



TECHNISCHE  
UNIVERSITÄT  
WIEN

# TU Wien + RealObjects PDFreactor

**Accessible, Standards-Compliant PDF Generation at  
Scale**

# TABLE OF CONTENTS

1	ABOUT TU WIEN AND THE CAMPUS IT DEPARTMENT	3
2	INITIAL SITUATION AND REQUIREMENTS	3
3	SOLUTION, MOTIVATION AND WHY PDFREACTOR	4
4	IMPLEMENTATION AND TECHNICAL ARCHITECTURE	5
5	TESTIMONIALS	6
6	RESULTS, BENEFITS AND BUSINESS VALUE	6

# 1 About TU Wien and the Campus IT department

TU Wien (Technische Universität Wien) is Austria's largest research and education institution in the field of technology and natural sciences. More than 4,000 researchers work across five research focus areas at eight faculties under the motto "Technology for People." The university offers 62 study programs to more than 26,000 students, with study content derived from excellent research. As an innovation driver, TU Wien strengthens Austria's economic position, enables cooperations, and contributes to societal prosperity.

The Campus IT department serves as the central information technology service provider for the entire university, creating innovative working environments for teaching, research, and administration through the digitalization of business processes and provision of stable, efficient IT infrastructure. The department's mission focuses on customer and service orientation while promoting teaching, research, and innovation at TU Wien through comprehensive IT expertise.

As the backbone of TU Wien's digital transformation, Campus IT manages critical university systems and services, including the TU Wien Information System (TISS), e-learning platforms, network infrastructure, and comprehensive document management solutions. The department operates with a strong commitment to accessibility, compliance, and service excellence, handling hundreds of thousands of documents annually.

## 2 Initial Situation and Requirements

Prior to 2022, Campus IT managed a fragmented ecosystem of document-generation technologies, resulting in notable operational complexity and inefficiencies across the university.

Key challenges included:

- **PDF/UA Compliance Issues:** The existing solutions could not reliably generate documents that met legal accessibility requirements
- **Layout Consistency Problems:** Complex layouts frequently suffered from rendering bugs and inconsistencies
- **Technical Complexity:** Managing multiple different technologies created maintenance overhead and integration difficulties
- **Scalability Concerns:** The patchwork of solutions struggled to handle the university's high document volume efficiently

Campus IT needed a comprehensive solution to handle an extensive range of document types, including:

- **Administrative reports and management documents**
- **Official student certificates and academic transcripts**
- **Accessible documents (PDF/UA) for compliance requirement**
- **Technical documentation and manuals**

The department required a solution that could seamlessly integrate into their existing enterprise infrastructure—which includes both Ruby and Java applications—through a technology-independent approach, while ensuring full accessibility compliance (PDF/UA), long-term archiving capabilities (PDF/A-1b), superior rendering quality, and the ability to handle hundreds of thousands of documents annually without performance degradation.

## 3 Solution, Motivation and Why PDFreactor

After comprehensive market research and evaluation of multiple alternatives, Campus IT selected RealObjects PDFreactor in 2022. The decision process included thorough assessment of both commercial solutions and open-source alternatives.

PDFreactor distinguished itself through several critical advantages:

### Technical Superiority

- **Technology Independence:** PDFreactor's REST API approach enables seamless integration with Campus IT's heterogeneous application landscape, including both Ruby and Java applications
- **Exceptional PDF/UA Compliance:** PDFreactor's advanced accessibility features ensured full compliance with legal requirements, with all documents verified using PAC checker
- **PDF/A-1b Support:** Reliable generation of archival-quality documents meeting long-term storage and preservation requirements
- **Superior HTML/CSS Rendering:** The combination of CSS print capabilities and PDFreactor's rendering engine enables achievement of even the most complex layouts
- **Modern Container Support:** Native Docker containerization aligned perfectly with Campus IT's infrastructure strategy
- **Performance Excellence:** Proven ability to handle enterprise-scale document generation without performance issues

### Economic Benefits

- **Optimal Price-to-Feature Ratio:** PDFreactor offered the best value proposition compared to all evaluated alternatives
- **Reduced Technical Debt:** Consolidation from multiple technologies to a single, comprehensive solution
- **Lower Maintenance Overhead:** Simplified architecture reduced ongoing operational costs

### Strategic Fit:

- **Enterprise Integration:** Seamless REST API integration with existing workflows
- **Reduced Technical Debt:** Elimination of separate Java and Ruby PDF generation libraries, consolidating to a single, centralized solution
- **Scalability:** Proven capacity to handle hundreds of thousands of documents annually
- **Future-Proof Architecture:** Modern, containerized deployment model supporting growth and evolution

