

The Changing Landscape of Barcode Labeling

Global Supply Chains and Changing Regulations Power
Enterprise Labeling Solution Evolution



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By Richa Gupta, Director AIDC with David Krebs, Executive Vice President

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EXECUTIVE SUMMARY

Diverse international regulations, global distribution channels, and evolving customer requirements have become the norm in business today and every organization has its own unique set of business processes, regulatory considerations, and traceability requirements that its barcode labeling-related investments must accommodate. Therefore, when it comes to barcode labeling software, integration to existing business applications, deployment reliability and scalability are important considerations.

This paper addresses the evolution of barcode labeling software and outlines the evolving requirements shaping the future of labeling. You'll also find out how leading Enterprise Labeling Solution providers help companies manage mission-critical labeling in today's new interconnected, flexible, and efficient global supply chain model.

Standardization is the single most important criterion for organizations, especially as they look to achieve labeling consistency across their distributed locations and promote business continuity. To meet evolving customer demands, leading labeling solution providers now focus their offerings on enterprise-wide deployment models versus individual, single user licensing.

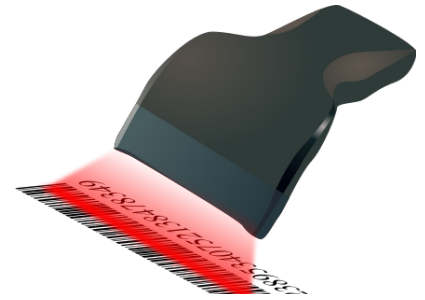
Labeling software is not treated as a siloed, standalone application by either the vendor or the deploying enterprise. Instead, integration with business process applications like Enterprise Resource Planning (ERP), Product Lifecycle Management (PLM) and Warehouse Management Systems (WMS) is essential to support companies' need for seamless and pervasive communication across enterprise-wide solution deployments.

Businesses are increasingly opting for multi-modal approach to enterprise application deployment. Interest in cloud-based models continue to grow as solution providers are able to establish lower total cost of ownership (TCO) by freeing up storage and processing-related resources. Cloud-based models will also enable end-user organizations to cut down on their in-house IT functions and investments by offloading application services to third-parties.

Loftware is a solution provider that is equipped to integrate with a cloud-based enterprise application, an important consideration for organizations currently undergoing or evaluating migrating to the cloud. Solutions like Loftware Spectrum® address enterprise end users' evolving labeling requirements by offering a cloud-based solution that provides a browser-based interface with multi-site deployment. Loftware Spectrum is designed to alleviate challenges associated with distributed operations and centralized application deployment models. The vendor looks to help organizations sustain a competitive advantage in their markets by helping them operate seamlessly in today's new interconnected, flexible, and efficient global supply chain model.

IMPORTANCE OF BARCODE LABELING

Barcode labeling is central to a range of mission-critical enterprise operations including production and distribution; supply chain traceability, management and control; and final delivery. Every organization has its own unique set of business processes, regulatory considerations, and traceability requirements that its barcode labeling-related investments must accommodate. Globalization has dramatically transformed markets and entire industries, generating greater opportunities while also expanding operations and ultimately creating complex multi-step supply chains. Enterprise Labeling, which allows companies to leverage existing business processes and vital data sources, is a strategic enabler for customer responsiveness, regulatory and standards compliance, brand consistency, enterprise collaboration, business continuity, and supply chain efficiency. VDC's latest research on enterprise labeling highlights the importance of attaining and maintaining compliance with customer, government, and industry mandates in order to support expanding operations, globally distributed supply chains, and the need to improve recall preparedness and overall supply chain transparency. As businesses and their supply chains become more proactive, agile, and flexible, it has become essential for them to change their approach to their use of and investments in labeling solutions especially as demands for labeling accuracy and consistency increase. The increasing use of barcodes, anti-counterfeiting initiatives, and the push for serialization in certain industries such as automotive, food and beverage, and pharmaceuticals is also helping drive home the importance of labeling.



