Visual technical communications
– from cost factor to added value

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Abstract

What do customers require today? Products with higher quality technical documentation that speaks the language of the user, is comprehensible, and up-to-date. When used in technical documentation or visual communications, illustrations help to clarify complex technical information. They can also take the place of text, are easy to reuse, and do not need to be translated. However, it is quite difficult to create technical illustrations with traditional tools. To streamline the illustration process, companies require an all-in-one solution. To that end, Corel DESIGNER® Technical Suite was designed to meet the workflow requirements of technical illustrators. Ideally, this solution will cover other functions, including the creation of creative and presentation graphics, while also fulfilling the following key requirements:

· **openness and compatibility** regarding the integration of visual technical communications into other processes involved in the product's life cycle

· **flexible use of engineering data** from any CAD application (including 3D) to create technical illustrations

· **full range of professional tools** to edit technical illustrations and other images, and trace and convert scanned data

· **wide support for industry standards** and output formats in a multi-purpose user environment

· **intuitive features** that curtail the learning curve even for self-taught technical graphic users.

This white paper describes the challenges faced by many manufacturing companies when creating technical documentation and shows how the process can be streamlined through the efficient use of visual technical communications.

Clear and easy to understand across languages, technical illustrations sometimes can replace text completely.

Illustration: HJS - Technische Grafik & Design
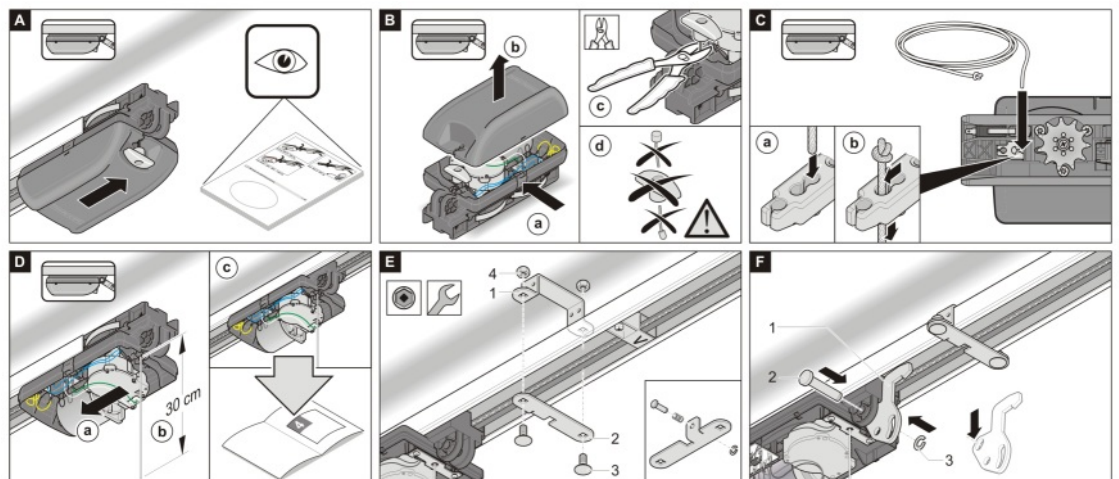
Challenges faced by industrial and service companies

Manufacturing entities seeking to maintain their market share and tap into new opportunities face a series of challenges that affect virtually all business processes over the product life cycle. To stay competitive, particularly in lean times, companies look to save time and money by focusing on improving these processes. By integrating technical illustration production with other product graphics, such as 3D visualizations, companies can improve the linkage between technical documentation and the product life cycle.

Reduction of development costs and time-to-market

For decades, manufacturing entities have sought to reduce development cycles and speed up the launch of new products. To this end, they have streamlined core development and manufacturing processes by introducing new tools and methods. While product information management systems, or Product Life-cycle Management (PLM), have helped to save significant time and costs, these efficiencies have yet to reach other processes.

A case in point is the effort required to "reinvent" data instead of using information generated earlier in the process or integrating data, systems, and processes between development, production, technical documentation, sales and marketing, service, and other business units. This effort amounts to a huge waste of resources given the increasing amount of reusable data obtained by using 3D modeling, simulation, and calculation tools. For many companies, using this rich data pool for visual technical communications became an obvious starting point for further process optimization.

Product Life-cycle Management (PLM) has significantly reduced time and costs. However, these efficiencies have yet to reach other product development processes.

