CYIENT

ENABLING DIGITAL TRANSFORMATION IN TECHNICAL PUBLICATIONS

Using cutting-edge technology to transform end-user experiences and providing real-time, tailored information

CONTENTS

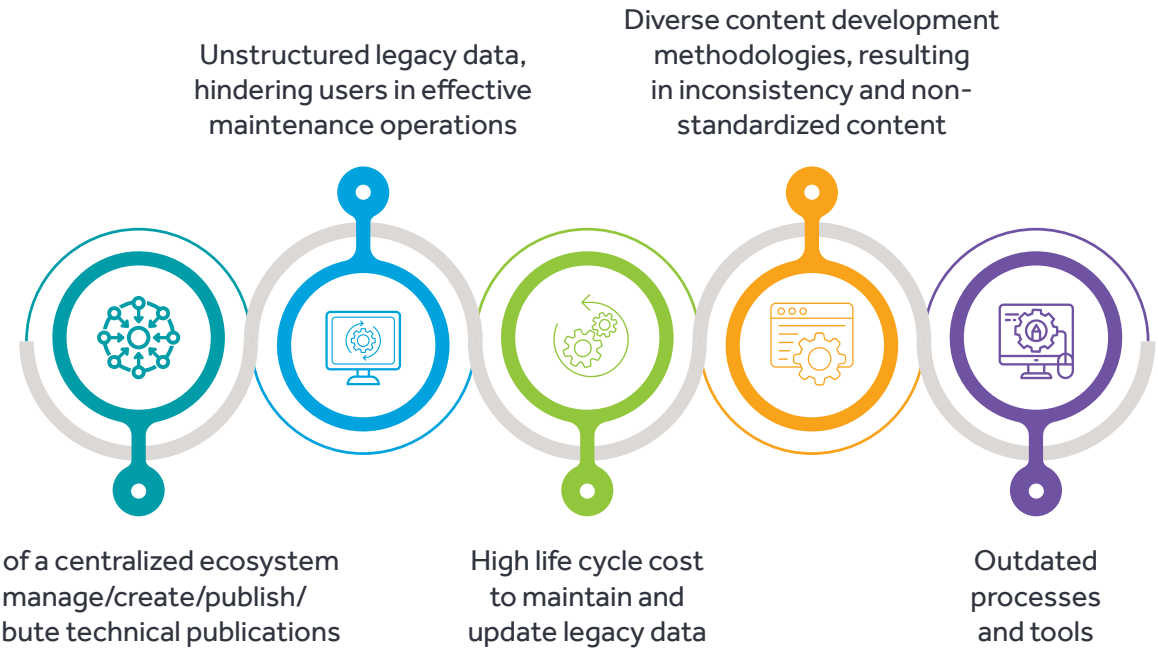
Abstract

Technical publications are sources of information that guide service technicians in the operation, maintenance, and repair of a product. They include manufacturer's technical manuals, troubleshooting guides, training manuals, service bulletins, catalogs, and specifications. Proper use of these publications greatly aids efficient operation and maintenance—more so when digital technologies such as AR/VR, AI, and ML are deployed in the publication life cycle. This paper focuses on how digital technology is transforming the way the technical publications are managed in a product life cycle.

Introduction

Most OEMs involved in the creation of technical documentation for their products still deal with traditional paper-based data to update and/or manage legacy information. Legacy data exists in different standards, styles, and formats resulting in high life cycle costs of updating/maintaining these diverse documents.

Challenges in technical publication:



In recent years, much has changed in the technical publications industry. The development of more complex equipment means more data to collect, process, and analyze than ever before. The paper-based technical publications industry has evolved to give rise to content management solutions and has redefined how technical information is documented today. Further, servitization or data-driven maintenance contracts creates the need for integrated asset management, fault isolation, technical publications, and spares and tooling to be on a single intuitive platform.

The content management system (CMS) can hold quanta of data in baselines and in languages. It comes with in-built capability to handle baselines to assist easy and efficient tracking of multiple users working on the content. The content in the CMS can be reused for various projects and platforms. In addition, the content can be published in both physical and digital forms.