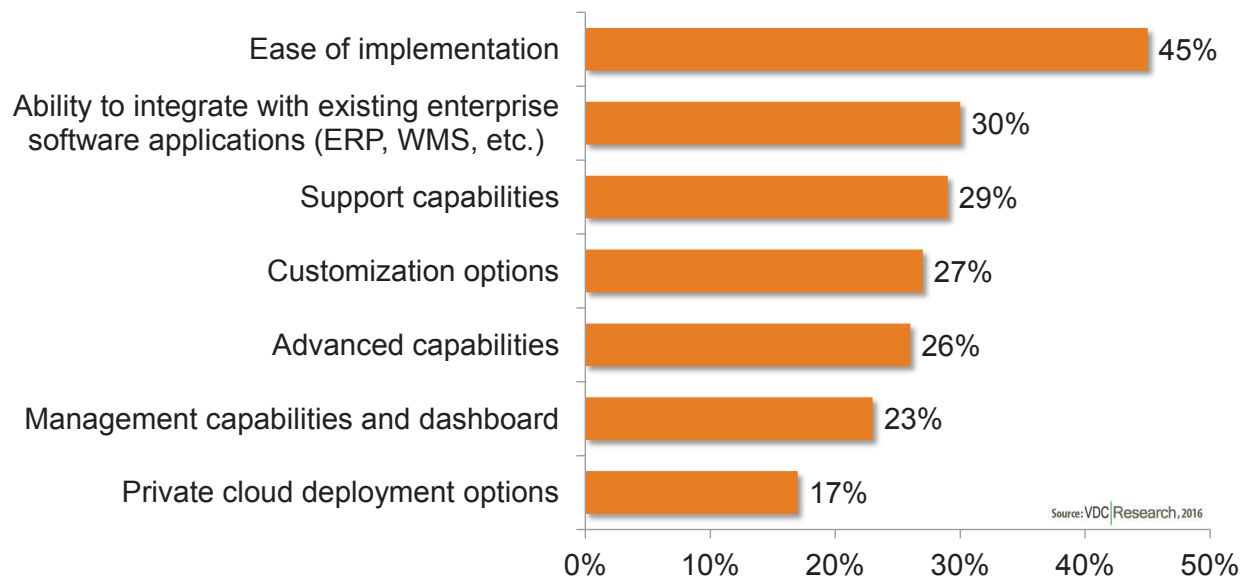
Policymakers, industry groups, and leading manufacturers have, in recent months, begun pushing for the adoption of traceability systems on a national scale to address issues ranging from food safety to driver safety and patient safety, and to consumers' right to know what is in the product they are purchasing. Each regulation introduces stringent deadlines, guidelines, and extended powers to regulatory agencies respective to their industries and companies risk significant delays, penalties, and fines with non-compliance. Traceability initiatives and technology like labeling software are now established as vital elements to enable supply chain efficiencies, without which companies stand to expose themselves to considerable risks and liabilities. To meet supply chain executives' core functional requirements, labeling solutions today must be dynamic and scalable with advanced automation and integration capabilities to connect to a centralized source of truth for data to successfully deal with a broad range of customer and regulatory requirements. They are increasingly realizing and recognizing the importance of labeling in helping achieve key business objectives that have a direct impact on organizational profitability.

Barcode labeling is mission-critical to support everyday operations; therefore, when it comes to barcode labeling software, deployment reliability and scalability are important considerations. Organizations' labeling software purchasing decision is heavily influenced by factors like configurability and flexibility. The ability to configure commercially available software with minimum hassle in-house or via third-party partners is an increasingly desirable characteristic. Labeling software is not treated as a siloed, standalone application by either the vendor or the deploying enterprise. Instead, integration with business process applications like Enterprise Resource Planning (ERP), Product Lifecycle Management (PLM) and Warehouse Management Systems (WMS) is essential to support companies' need for seamless and pervasive communication across enterprise-wide solution deployments. Technical support and consulting; onsite and remote maintenance, updates and upgrades; and certifications also feature on businesses' list of critical requirements of their solution partners, as evidenced by VDC's research on the topic. Companies base their enterprise application selection on the solution's ability to meet their specific operational and functional requirements.