Outsourcing and globalization of markets

For manufacturing companies, even traditional SMEs who have now become true "global players", globalization brings both opportunity and challenge. As they sell their products on foreign markets and operate worldwide production facilities that also carry out development tasks, companies must provide an increasing amount of localized product and process-related technical documents that comply with local regulations for security, product liability, environmental protection, etc.

At the same time, outsourcing trends point to a global phenomenon. As companies focus on specific areas of expertise and relocate other development and production tasks to optimize the equally global supply chain, portions of the technical documentation, or at least the input for its creation, come from external parties who use a variety of tools. In short, globalization and global outsourcing are putting greater demands on the openness and compatibility of the systems used in the documentation creation process.

Globalization and outsourcing have increased demands on the documentation creation process with regard to systems openness and compatibility.

Growing product complexity and customization

As a result of increasing demands for quality and product capability, consumer goods now offer an array of functions that need to be comprehensively covered in the accompanying technical documentation. Take a mobile phone, for example, which is also a camera, radio, MP3 player, Web browser, navigation system, and gaming console. In addition, products are not only increasingly complex but also increasingly customized. Even in the case of mass-produced items, such as cars, clients are opting for unique features that result in greater product differentiation.

Naturally, standard user guides, maintenance manuals, or other documentation will not meet the needs of these clients - who, in fact, expect technical documentation tailored to their product. To help prevent operating and maintenance errors, companies must not only produce more technical documents but also customize them to reflect specific product configuration.

Product Life-cycle Requirements

Technical documentation is an integral part of the product and thus subject to the same life-cycle changes as the mechanical, electronic, or software components. The more a product evolves over its various phases, the more important it is to closely interlink development and documentation processes. Feedback from the service department is also critical since it may include new, more powerful components that need to be documented accordingly.

Documentation process and product life-cycle management

In most companies, documentation creation is loosely tied to other business processes. In general, no cross-system electronic workflow exists to keep the technical documentation team abreast of changes in product specifications. In the absence of a centralized database, technical writers must often painstakingly gather information from various sources. In many cases, writers are creating technical documents with a text editor or a desktop publishing application and embedding graphics as images or OLE objects. This approach complicates, or even prevents, a company-wise reuse of these documentation components.

To optimize their documentation creation process, many companies are using XML editors and Content Management Systems (CMS) that analyze, classify, and manage the content of various technical documents in a structured way. These systems, which allow for automated publishing, also enable the reuse of data components in many document and media types by saving technical illustrations in an XML-based format.

Why are illustrations essential to technical documentation?

A technical illustration is a drawing, diagram, image, or perspective representation used to visually structure a complex set of information and make it easily comprehensible to a non-technical reader. As defined, technical illustrations are the visual link between a product and its accompanying technical documentation. By complementing or replacing descriptive text, illustrations often require less text and, in some cases, no translations. By extension, illustrations help overcome language barriers as well as enable untrained readers to understand the documentation.

As part of the visual communications spectrum, technical Illustrations are widely used in user guides, construction manuals, parts catalogues, assembly instructions, service guides, sales material, marketing brochures, and business reports. Unlike creative or presentation graphics, they must meet specific requirements, be informative, and be technically precise. For instance, perspective views are used not only for their visual appeal but because they aptly deliver certain types of information. Technical illustrations usually include text boxes whose content should be easy to update and, if necessary, translate. Therefore, integration with a translation memory system (TMS) is essential for the efficient use of technical illustrations in multiple languages.

Consider this study by the Aberdeen Group, which underscores the role played by technical illustrations in streamlining the entire documentation process: 72 percent of the companies controlling their documentation creation process exceptionally well use CAD-based illustration tools, 46 percent use tools for structured text acquisition, and 45 percent use a CMS. To optimize the documentation process, the American consulting firm recommends, among other things, that technical illustrators have access to 3D visualization and CAD-based illustration tools.

