

Technical Specification

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Author: Matt Jeffcoat

Organization: [Organization Name]

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ADVANCED MARKDOWN SHOWCASE

A comprehensive demonstration of markdown capabilities

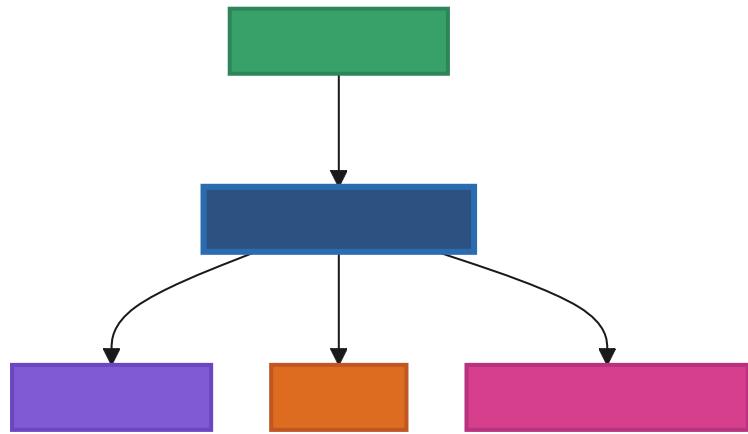
Introduction

This document showcases the full range of markdown features supported by the docs-pipeline system, including advanced diagrams, tables, code blocks, and typographic elements. Each section demonstrates a different capability that renders beautifully across all four visual profiles.

Architecture Diagrams

System Context Diagram

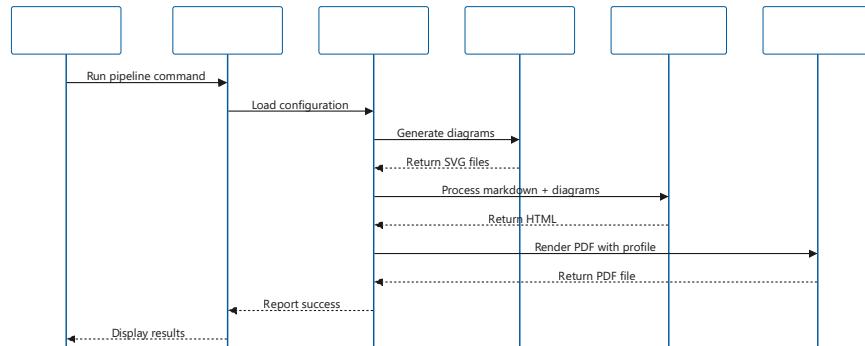
The following C4 context diagram shows the high-level system architecture:



Diagram

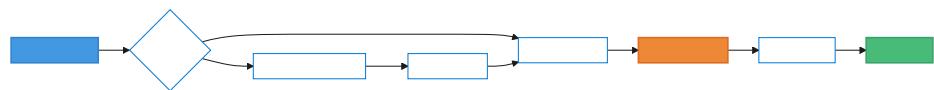
Sequence Diagram

Here's how the PDF generation process flows:



Diagram

Data Flow Diagram



Diagram

Complex Tables

Feature Comparison Matrix

FEATURE	TECH WHITEPAPER	DARK PRO	MINIMALIST	ENTERPRISE BLUE
Background	White	Dark Navy	Off-White	White
Primary	Blue	Cyan	Gray	Corporate Blue
Color	(#1976d2)	(#93c5fd)	(#2c3e50)	(#003d7a)
Typography	Serif + Sans	Modern Sans	Ultra-light	Corporate Sans
Code	Light gray bg	Dark bg + border	Minimal bg	Blue-tinted bg
Blocks				
Tables	Standard borders	Subtle borders	Borderless	Strong borders
Use Case	Print docs	Screen viewing	Architecture docs	Business reports
Page Margins	Standard	Compact	Generous	Standard
Heading Style	Bold + underline	Uppercase + glow	Thin + minimal	Corporate gradient

Performance Benchmarks

DOCUMENT SIZE	PROCESSING TIME	MEMORY USAGE	OUTPUT SIZE
Small (1-5 pages)	1.2s	45 MB	250 KB
Medium (10-20 pages)	3.5s	78 MB	890 KB
Large (50-100 pages)	12.8s	156 MB	3.2 MB
Enterprise (200+ pages)	45.2s	312 MB	8.7 MB