BARCODE LABELING SOFTWARE EVOLUTION

Diverse international regulations, global distribution channels, and evolving customer requirements have become the norm in business today. Organizations rely heavily on their solution provider partners to closely align application configuration with existing business requirements and operational processes. Ease of implementation (45%) and integration with enterprise applications including ERP and WMS systems (30%), are consistently cited as the leading selection criteria for enterprises' choice of barcode labeling solutions, according to results from a recently conducted VDC survey. As business processes and applications are becoming ever more interconnected, enterprise application integration is an essential requirement for labeling solutions.

Exhibit 1: Barcode Labeling Software Selection Characteristics



Standardization is the single most important criterion for organizations especially as they look to achieve labeling consistency across their distributed locations and promote business continuity. To meet evolving customer demands, leading labeling solution providers like Software now focus their offerings on enterprise-wide deployment models versus individual, single user licensing. This is designed to support operations across organizations' supply chains thereby enhancing overall efficiencies and performance reliability, being easier to scale and maintain, meeting complex requirements, and promoting labeling accuracy. Some of the key characteristics supported by enterprise labeling applications include enabling business users to manage labels and support for high-volume printing via smarter distribution of label information to printers. VDC's primary research indicates that labeling application integration with enterprise applications remains spotty and largely unreliable, with more than 60% indicating limited-to-no communication between the two applications. This is where solution providers like Software are highlighting the benefits associated by seamlessly integrating enterprise business process application suites with the labeling function to leverage investments thereby driving supply chain-wide labeling accuracy and consistency. Making the labeling function an integral part of enterprise applications brings about business process improvements and cost reductions while ensuring content consistency and reliability across all supply chain participants.

On-premise deployment has traditionally been the solution adoption and installation model-of-choice for the vast majority of enterprise end users, as evidenced by VDC's primary research on the topic. However, several mid-sized to large organizations are starting to migrate some or all of their business applications and data to the cloud via private

cloud and software-as-a-service models. Cloud-hosted applications are gaining increased investment consideration with a growing number of end users evaluating a potential move away from 100% on-premise hosted options. Not only will this enable significantly greater flexibility in terms of greater (and more distributed) access to mission-critical applications, but will also reduce the need for investments in costly in-house network infrastructure, thereby minimizing capital expenditures. 46% of respondents to VDC's survey on the topic indicated existing on premise deployment of enterprise applications, a percentage that is expected to come down to 37% in the next three years. Loftware is a solution provider that is fully equipped to integrate with cloud-based enterprise application suites, an important consideration for organizations currently undergoing or evaluating migrating to the cloud.

According to VDC's primary research, ERP systems are the furthest along in this migration to a cloud-based application deployment platform. While supply chain-related systems like SCM, WMS, and TMS continue to be largely on premise today, organizations have plans to migrate some or all of their options to cloud-based platforms. Large ISVs have outlined their cloud strategy and commitment to the same with an aim to make their customers' transition easier. Faster speed of application implementation – including deployment, updates and maintenance – is central to enterprise interest in an off premise model. Legacy on-premise enterprise applications that are unwieldy and cumbersome to implement will give way to more nimble solutions despite concerns surrounding data security and privacy. In addition, network connectivity, performance, and reliability are also not optimal, which could be potential inhibitors to cloud-based solution adoption. VDC believes organizational interest in and adoption of cloud-based deployment alternatives will gain traction with increased access to permanent, stable and always-on network connections globally.