[Aberdeen Group: The Next Generation Product Documentation Benchmark Report. Boston, 2006]

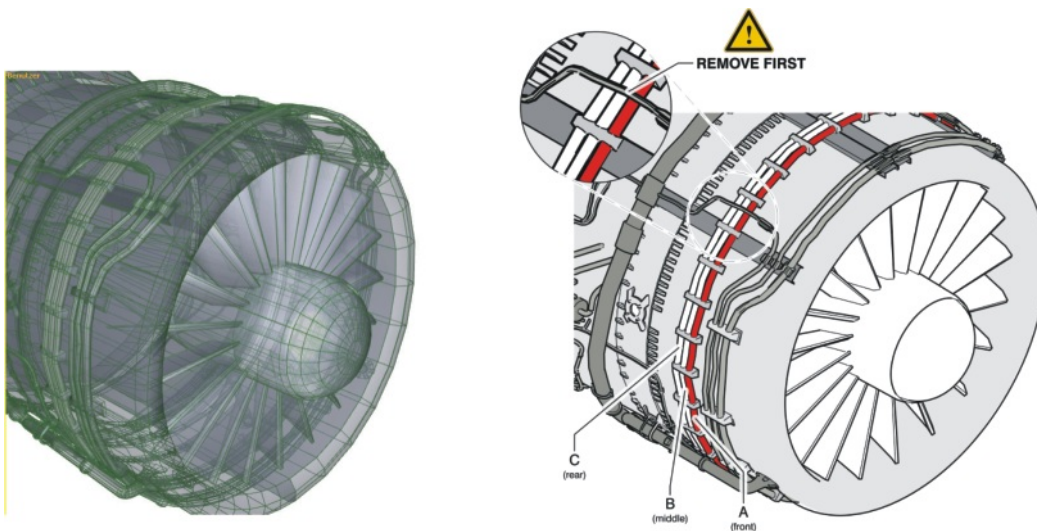## Creating technical illustrations with CAD-based tools

Today, most manufacturing companies design their products by using 3D models. As a result, being able to convert these models into clear and concise perspective views is one of the core requirements for a dedicated technical illustration application. The greater the systems integration, the easier it is to adjust illustrations whenever product changes occur. However, beyond a certain threshold, integration impairs compatibility with other CAD systems and formats.

Because they operate in a varied CAD environment or receive CAD data in different formats, companies often need to process more than one CAD format during the illustration design process. This is especially so when service providers create illustrations by using different import formats. To help ease processing requirements, Corel has integrated Right Hemisphere® Deep Exploration™ technology into Corel DESIGNER Technical Suite. As an add-on or standalone license, this open and compatible solution helps users process more than 80 data types, including commonly used 3D CAD formats, such as CATIA®, Pro/ENGINEER®, NX™, Autodesk® Inventor®, and SolidWorks®.

Better still, technical illustrators no longer need a CAD license to convert files. They can, as they do at Porsche AG, open and edit CAD files in their familiar working environment, eliminating intermediate processing steps that were previously outsourced and achieving significant time and cost savings. In fact, Porsche uses Corel's software solution to create assembly instructions that are based on CATIA engineering data.

Using the 3D import module, technical illustrators can convert 3D data from commonly used 3D systems into a volume-based intermediate format that correctly replicates bézier curves. For further editing, views derived from 3D models can be imported into Corel DESIGNER as vector graphics or into Corel PHOTO-PAINT®, an image-editing application, as bitmaps.

To efficiently create illustrations in a multifaceted environment or supply chain, using more than one CAD format, a company needs an open and compatible solution.

REMOVE FIRST

C
(rear)

B
(middle)

A
(front)

3D CAD-based technical illustration allows illustrators to create easy to understand graphics and enhances the quality of technical documentation.

Linking illustration process and change management

To stay ahead of the curve in a short development cycle, technical documentation staff often start creating illustrations before the actual product design is complete. As the process unfolds, they will adjust the 3D models on which graphics are based to reflect relevant changes to the illustrations in the documentation. The development of new product versions may also require modifications in the illustrations.

Corel DESIGNER Technical Suite supports the revision process starting with the conversion of the vector graphics. When opening a modified file, the 3D import module recognizes it as a modified version of an existing model and will update all the sectional views, exploded views, etc., that are based on the original model with a single click. However, since the vector graphics derived from the 3D data have to be recreated, it is far better to complete as many steps as possible in the 3D module and save the models as a 3D work file. Compatibility with CAD formats largely offsets this additional effort.

Protecting existing assets or illustrations

In the same way engineers have "living" 2D CAD drawings or even drawings on paper they will want to preserve after the transition to 3D, technical illustrators do not always start from scratch, instead they continue to reuse valuable assets accumulated over the years.

To save time, they often scan documents and use them as templates to create new graphics, schematics or drawings. With Corel® PowerTRACE™, a tracing application included in the Corel solution, they can transform scanned bitmaps into precise vector graphics that can be edited with tools in Corel DESIGNER.