Technology Stack

COMPONENT	TECHNOLOGY	VERSION	PURPOSE
Parser	Pandoc	3.1+	Markdown → HTML conversion
Diagrams	Mermaid CLI	10.6+	Diagram rendering
Architecture	Structurizr CLI	Latest	C4 model diagrams
PDF Renderer	WeasyPrint	60.0+	HTML → PDF (default)
PDF Renderer (Alt)	Playwright	1.40+	HTML → PDF (enhanced SVG)
Orchestration	Python	3.10+	Pipeline coordination



Code Examples

Python API Implementation

```
from pathlib import Path
from typing import Optional
import asyncio

class DocumentPipeline:
    """
    Production-grade document generation pipeline.

    Coordinates diagram generation, markdown processing,
    and PDF rendering with configurable profiles.
    """

    def __init__(self, config_path: Path, profile: str = "tech-whitepaper"):
        self.config = self._load_config(config_path)
        self.profile = profile
        self.cache_enabled = True

    async def process(self, input_file: Path, output_file: Path) -> bool:
        """
        Process a single document through the pipeline.

        Args:
            input_file: Source markdown file
            output_file: Target PDF file path

        Returns:
        """

```

```
True if successful, False otherwise
"""

try:

    # Step 1: Generate diagrams
    diagrams = await
    self._render_diagrams(input_file)

    # Step 2: Process markdown with diagrams
    html = await
    self._markdown_to_html(input_file, diagrams)

    # Step 3: Render PDF with selected profile
    success = await self._render_pdf(html,
                                     output_file, self.profile)

return success

except Exception as e:
    self._log_error(f"Pipeline failed: {e}")
    return False


def _load_config(self, path: Path) -> dict:
    """Load and validate YAML configuration."""
    import yaml
    with open(path) as f:
        return yaml.safe_load(f)
```

JavaScript Event Handler

```
// Real-time document preview system

class DocumentPreview {

    constructor(container, apiEndpoint) {

        this.container = container;

        this.api = apiEndpoint;

        this.debounceTimer = null;

        this.currentRequest = null;

    }

    async updatePreview(markdown) {

        // Debounce rapid changes

        clearTimeout(this.debounceTimer);

        this.debounceTimer = setTimeout(async () => {

            try {

                // Cancel previous request if still pending

                if (this.currentRequest) {

                    this.currentRequest.abort();

                }

                // Create new request with AbortController

                const controller = new AbortController();

                this.currentRequest = controller;

                const response = await fetch(this.api, {

                    method: 'POST',
                    headers: { 'Content-Type': 'application/
json' },

```

```
        body: JSON.stringify({
            markdown,
            profile: 'tech-whitepaper'
        }),
        signal: controller.signal
    });
}

if (response.ok) {
    const { html } = await response.json();
    this.container.innerHTML = html;
    this._attachEventListeners();
}

} catch (err) {
    if (err.name !== 'AbortError') {
        console.error('Preview update failed:', err);
    }
}

}, 300);
}

_attachEventListeners() {
    // Handle internal navigation
    const links =
        this.container.querySelectorAll('a[href^="#"]');
    links.forEach(link => {
        link.addEventListener('click', e => {
            e.preventDefault();
            const target =
                document.querySelector(link.hash);
        });
    });
}
```

```
target?.scrollIntoView({ behavior:  
  'smooth' });  
});  
}  
};
```

YAML Configuration

```
# docs-pipeline.yaml - Production configuration

workspaces:

    production:

        # Structurizr diagram generation

        diagrams:

            workspace: architecture/system.dsl
            workspace_dir: architecture/
            formats: ["svg", "png", "mermaid"]
            output_dir: docs/diagrams/
            resources:
                - architecture/styles/
                - architecture/icons/

        # Document generation with multiple profiles

        documents:

            # Technical specification - all profiles
            - input: docs/specs/system-architecture.md
              output: output/specs/architecture-tech.pdf
              format: pdf
              profile: tech-whitepaper
              renderer: playwright

            - input: docs/specs/system-architecture.md
              output: output/specs/architecture-dark.pdf
              format: pdf
              profile: dark-pro
              renderer: playwright
```

```
# API reference - enterprise profile

- input: docs/api/reference.md

    output: output/api/reference.pdf

    format: pdf

    profile: enterprise-blue

    renderer: weasyprint
```