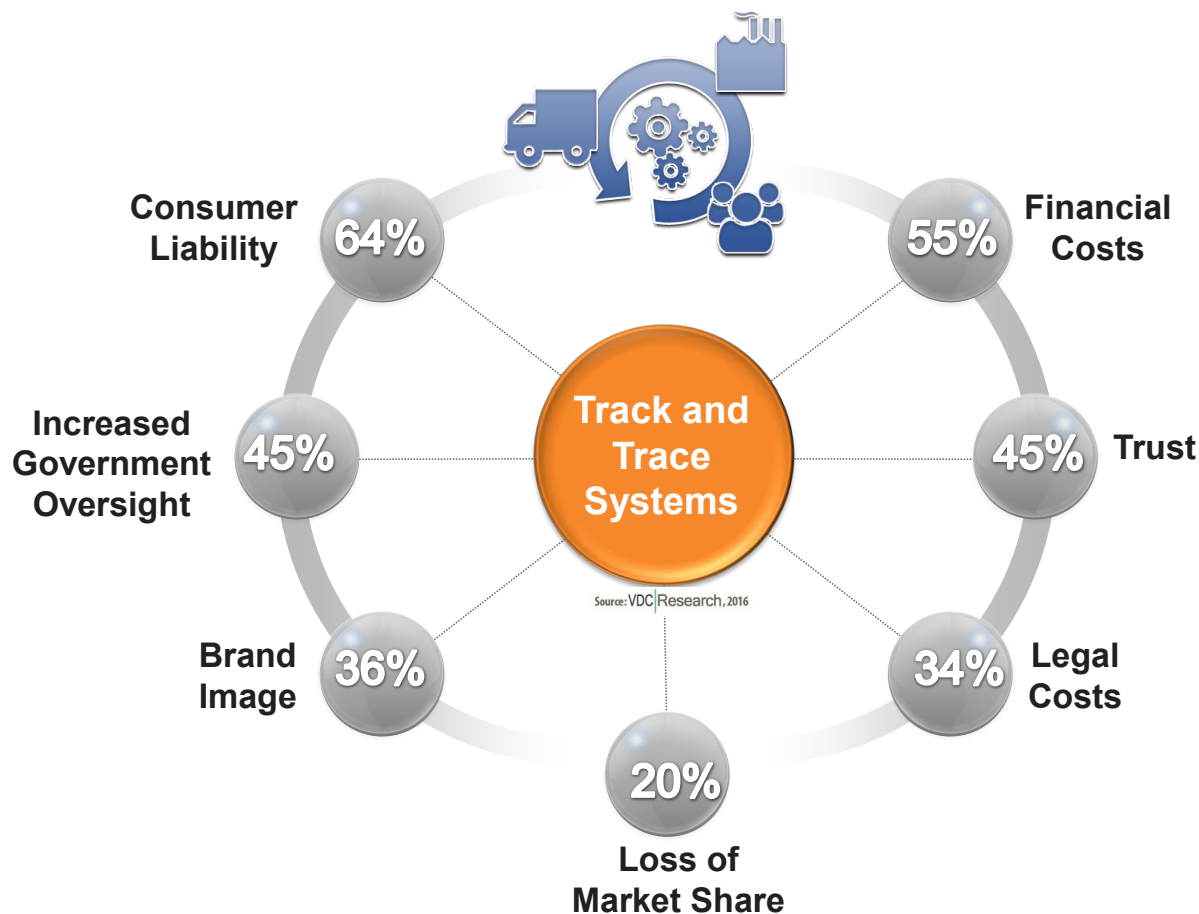
Businesses are increasingly opting for a multi-modal approach to enterprise application deployment, Interest in cloud-based models will only grow as solution providers are able to establish lower TCO by freeing up storage and processing-related resources. This will also enable end user organizations to cut down on their in-house IT functions and investments by offloading application services to third parties. Going forward, VDC expects end users to make investments in labeling solutions that can integrate to these software suites, regardless of the associated deployment model (on- or off-premise), and are also seeking labeling solutions that can be deployed in the cloud. VDC primary research reveals that 37% of end users prefer labeling solutions that can be deployed in a private cloud environment. Also, the need for more flexible application suites, which have been historically unwieldy, is driving organizations to seek out viable alternatives. Those organizations look to seamlessly integrate the label generation function with the cloud. Loftware's Spectrum solution, for instance, is a cloud-based solution that is designed to integrate with other cloud-based or on-premise enterprise applications that either trigger labeling or act as a source of truth for label data.