Further, the CMS can be integrated as outlined below to provide a seamless user experience:

The ERP system gets information of spare parts referred to in the maintenance procedures, eliminating the need for manual intervention

The user experience is further enhanced by integrating the 3D model viewer to visually understand the design of a component

The diagnostic system helps service technicians repair and maintain a product in the workshop

The content is made accessible 24x7 over the Web through a distribution platform. The platform provides an enhanced experience with features that enable providing feedback on tech pub content, ordering spares, performing detailed search, navigating between different manuals, tracking baselines, etc. The experience is also optimized to be device-agnostic. Key essential features include intuitive indexing—search and retrieval features index all data for easy access through search functions and allow users to search by attributes such as publication dates, keywords, or author.

Technology has evolved to—

Replace traditional classroom training by virtual training with content based on virtual reality (VR) technology, giving the manufacturer the flexibility to reuse the content on a larger scale and save cost.

Enhance user experience for maintenance and repair with augmented reality (AR) technology.

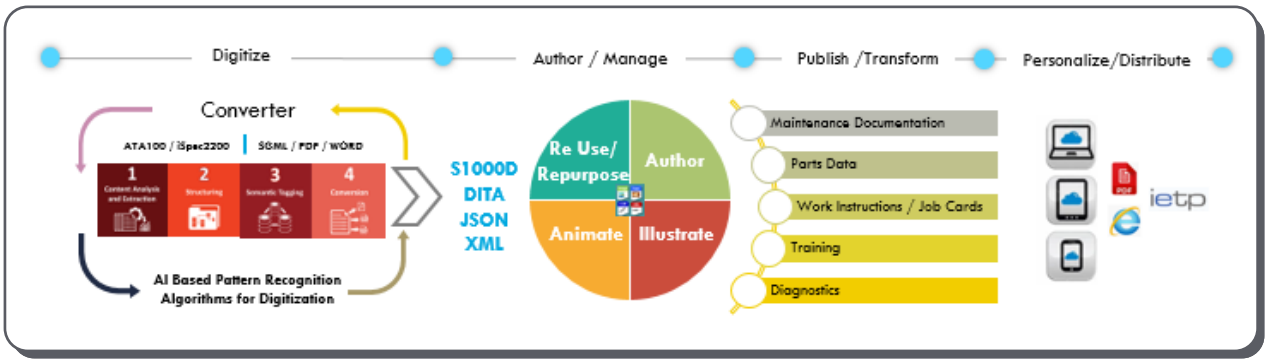
The advent of cutting-edge technologies such as artificial intelligence, data analytics, and augmented reality led to the transformation of end user documentation to facilitate more real-time support service, thereby engaging end users with real-time and tailored information.

Solution Details

Cyient leverages two decades of extensive experience in technical publications to develop leading-edge technical content and transform the user experience through innovative solutions.

Next-Gen Technical Publications Suite of solutions to accelerate digital transformation in technical publications for an enterprise.

Cyient offers a wide range of next-gen technical publication solutions from digitizing legacy data to authoring/managing manuals, to transformation and personalization of data.



Cyient has developed a digital tool kit together with its technology partners to address complex issues and enable smooth implementation processes for its customers.

SOLUTION 1

Digitization of paper-based and legacy data to structured XML

The AI, ML, and NLP technologies-based solution transforms legacy data into structured modular content.

Salient features:

01 Compliant with customer/industry-specific schemas

02 Eliminates manual data processing in maintenance workflows

03 Processes documents in multiple languages

04 Comprehensive system with over 80 pattern, structure, and content element (tables, images, etc.) recognition algorithms to process the data

05 Converts unstructured content to structured and actionable content

06 Saves significant time in information retrieval and supply chain logistics

SOLUTION 2

Content Management System (CMS)

The CMS platform lets users create, edit, archive, collaborate, report, publish, and distribute.

Key features:

- Facilitates creation of content that is re-usable for multiple platforms or projects.
- Enables multiple users (authors, illustrators, SMEs, publication managers) to handle and control information involved in the development of content.
- Can maintain baselines/versions of content for easy tracking.
- Enables authoring content once and publishing to various manuals.
- Provides customizable DTD and stylesheets.
- Complies with S1000D/DITA/Json.
- Supports multiple languages.

