 80 Durometer Nitrile

Stop Tube: Yes No

Advanced CPQ features are available in Revalize Configure One Cloud for Acumatica. Integration supports commerce storefront deployments, CAD model generation, parametric visualization, nested configurations, and finished good item numbering.



“We work with about 20 different flooring vendors that have different rules to cost an area rug. You’re defining it by the inch, you have multiple colors, multiple finishings, and other add-ons. And so, we have a very complex way to get to the final price that we need to show live on the website and calculate accurately within the ERP . . . The product configurator in Acumatica was the only solution that did that elegantly.”

–Peter Bonoff, Sales and Operations Manager, Curran

Curran Turns to Cloud ERP to Scale Its Business and Support Growth

In 2018, Curran, a luxury outdoor furniture and flooring online retailer headquartered in Seattle, identified the need to embrace a digital-first strategy. Up to that point, the company had relied on a mix of legacy and paper-based processes to run its business. Those legacy systems were unstable and not set up well, impacting the efficiency of employees. Curran lacked visibility into data and could not do basic reporting; getting information about customers, products, sales, margins, and so forth was impossible. Inventory management was also poor, and Curran needed multicurrency functionality to expand further into Europe.

Facing all these issues, Curran started the process of finding a solution to begin its digital transformation journey. Curran aimed to consolidate multiple legacy systems that ran its operations into a single ERP platform, Acumatica ERP Manufacturing Edition.

Curran collaborated with their Acumatica partner and hired a new employee to lead and manage the ERP project internally. Curran spent roughly six months on implementation, with the go-live taking place during the third month of the pandemic.



In hindsight, Curran wishes it had taken a more holistic view of the system from the start. Having a small team lead an ERP project can make it a challenge for any organization to balance the big picture and the impact decisions have on all groups in a company. In addition, while Curran considered best practices from the start, those practices had to be built from the ground up because the company historically had not utilized them. Curran also faced challenges in setting up its system to fit its business’s unique custom product needs.

Digitization has long been the backbone of operational effectiveness for manufacturers. Throughout the project, Curran identified key performance indicators (KPIs) to measure success. Most metrics are around time savings and employee productivity, which are critical for a small but growing company such as Curran. In addition, Curran has increased its sales without increasing its sales staff, with company revenue rising from \$3 million in 2018 to \$10 million in 2021. Additional areas in which Curran has experienced benefits are as follows:



- Purchase order accuracy has increased. Employees used to enter information manually; now, purchase orders are generated directly from sales orders.
- Employees can always access the most up-to-date data to make informed business decisions.
- Manual data entry has been eliminated, saving time and increasing accuracy.

Curran feels its ability to maximize the value of data will open new business avenues for the company as it utilizes years of historical data. There is also excitement around building an e-commerce platform (low-volume, high-touch/high-value sales) that will provide Curran with high visibility into all orders and customer experiences. Curran is in the planning stages with an e-commerce partner of Acumatica’s to build the platform. Also, while Curran does not operate its own warehouse yet, the company is looking into adding warehouse management capabilities over the next five years.

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CONCLUSION

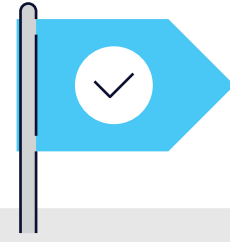
Transform Product Configuration with a Future-Proof Cloud Manufacturing Platform

Acumatica's native Product Configurator is an affordable and robust option for many configure-to-order manufacturers. Companies with advanced configuration needs such as commerce storefront integration, nested configurations, parametric visualization, and CAD integration are well-served with Revalize Configure One Cloud.

Sell more with native e-commerce storefront connectors, up-sell, cross-sell, and item substitutions. Manage extensive raw material portfolios with matrix items using attributes to create inventory records and select items for sales or purchase orders.

Acumatica Manufacturing Edition helps manufacturers maximize resources, reduce costs, and improve profits. An extensive suite of connected business applications provides unparalleled manufacturing depth for production, estimating, engineering, material planning, scheduling, product configuration, and manufacturing data collection.

Balance supply and demand with inventory, sales, and purchasing on top of a comprehensive suite of accounting applications. Leverage automation, workflows, and document management to connect data and processes throughout the manufacturing business for improved customer service, retention, and growth.



“The matrix inventory probably saves us two full-time employees. We're saving three-quarters of an employee using Acumatica for royalties . . . Acumatica will help Jeffree Star Cosmetics grow by giving us the data to make wise decisions as we move into the future.”

– JENNI ARANT
CHIEF STRATEGY OFFICER
JEFFREE STAR COSMETICS /
KILLER MERCH

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Acumatica Cloud ERP is a comprehensive business management solution that was born in the cloud and built for more connected, collaborative ways of working. Designed explicitly to enable small and mid-market companies to thrive in today's digital economy, Acumatica's flexible solution, customer-friendly business practices, and industry-specific functionality help growing businesses adapt to fast-moving markets and take control of their future.

For more information on Acumatica, visit www.acumatica.com or follow us on [LinkedIn](#).