The rising interest in cloud-based deployments is moving hand-in-hand with the evolution of software licensing. The traditional model of licensing software on a per-machine basis is not entirely compatible with a cloud-based application delivery, prompting software vendors to offer enterprise licensing models with the ability to provide access control to users who need to be part of label design, print, or management. ISVs are increasingly educating their customer base on these shifts and on available options so they can make informed decisions as it relates to their labeling software application investments. Companies like Loftware are offering solutions like Loftware Spectrum, which in addition to offering cloud deployment capabilities provides a 100% browser-based interface enabling immediate deployment across the entire enterprise.

EVOLVING REQUIREMENTS SHAPING THE FUTURE OF LABELING

The need to recall items effectively has become vital to manufacturers as daily media coverage of parts defect/error-related issues, food-borne illnesses, injuries, and even deaths exacerbate consumers' negative reactions towards businesses and brands. According to results from VDC's recently-concluded traceability survey, consumer liability (64%), financial costs (55%), and trust (45%) are the leading negative consequences of an inability to trace products through the supply chain.

Exhibit 2: Primary factors impacted from an inability to trace items through the supply chain



Offering centralized access to data and integrating labeling applications with ERP, WMS, and MES (Manufacturing Execution Systems) applications is essential to ensure end-to-end traceability and consistency. This helps provide granular visibility into product origins and passage through the overall supply chain. Large, global organizations want to achieve visibility into every stage within their supply chains, at all the important stages of manufacturing and distribution to augment asset utilization, expedite order fulfillment, and improve overall accuracy, productivity, and even profitability. Given the central role that barcode labeling plays in achieving these desired strategic business process improvement objectives, companies are increasingly investing resources towards building teams dedicated to the labeling process. They are carving out specific profiles that are winding their way into industries with especially stringent traceability requirements.

As is now widely recognized, labeling enables organizations to attain and maintain standards compliance established for quality, reporting, and overall safety while helping identify areas of improvement within the value chain for cost reduction, operational enhancements, and yield/productivity management. It is also becoming imperative for leading global organizations to centralize their labeling-related decision-making and/or investments in order to achieve consistency and reliability across distributed operational setups – including mission-critical barcode labeling software and hardware needed to facilitate the desired course of action. The ultimate goal is for enterprises to be able to address the need to be in compliance with government, industry, and customer mandates. It is also important to support high volumes of label printing across globally distributed locations; make investments in centralized and/or decentralized labeling options that will help achieve labeling accuracy and consistency; and enable flexibility and reliability with data-driven labeling. Global corporations are increasingly seeking out more pronounced levels of control over distributed printer networks and enhanced print job visibility. In addition to evaluating on-premise versus cloud deployment, they are evaluating options including a single deployment across multiple geographies and remote facilities while synchronizing to a central location, which gives enterprises centralized control while ensuring labeling consistency and continuity at the facility level across distributed remote locations.

Loftware Spectrum addresses enterprise end users' evolving labeling requirements. By offering a cloud-based solution that offers a browser-based interface with multi-site deployment, Loftware Spectrum has the potential to alleviate challenges associated with distributed operations and centralized application deployment models. Loftware's vertical industry focus may be especially important for companies that are looking to address industry-specific regulatory compliance by seamlessly integrating with SAP, Oracle and other enterprise applications.

SHINING THE SPOTLIGHT ON SOFTWARE

With a specific focus on the enterprise segment, Loftware's market positioning, competitive differentiation, and go-to-market strategies set the company apart in the fragmented barcode label software market. Loftware's focus is on addressing organizations' vertical and/or industry-specific regulatory compliance labeling requirements via its comprehensive enterprise labeling solution suite. Over the years, the company has developed strategic alliances with business process application vendors including Oracle and SAP and others to enable its customers to successfully deploy and leverage its software capabilities across the enterprise. Its solutions integrate seamlessly with enterprise application suites, one of the most important investment considerations for businesses today.

Loftware stresses the importance of customer responsiveness, particularly with regards to the design and delivery of its core product, and ever-evolving customer, government and industry compliance mandates. Its cloud based solution, Loftware Spectrum, is designed to empower users across an enterprise's supply chain, with its access control and permissions capabilities enabling increased collaboration. This product is in the market at a time when enterprises are increasingly considering (and even supporting) process automation, provisioning, and global distributed work environments. The company's approach to enterprise labeling enables it to help businesses achieve labeling accuracy and consistency, while ensuring standardization across global locations. Standardization is a critical challenge that organizations with globally distributed operations run into especially as individual regions largely operate autonomously.