SOLUTION 3

Interactive Electronic Technical Manual (IETM)

The solution is a digital interface designed to access technical documentation (including videos, and animations) in an intuitive and immersive environment. This next-gen interface will transform the end customer (OEMs, operators, and service technicians) experience by providing access to technical data using handheld devices. Customers can access data from anywhere in the world 24x7, and get updates on manual revisions easily.

Key features:

- An interactive viewer supports the dynamic presentation of SGML, XML, and PDF formats, as well as audio, video, and other text and graphical content.
- Auto-generated acronyms, support equipment, and consumables using content derived from procedures.
- Content control and technical information security via data encryption and IETP expiry.
- Cart functionality for spare parts ordering.
- Filter functionality for configuration management based on product family/ variants.
- Advanced search and bookmarking capabilities.
- History functionality to keep track of all accessed tasks.
- Annotations to record and interact with maintenance/repair technicians.
- Hotspot illustration feature to seamlessly navigate between procedures and illustrations in manuals.
- Simplifies maintenance activities performed by personnel.
- Displays information based on applicability, including combinations such as model variant.
- Supports 3D models, animations, and all popular formats of illustrations.
- Provides block chain-powered content distribution platforms to open new revenue streams.

SOLUTION 4

Interactive Electronic Diagnostic System (IEDS)

A comprehensive fault isolation solution that provides interactive and collaborative troubleshooting while capturing new field experience to grow and retain tribal knowledge and improve first-time fix.

Key features:

- Monitor, maintain, and collaborate on all unscheduled maintenance tasks.
- Self-learning tool based on responses of the user.
- Reduce overall equipment downtime and total repair costs.
- Accumulate knowledge over time.
- Incorporate validated engineering and field experience to provide consistent and accurate troubleshooting procedures.
- Enable field service technicians to access the right knowledge at the right time.
- Reduce troubleshooting time and help fix issues on the first visit.
- Available both as online and offline versions.

SOLUTION 5

AR/VR/MR Technology-Based Content

Cyient's in-house digital team offers an immersive AR/VR/MR experience based on the needs of an enterprise ranging from maintenance to training.

Key features:

- Intuitive, mobile, and easy-to-navigate user manual for operation, repair, and maintenance.
- Can be used to train on functionality/ maintainability of complicated machinery or equipment.
- Enables viewing of published technical documentation (user manuals and work instructions).
- SCORM-compliant.

SOLUTION 6

Collaboration Tool

Cyient leverages its experience in executing large and complex projects in different phases of a product life cycle to support enterprises with collaborative tools.

Salient features:

- Comprehensive solution to manage projects, resources, dynamic workflow creation, Web review with digital checklist, and processes.
- Capability to build dynamic project plans that automatically adjust to changing real-world conditions.
- Facilitates collaboration on a project in different roles.
- Facilitates communication with stakeholders.
- Address problems with milestones, tasks, and projects without leaving your dashboard.
- Easily allocate resources to tasks based on availability, demand, and skills.
- Stay on top of your projects with automatic email alerts.
- Optimized interface that works on mobile, tablet, or any Web browser.

Business Benefits/Best Practices

Cyient's digital tool kit helps streamline technical documentation processes, improve customer experience through intuitive and immersive content delivery. Proven benefits include reduced translation costs, faster time-to-market, reduction in cycle time for legacy data transformation, and improved quality.

Case Studies

1. Automated S1000D Conversion and IETM Delivery

Problem Statement

High cost of maintenance and increased revision time of over six million pages of tech pub content due to various legacy formats across product portfolio.