If illustrations are in an electronic format, they need to be migrated without data loss. Data migration is essential, particularly for companies that have been creating illustrations with specialized software programs and have an immense legacy collection or assets to protect.

In this context, not unlike KNIPF GmbH, compatibility means the ability to repurpose legacy files, which include data from old UNIX systems. Based in Germany, KNIPF creates thousands of technical illustrations every year for BOSCH's Automotive Aftermarket division by using Corel DESIGNER Technical Suite. Among other benefits, this software is the only solution able to read and immediately process illustrations generated by the company's legacy systems. The ability to migrate legacy data is also a critical factor for Heidelberger Druckmaschinen AG who has also opted for Corel's software solution.

Integration with other enterprise applications

Companies that have a huge collection of technical illustrations and want to streamline their technical documentation processes need database-driven management systems to quickly retrieve existing data, or better still, an integrated illustration application and CMS. Through its compatibility strategy, Corel helps manage and publish technical illustrations more efficiently and allows for integration with any CMS through an API.

The openness of the illustration application makes it possible to integrate with enterprise applications, such as the PLM or ERP systems preferred by some companies to store document-related content. For instance, while implementing a technical documentation reengineering project, Heidelberger Druckmaschinen AG developed an authoring system based on SAP® and replaced existing graphic tools with Corel DESIGNER Technical Suite.

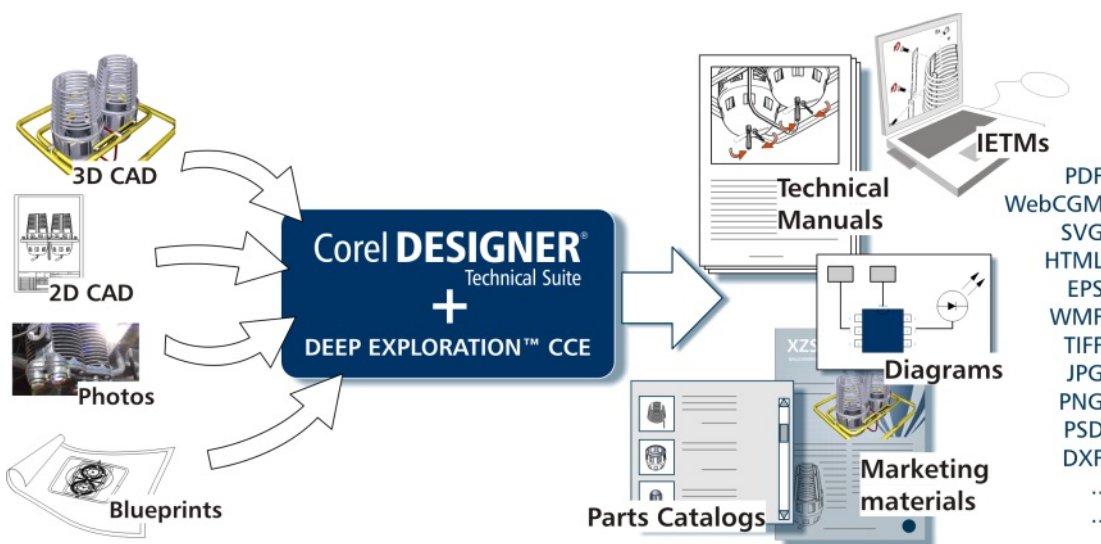# Optimizing Technical Illustration Processes

Even in companies that follow a well-defined technical documentation design process, the creation of illustrations is not without inefficiencies because technical illustrators use several graphic applications not specifically tailored to their needs. Sometimes, they may even create illustrations directly on the CAD system, which requires effort and specialized knowledge. Dismantling this "makeshift system" by introducing a dedicated illustration application is key to streamlining the illustration processes.

An all-in-one solution for all user groups

For an illustration application to be widely used in the manufacturing sector, including the apparel and construction industries, it must appeal to different user groups through its range of functionality and ease-of-use. Typical users are technical illustrators with technical training who work in the documentation department of major companies, small-to-medium service providers, or freelancers. However, especially in large-scale entities, there are many users who are self-taught and do require a versatile and easy-to-learn technical graphic tool.

Technical illustrators, whether trained or self-taught, create graphics for a variety of documents, such as user guides, assembly instructions, maintenance manuals, spare parts catalogues, schematics, and wiring diagrams. These graphics are based on input provided by clients, service providers, and colleagues who may all be using different programs. Additionally, graphics may be created from scratch, without any input, and which are then output to various media such as print, the Web, or interactive electronic technical manuals (IETM).