## 4 Implementation and Technical Architecture

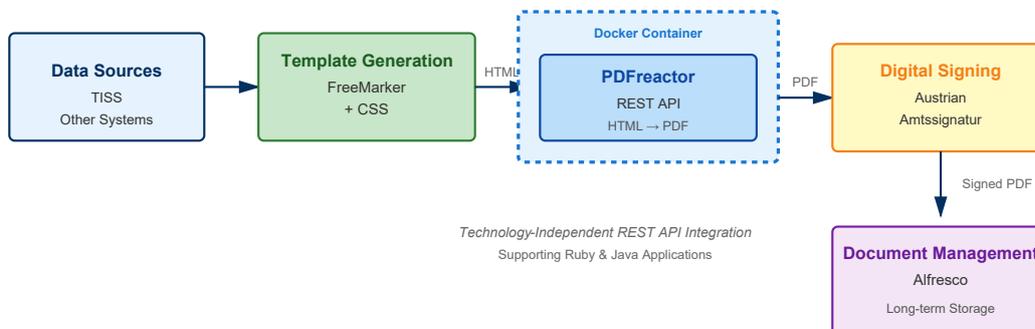
Campus IT implemented PDFReactor as part of a sophisticated, enterprise-grade document generation workflow that exemplifies modern best practices in document management and digital transformation.

### Technical Architecture:

The implementation centers around a comprehensive document lifecycle:

- **Template Generation:** FreeMarker templating engine combined with CSS creates dynamic HTML templates
- **PDF Conversion:** PDFReactor server deployed in Docker containers converts HTML to PDF via REST API
- **Digital Signing:** Integration with Austrian Amtssignatur provides official digital signatures
- **Document Management:** Alfresco handles long-term storage, metadata management, and retrieval

### TU Wien Campus IT - Document Generation Workflow



### Integration Details:

PDFReactor operates as a containerized microservice within Campus IT's infrastructure, accessible via REST API calls. This architecture ensures:

- **Scalability:** Horizontal scaling through container orchestration
- **Reliability:** Containerized deployment provides consistency and fault tolerance
- **Maintainability:** Clear separation of concerns and standardized interfaces
- **Security:** Isolated execution environment with controlled access

### Workflow Process:

The streamlined workflow processes documents from creation to archival:

- Data from TU Wien Campus Software TISS and other university systems populates FreeMarker templates

- CSS print styles ensure optimal layout and formatting
- PDFReactor converts HTML to PDF/UA-compliant documents
- Austrian Amtssignatur provides legal digital signatures
- Alfresco manages final document storage and metadata

This architecture successfully handles the full spectrum of university documentation needs, from routine administrative reports to legally-binding student transcripts, all while maintaining strict accessibility and compliance standards.

## 5 Testimonials

### Technical Excellence -Senior Developer, Campus IT:

*"The combination of CSS print and PDFReactor is extremely versatile. After migrating all automatically generated documents at Campus IT—including official student documents, administrative reports, and self-service documents—to this workflow, I cannot think of a layout I cannot achieve with this combination. The rendering accuracy and PDF/UA compliance capabilities have transformed how we approach document generation.."*

### Business Value - Head of Software Division, Campus IT:

*"Perfect support, scalability of the approach, high reliability. PDFReactor has proven to be a strategic asset for our operations, enabling us to meet all accessibility requirements while handling our substantial document volume efficiently."*

## 6 Results, Benefits and Business Value

The implementation of PDFReactor has delivered transformative results across Campus IT's document generation operations, establishing new standards for quality, compliance and efficiency.

### Quality and Compliance Achievements:

- **Full PDF/UA Compliance:** 100% of generated documents now meet accessibility standards, verified through PAC checker validation
- **Elimination of Layout Issues:** Complex layouts are consistently rendered accurately, eliminating the bugs that plagued previous solutions
- **Legal Compliance:** All official student documents and administrative reports meet Austrian legal requirements for accessibility

### Operational Excellence

- **Enterprise Scale Performance:** Successfully processing hundreds of thousands of documents annually without performance degradation
- **Streamlined Operations:** The integrated FreeMarker → PDFReactor → Amtssignatur → Alfresco workflow has significantly improved operational efficiency
- **Reduced Technical Complexity:** Consolidation from multiple fragmented technologies to a single, comprehensive solution

**Economic Benefits:**

- **Cost Optimization:** PDFreactor provides superior value compared to commercial alternatives while delivering enterprise-grade capabilities
- **Reduced Maintenance Overhead:** Simplified architecture decreases ongoing operational costs and technical debt
- **Development Efficiency:** Faster implementation of new document types and layouts

**Support and Partnership Excellence:**

Campus IT's experience with RealObjects support has been exceptional, characterized by very quick response times and technical expertise that consistently resolves issues effectively. The comprehensive and up-to-date documentation has proven invaluable for implementation and ongoing operations.

**Strategic Impact:**

The PDFreactor implementation represents more than a technology upgrade—it embodies Campus IT's commitment to digital transformation, accessibility, and operational excellence. By achieving full PDF/UA compliance while maintaining superior performance and cost-effectiveness, the solution positions TU Wien as a leader in accessible document generation within higher education.

The success of this implementation demonstrates the strategic value of selecting enterprise-grade solutions that align with institutional values and operational requirements, delivering measurable benefits across quality, compliance, performance, and cost-effectiveness.



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