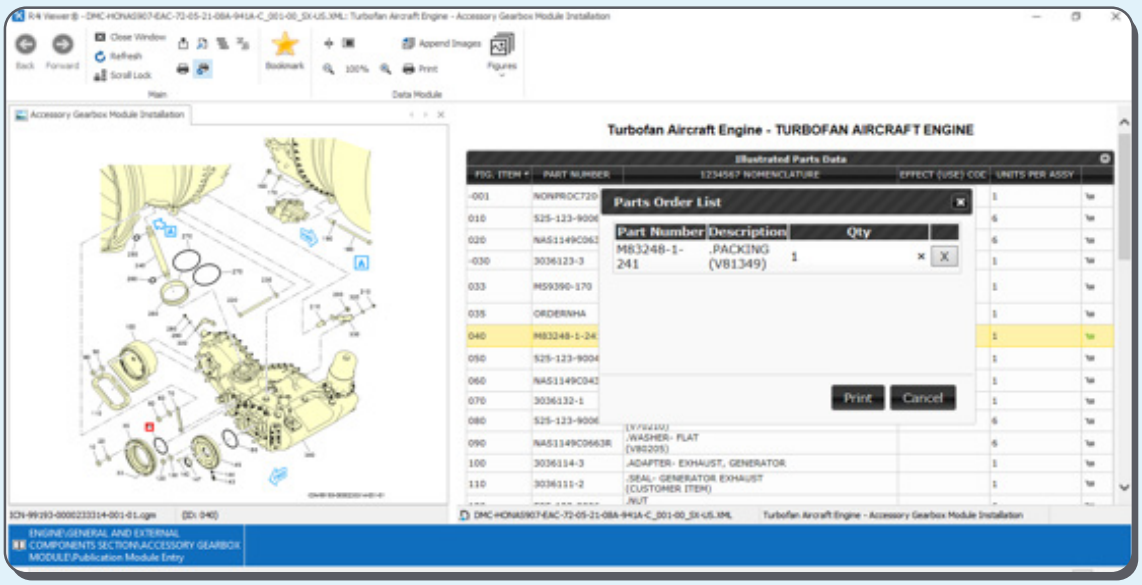
Outcomes

40% reduction in conversion efforts to S1000D
25% productivity savings passed to customer

Solution

Cyient delivered the following automated S1000D conversion:

- Developed text analytics-based algorithms to automate the efforts needed to convert from legacy format to S1000D format
- Implemented the R4i CMS platform to manage the huge volume of documentation, their updates, configuration, and delivery as a DDN package
- Reused content blocks to reduce authoring and illustration time
- Took ownership of creating DMRL, data conversion, revision, final delivery, and distribution of IETM manuals



2. AI-Based Fault Isolation

Problem Statement

- Longer troubleshooting time led to longer equipment downtime
- New technicians without expertise on the equipment used more spares to fix the issue