From a user standpoint, an all-in-one illustration application is much preferred because it shortens the learning curve. A versatile suite of applications offers similar benefits and more by helping companies to standardize their graphic applications, reduce IT administration efforts, and achieve savings on licensing costs.

Dismantling the existing "makeshift system" by introducing a dedicated illustration application is key to streamlining the illustration processes.

Technical illustrations can originate from many sources, be used in many document types, and are output to different media, including electronic formats.

Ease-of-use and full range of functionality

Even though CAD data is increasingly used in technical illustrations, not all graphics originate from 3D models because they do not always have all the details required to communicate technical information. Details, such as screws, must be added and technical illustrators need precise and handy tools to draw in an isometric view and complete the CAD-based graphics.

Technical illustrators like to represent certain relations and processes with 2D schematic diagrams created by using their familiar stand-alone illustration program. However, this program should automatically recognize not only free-hand connection lines but also connections in existing diagrams that were created in other programs, such as Microsoft® Visio®.

Digital photos are now widely used in technical documentation well beyond presentations or marketing materials. Technical illustrators use them because they aptly depict items that will otherwise require complex computer renderings. In the absence of 3D models, digital photos are particularly suitable for documenting finished products or products whose appearance has been changed or damaged. For best results, technical illustrators need functions within their familiar work environment to import and effortlessly optimize image data in varying formats, such as TIFF, JPEG, Camera RAW, etc. .
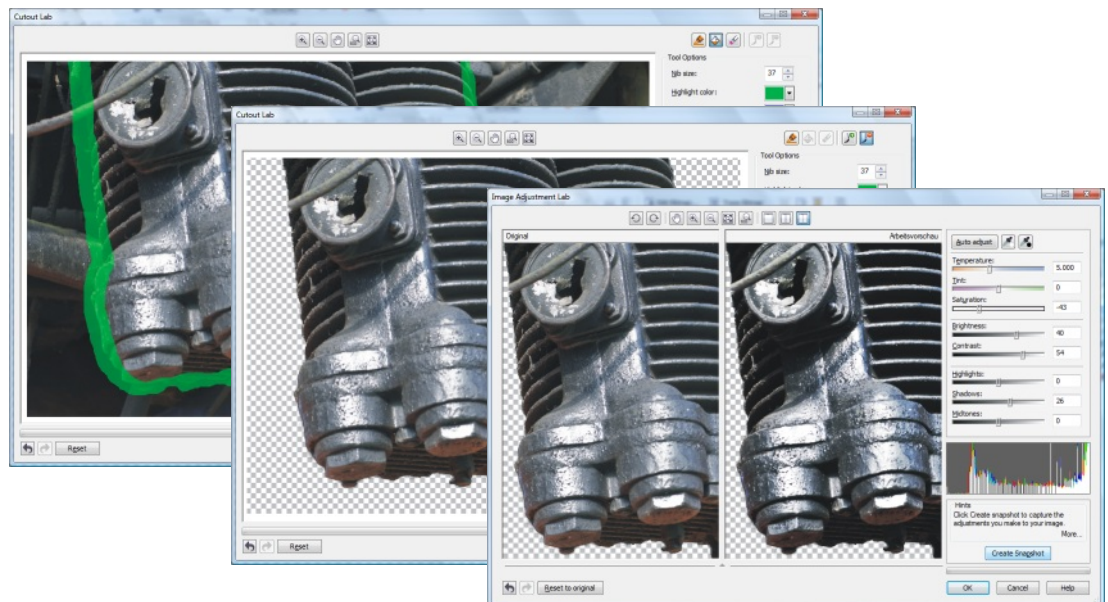
However complete its feature-set, an illustration application must be easier to use than a CAD system, because the more intuitive it is, the easier it will be for self-taught technical graphics and occasional users to work with the software. At KNIPF, a two-day course was enough for the employees to learn to effectively use Corel DESIGNER Technical Suite. After three days, the technical writers at Heidelberger Druckmaschinen AG were in a position to share their knowledge with their colleagues.

Flexible use and reuse of visual content

Even with access to powerful tools, technical illustrators prefer to reuse existing illustrations rather than to create new ones. They consider it more efficient, especially if the application supports all the required output formats from the long-established standards, such as CGM and TIFF, to new archiving formats, such as SVG or the PDF/A. Given the documentation requirements in the aerospace industry and the military, the ability to export data in CGM V4 format — the basis for the creation of IETMs (Interactive Electronic Technical Manuals) — is imperative.

