

# **PowerShell Script Analysis**

## **Improvements**

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# Overview

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This document outlines the improvements made to the PowerShell script analysis system in PSScript. The enhanced analyzer now provides consistent rating scales, better explanations, and comprehensive Microsoft Learn documentation references.

# Key Improvements

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## 1. Enhanced Rating Scales

The analyzer now uses consistent, well-defined rating scales for all evaluations:

### Security Score (1-10)

- **1-3:** Minimal security risks - Safe for production use
- **4-6:** Moderate security risks - Address issues before production use
- **7-10:** Severe security risks - Requires immediate attention before use

### Code Quality Score (1-10)

- **8-10:** Excellent code quality - Follows best practices
- **5-7:** Acceptable code quality - Some improvements needed
- **1-4:** Poor code quality - Significant refactoring required

### Risk Score (1-10)

- **1-3:** Minimal execution risk - Safe to execute in most environments
- **4-6:** Moderate execution risk - Use with caution, test thoroughly first
- **7-10:** High execution risk - Careful review and controlled environment required

### Reliability Score (1-10)

- **8-10:** Robust code with excellent error handling
- **5-7:** Adequate error handling with some improvements needed
- **1-4:** Poor error handling requiring significant improvements

## 2. Microsoft Learn Documentation Integration

Each analyzed script now includes relevant Microsoft Learn documentation references with:

- Command/concept name

- Full URL to the Microsoft documentation
- Brief description of what the documentation covers

This helps users understand the PowerShell commands used in the script and provides easy access to official documentation.

### **3. Improved Analysis Details**

- More comprehensive command details including purpose and potential risks
- Better categorization of scripts based on their functionality
- More actionable optimization suggestions

# Implementation Details

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## Core Components Updated

1. **AI Script Analyzer** (`/src/ai/analysis/script_analyzer.py`)
  2. Updated prompt templates with clear rating guidelines
  3. Added structure for Microsoft Learn documentation references
  4. Improved field mapping for consistent results
5. **Backend Integration**  
(`/src/backend/src/controllers/ScriptController.ts`)
  6. Fixed field mapping between AI analysis and database storage
  7. Added support for MS Learn documentation references
  8. Updated analysis storage format
9. **Batch Analysis Tools**
  10. Added `update-script-analysis.js` for batch updating existing scripts
  11. Created shell script for easy execution of the update process

## User Interface Updates

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The script detail and analysis pages now show:

- Clear rating indicators with explanations
- Links to relevant Microsoft Learn documentation
- More actionable improvement suggestions

## Running the Update

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To re-analyze all existing scripts with the improved analyzer:

```
# Make the script executable  
chmod +x update-all-script-analysis.sh  
  
# Run the update  
./update-all-script-analysis.sh
```

This will process all scripts in batches and update their analysis information in the database.

## Technical Notes

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- The analysis uses the OpenAI API with GPT-4o model for high-quality results
- Analysis results are cached to improve performance and reduce API costs
- The analyzer includes fallback mechanisms for handling errors
- Batch processing is used with configurable concurrency and rate limiting

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