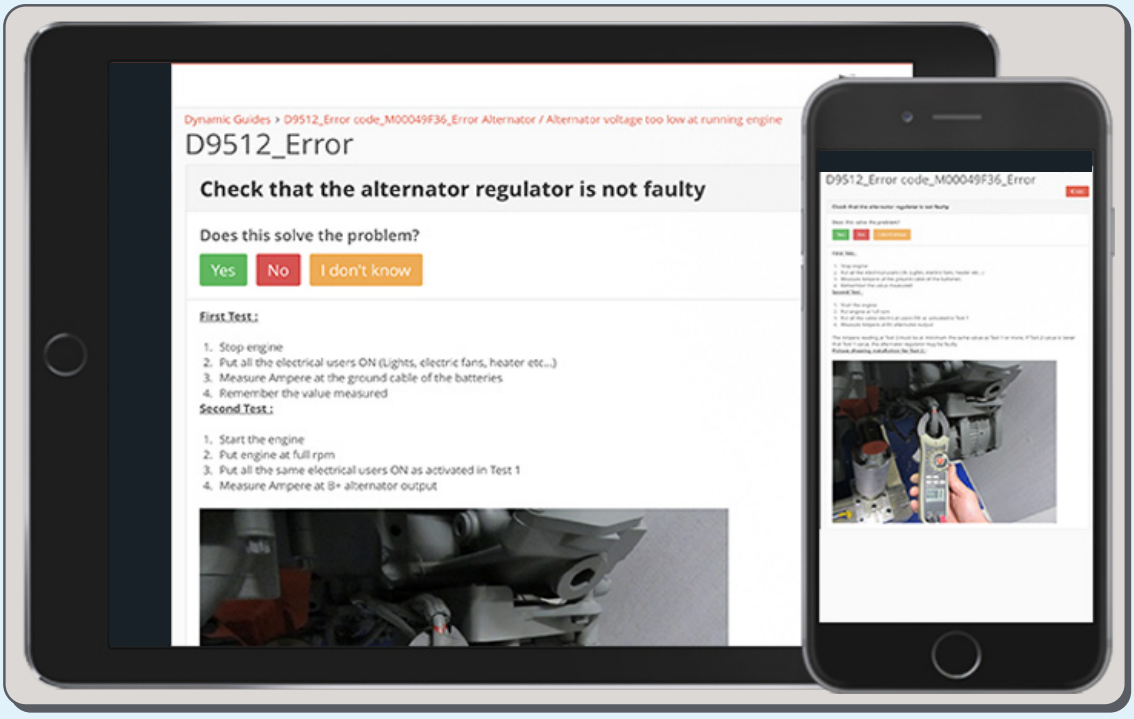
Outcomes

30% reduction in fault resolution time
40% reduction in field queries

Solution

Cyient implemented an AI-based guided diagnostics software that could—

- Capture, organize, and optimize expert knowledge related to the rolling stock model for a diagnostic database knowledgebase
- Diagnose faults based on symptoms and identify root causes and solutions through an interactive maintenance chat bot
- Direct users to the customer technical support center for expert guided diagnostics in sessions where the chat bot could not identify root causes



3. E-Learning Modules

Problem Statement

- Huge spends on training management and measuring effectiveness of training were a challenge
- Lack of experienced technicians and therefore lack of skill in and knowledge retention of critical maintenance activities

Outcomes

20% reduction in training cost
Complete traceability of training, measurement, and effectiveness in LMS

Solution

Cyient implemented an AI-based guided diagnostics software that—

- Deployed a Learning Management System (LMS)
- Developed intuitive 3D animations, 2D animations, and infographics to enrich training content
- Eased training delivery during the pandemic thanks to knowledge stored in the LMS database
- Ensured traceability of training delivery and effectiveness of training measured through the learning management system

THE CYIENT THOUGHT BOARD

Why is it important for enterprises to adopt digital technologies throughout the technical publication life cycle?

To enhance the user experience for maintenance and repairs

To develop and deploy a centralized ecosystem to manage/create/publish/ distribute technical publications

To reduce high lifecycle cost to maintain and update legacy data

What challenges/roadblocks are slowing the adoption of digital technologies in technical publications?

Resistance to change from workforce

Lack of change management in organizations

How can organizations achieve higher ROI by adoption of digital technologies in technical publications?

Improve time-to-market

Reduce translation costs, 3x faster production, reduction in cycle time for legacy data transformation, and improved data quality

Keep the organization relevant, adaptable, and competitive amidst a shifting landscape

Conclusion

A collaborative and integrated platform for technical publications helps organizations achieve multiple goals. These include standardization and consistency, time and cost savings in conversions, and improved time-to-market, along with an intuitive and immersive customer experience.

As an engineering services provider, Cyient works closely with industry experts, and new technologies to align our offerings to the technical publications industry trends. We enable this through our deep focus on the megatrends related to Hyper Automation and Smart Operations, and building solutions under Data AI and Platformization.

About the Authors

Sunith Kumar is an SME in Technical Publications Services. He has over 14 years of experience in the aerospace and rail industries. His areas of expertise include managing, transforming, and distributing publications in a product life cycle. A techno-leader and an ardent follower of engineering trends, he drives implementation of technology to generate value in day-to-day work.

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About Cyient

Cyient (Estd: 1991, NSE: CYIENT) is a leading global engineering and technology solutions company. We are a Design, Build, and Maintain partner for leading organizations worldwide. We leverage digital technologies, advanced analytics capabilities, and our domain knowledge and technical expertise, to solve complex business problems.

We partner with customers to operate as part of their extended team in ways that best suit their organization's culture and requirements. Our industry focus includes aerospace and defense, healthcare, telecommunications, rail transportation, semiconductor, geospatial, industrial, and energy. We are committed to designing tomorrow together with our stakeholders and being a culturally inclusive, socially responsible, and environmentally sustainable organization.

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