The trend towards electronic documentation presents the opportunity to use 3D models, such as animated exploded views, and illustrations in assembly instructions and maintenance manuals. Anticipating this trend, the 3D import module in Corel DESIGNER Technical Suite allows users to embed model data into 3D PDF documents. Thanks to the versatile output options, visual content can also be used to create various items, including marketing materials.

Companies cannot afford to dispense with a powerful illustration application if they want to maintain proven processes in technical documentation. Corel DESIGNER Technical Suite provides a wizard that preprocesses graphic content with the highest display quality for embedding in Microsoft® Office documents. It also supports a variety of output formats and allows for illustrations to be included in an XML-based publication process. These unique advantages led Texas Instruments, a leading semiconductor manufacturer, to standardize on Corel's solution to create the illustrations needed for its customized semiconductors.

Translation of technical illustrations

In the era of globalization, translation has become an important cost item in the creation of technical documentation. When used consistently, technical illustrations can greatly reduce total translation costs because they generate less text to be localized, including the much-needed text boxes whose content can be efficiently managed with a Translation Management System (TMS).

Using its API, Phoenix Contact GmbH & Co. KG, a worldwide market leader of electronic connection, electronic interface, and industrial automation technology, linked Corel DESIGNER Technical Suite and Across TMS to translate the technical illustrations used in parts catalogues into more than 18 languages faster and more cost-effectively.

Conclusions

By improving the linkage between product development and technical documentation , manufacturing companies can expect time and cost savings during the entire product development process. Such improvement requires greater compatibility and optimization between the various systems, media, and applications used during the technical illustration process. Technical documentation users need a versatile and compatible illustration application that allows them to efficiently use both 3D models and legacy data when creating new illustrations, and to output the final illustrations to all formats needed for the publication process.

By using Corel DESIGNER Technical Suite to optimize technical illustrations processes, companies can accelerate the creation of technical illustrations, create higher-quality illustrations, and use more illustrations in their technical documents. The use of high-quality illustrations not only enhances the comprehensibility but also reduces the documentation creation costs since less text needs to be written, managed, and translated. Significantly leaner documentation also results in printing, shipping, and storage cost savings. With all of these considerations, it's easy to see how technical illustration can make an important contribution to a shorter time-to-market.

More comprehensible documentation helps to achieve higher customer satisfaction. With visually clear instructions, documentation helps users to learn, use, and maintain the products, all of which result in time savings. Due to its unambiguous nature, comprehensible documentation increases occupational health and safety, and can prevent operating errors that could cause expensive downtime in the case of complex machines and installations. Technical illustrations not only help the producer to get his products to market faster, but also allow the buyer to use the product more efficiently — a classic win-win situation.

The optimization of technical illustration processes accelerates the creation of technical illustrations, enabling companies to create higher-quality illustrations and to use more of them in their technical documents. It enhances the comprehensibility of technical documentation while reducing the cost of its creation.

More information

For more information about Corel DESIGNER Technical Suite and a 30-days free trial version please visit the web site **http://www.corel.co.uk/designer** / http://www.corel.com/designer .

For more information on Corel's Volume Licensing Programmes please consult our web site **http://www.corel.co.uk/licensing** / http:www.corel.com/licensing .

Illustrations on pages 1 and 3 courtesy of
HJS - Technische Grafik & Design, Jan Seidl - js.design@dieumsetzung.de

About Corel

Corel (www.corel.com) is one of the world's top software companies with more than 100 million active users in over 75 countries. We develop software that helps people express their ideas and share their stories in more exciting, creative and persuasive ways. Through the years, we've built a reputation for delivering innovative, trusted products that are easy to learn and use, helping people achieve new levels of productivity. The industry has responded with hundreds of awards for software innovation, design and value.
Our award-winning product portfolio includes some of the world's most widely recognized and popular software brands, including CorelDRAW® Graphics Suite, Corel® Painter™, Corel DESIGNER® Technical Suite, Corel® Paint Shop Pro® Photo, VideoStudio®, WinDVD®, Corel® WordPerfect® Office and WinZip®. Our global headquarters are in Ottawa, Canada, with major offices in the United States, United Kingdom, Germany, China, Taiwan and Japan.

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