

Technical Specification

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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 Color	Blue (#1976d2)	Cyan (#93c5fd)	Gray (#2c3e50)	Corporate Blue (#003d7a)
Typography	Serif + Sans	Modern Sans	Ultra-light	Corporate Sans
Code Blocks	Light gray bg	Dark bg + border	Minimal bg	Blue-tinted bg
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
        });
      }
    }, 500);
  }
}
```

```
    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

```

# Example YAML configuration for a web application
# This file defines the settings for the application, including database
# connections, logging, and other configuration parameters.

# Application Settings
application:
  name: "MyWebApp"
  version: "1.0.0"
  environment: "production"

# Database Configuration
database:
  driver: "mysql"
  host: "localhost"
  port: 3306
  name: "mydb"
  user: "root"
  password: "password"

# Logging Configuration
logging:
  level: "info"
  format: "%date% [%level%] %message%"
  output: "logs/app.log"

# Server Configuration
server:
  host: "0.0.0.0"
  port: 8080
  ssl:
    enabled: false
    cert: "cert.pem"
    key: "key.pem"

# Feature Flags
features:
  new_ui: true
  analytics: false
  debug_mode: false
```

```
# 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

# Configuration
APP_NAME="my-app"
APP_VERSION="1.0.0"
DEPLOY_DIR="/var/www/html"
BACKUP_DIR="/var/backups"
LOG_FILE="/var/log/deploy.log"

# Colors
RED='\033[0;31m'
GREEN='\033[0;32m'
YELLOW='\033[0;33m'
BLUE='\033[0;34m'
NC='\033[0m' # No Color

# Logging
log() {
    echo "$(date +%Y-%m-%d\ %H:%M:%S) $1" | tee -a $LOG_FILE
}

# Check if running as root
if [ $(id -u) -ne 0 ]; then
    log "${RED}Error: This script must be run as root."
    exit 1
fi

# Create backup
create_backup() {
    log "${GREEN}Creating backup of current deployment..."
    if [ -d $DEPLOY_DIR ]; then
        tar -czf $(date +%Y-%m-%d\ %H:%M:%S).tar.gz $DEPLOY_DIR
        mv $(date +%Y-%m-%d\ %H:%M:%S).tar.gz $BACKUP_DIR
    else
        log "${GREEN}No existing deployment found, skipping backup."
    fi
}

# Install dependencies
install_dependencies() {
    log "${GREEN}Installing dependencies..."
    apt-get update
    apt-get install -y curl git unzip
}

# Download application
download_app() {
    log "${GREEN}Downloading application..."
    curl -L -o $APP_NAME.tar.gz https://example.com/releases/$APP_NAME-$APP_VERSION.tar.gz
    if [ $? -ne 0 ]; then
        log "${RED}Error: Failed to download application."
        exit 1
    fi
}

# Extract application
extract_app() {
    log "${GREEN}Extracting application..."
    tar -xzf $APP_NAME.tar.gz -C $DEPLOY_DIR
}

# Remove old deployment
remove_old() {
    log "${GREEN}Removing old deployment..."
    rm -rf $DEPLOY_DIR
}

# Deploy application
deploy_app() {
    log "${GREEN}Deploying application..."
    mv $APP_NAME $DEPLOY_DIR
    chown -R www-data:$DEPLOY_DIR
}

# Main function
main() {
    log "${BLUE}Starting deployment process..."
    create_backup
    install_dependencies
    download_app
    extract_app
    remove_old
    deploy_app
    log "${GREEN}Deployment completed successfully."
}

# Run main function
main
```



```
#!/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

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

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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