Loftware recently announced its latest release of Spectrum, which offers new multi-site capabilities to enable its enterprise customers to leverage a single deployment of the solution across multiple geographies and distributed facilities, all while synchronizing with a central location. The goal of this capability is to offer customers the benefits of both centralized and decentralized deployment models. Loftware is looking to empower organizations to enable their distributed locations to run autonomously on a routine basis and sync, as required, with a central location. It offers customers the flexibility of cloud-based deployment with WYSIWYG label design, seamless integration with enterprise applications, a business rules engine, device management capabilities, on-demand data driven printing, and high performance native printing, all in a single software solution. These features, along with the latest functional capabilities, will promote labeling consistency and provide transactional information back to the headquarters so they can continue to have operation visibility. These capabilities will particularly appeal to facilities that do not have a need for constant communication with the global headquarters, but at the same time, rely on their input for labeling specifications periodically.

More than 65% of the respondents from a recently conducted VDC survey indicated issues with their network connectivity. These range from occasionally dropped connections to networks that are frequently disrupted and wholly unreliable. This statistic highlights the key market requirement that Loftware Spectrum has the potential to address – that of enabling manufacturing, warehousing, and distribution facilities of a global enterprise to run independently and free of operational disruptions, without having to stall the label generation function due to a loss of network connectivity.

Barcode labels are the foundation of a sound track-and-trace initiative and facilitate seamless data collection and visibility throughout the supply chain. The information made available provides crucial insights into product flow and enables organizations to enhance their operations and productivity. Enterprise Labeling integrates labeling processes with business processes to standardize mission-critical labeling across the supply chain. This is an approach that promotes integration to applications to serve as a source of truth for label data, enabling labeling to be both dynamic and data driven. Loftware's industry leading solutions are designed to help organizations sustain a competitive advantage in their market by helping them execute their operations to perfection in today's new interconnected, flexible, and efficient global supply chain model.

ABOUT THE AUTHORS



Richa Gupta

Richa Gupta is responsible for VDC's strategic research on the global markets for data capture technologies including barcode scanners and printers, as well as machine vision solutions among others. Data capture hardware vendors and solution providers leverage her expertise in the AIDC market for key market development initiatives, with the highly actionable data and insights helping formulate their long-term business strategies. She undertakes market opportunity sizing and forecasting, competitive landscape analysis, and strategic marketing assistance while also providing valuable thought leadership for this technology market segment. Richa holds a degree in Computer Engineering and an MBA from India.

Contact Richa:

rgupta@vdcresearch.com



David Krebs

David Krebs has more than 10 years of experience covering the markets for enterprise and government mobility solutions, wireless data communication technologies, and automatic data-capture research and consulting. David focuses on identifying the key drivers and enablers in the adoption of mobile and wireless solutions among mobile workers in the extended enterprise. David's consulting and strategic advisory experience is far reaching and includes technology and market opportunity assessments, technology penetration and adoption enablers, partner profiling and development, new product development, and M&A due diligence support. David has extensive primary market research management and execution experience to support market sizing and forecasting, total cost of ownership (TCO), comparative product performance evaluation, competitive benchmarking, and end-user requirements analysis. David is a graduate of Boston University (BSBA).

ABOUT VDC RESEARCH

Founded in 1971, VDC Research provides in-depth insights to technology vendors, end users, and investors across the globe. As a market research and consulting firm, VDC's coverage of AutoID, enterprise mobility, industrial automation, and IoT and embedded technologies is among the most advanced in the industry, helping our clients make critical decisions with confidence.



Offering syndicated reports and custom consultation, our methodologies consistently provide accurate forecasts and unmatched thought leadership for deeply technical markets. Located in Natick, Massachusetts, VDC prides itself on its close personal relationships with clients, delivering an attention to detail and a unique perspective that are second to none.

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info@vdcresearch.com