Bash Deployment Script

```
#!/bin/bash

set -euo pipefail


# docs-pipeline deployment script
REPO_ROOT=$(cd "$(dirname "${BASH_SOURCE[0]}")"/..
&& pwd)"

OUTPUT_DIR="${REPO_ROOT}/output"
DOCS_DIR="${REPO_ROOT}/docs"

echo "🚀 Starting document pipeline..."


# Step 1: Clean previous output
if [[ -d "$OUTPUT_DIR" ]]; then
    echo "⚡ Cleaning output directory..."
    rm -rf "$OUTPUT_DIR"/*
fi


# Step 2: Generate architecture diagrams
echo "📊 Generating Structurizr diagrams..."
python -m tools.structurizr.cli \
    --workspace architecture/system.dsl \
    --format svg,png,mermaid \
    --output "$DOCS_DIR/diagrams/"


# Step 3: Process all documents
echo "📄 Processing markdown documents..."
python -m tools.docs_pipeline.cli \
    --config docs-pipeline.yaml \
```

```

--parallel \
--verbose

# Step 4: Verify outputs

echo "☒ Verifying generated files..."

required_files=(
    "output/specs/architecture-tech.pdf"
    "output/specs/architecture-dark.pdf"
    "output/api/reference.pdf"
)

for file in "${required_files[@]}"; do
    if [[ ! -f "$REPO_ROOT/$file" ]]; then
        echo "✗ Missing required file: $file"
        exit 1
    fi
done

echo "◆ Pipeline complete! Generated $(find
"$OUTPUT_DIR" -name '*.pdf' | wc -l)
documents."

```

Mathematical Expressions

Inline Math

The quadratic formula is
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$
 and the exponential function is
$$e^{i\pi} + 1 = 0$$
.

Display Math

$$\begin{aligned} \nabla \times \vec{E} &= -\frac{\partial}{\partial t} \vec{B} \\ \nabla \times \vec{B} &= \mu_0 \vec{J} + \mu_0 \epsilon_0 \frac{\partial \vec{E}}{\partial t} \\ &\quad + \frac{\rho}{\epsilon_0} \nabla \cdot \vec{B} = 0 \end{aligned}$$

Performance scaling follows:

$$T(n) = O(n \log n) \text{ where } n = \text{document size}$$

Lists and Hierarchies

Feature Roadmap

1. **Phase 1: Core Pipeline** (Q4 2024)

- Markdown to PDF conversion
- Basic Mermaid diagram support
- Single profile system
- CLI interface

2. **Phase 2: Multi-Profile System** (Q1 2025)

- Four distinct visual profiles
- Profile-specific CSS
- Configurable renderer selection
- Web demo interface

3. **Phase 3: Advanced Features** (Q2 2025)

- Structurizr C4 integration
- Multi-workspace orchestration
- Parallel document processing
- Diagram caching system

4. **Phase 4: Enterprise Features** (Q3 2025)

- Custom branding support
- Template library
- API access
- Cloud deployment options

Technical Requirements

◦ **System Requirements**

- Python 3.10 or higher
- Node.js 18+ (for Mermaid CLI)
- Docker (optional, for Structurizr)
- 2GB RAM minimum (4GB recommended)

◦ **Development Tools**

- Git for version control
- VS Code or similar editor

- pytest for testing

- ruff for linting

- **Optional Dependencies**

- Playwright (for enhanced PDF rendering)

- SVGO (for SVG optimization)

- KaTeX CLI (for math rendering)

- PlantUML (for UML diagrams)

Callouts and Quotes

Important Note

This document demonstrates production-ready markdown processing capabilities. All features shown here are fully functional and render consistently across all four visual profiles.

Performance Tip

Enable diagram caching with `use_cache: true` in your configuration to significantly reduce processing time for repeated builds. Cached diagrams are stored in `tools/pdf/output/pdf-diagrams/` by default.

Special Elements

Horizontal Rules

Sections can be separated with horizontal rules for visual clarity:

Inline Formatting

Text can be **bold**, *italic*, **bold and italic**, ~~strikethrough~~, `inline code`, or even ^{superscript} and _{subscript}.

Links and References

For more information, see: - [Pandoc Documentation](#) - [Mermaid Syntax](#) - [Structurizr DSL](#) - [WeasyPrint Documentation](#)

Conclusion

This showcase demonstrates the comprehensive markdown capabilities of the docs-pipeline system. From simple formatting to complex diagrams, tables, and code blocks, every element renders beautifully across all visual profiles.

Key Takeaways

- ✓ **Multi-format support** - PDF, DOCX, and HTML outputs ✓ **Four visual profiles** - Choose the right look for your audience ✓
- Production-ready** - Handles enterprise-scale documentation ✓
- Extensible** - Add custom profiles and renderers ✓ **Fast** - Parallel processing and intelligent caching

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