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HAR to K6 Script Conversion: Bridging HTTP Archive Files with Performance Testing Frameworks

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Abstract		Original Research Article

Performance testing plays a crucial role in ensuring the reliability and responsiveness of web applications. HTTP Archive (HAR) files, widely used for capturing browser network activity, contain valuable insights into application performance. However, translating these insights into actionable load tests often requires manual effort, especially when creating scripts for K6, a powerful performance testing framework. This paper presents an automated solution for converting HAR files into K6 scripts, enabling testers to streamline the script generation process. By reducing manual effort, enhancing script accuracy, and integrating seamlessly into existing workflows, this utility addresses key challenges faced by development and quality assurance teams. The paper discusses the technical approach, implementation details, and benefits of the tool, along with real-world use cases demonstrating its impact on performance testing efficiency.
Keywords: Performance Testing, HAR File, K6 Script, Automation, Software Tools, HTTP Archive, Test Automation.

1. INTRODUCTION

In today's rapidly evolving digital landscape, web applications play a pivotal role in businesses and user experiences. Ensuring the performance, reliability, and scalability of these applications is critical for maintaining customer satisfaction and competitive advantage. Performance testing, a key aspect of quality assurance, simulates user interactions to measure how an application behaves under load. This helps identify bottlenecks, optimize resource utilization, and ensure that applications meet performance expectations.

HTTP Archive (HAR) files are widely used for capturing detailed browser network activity. These files contain a comprehensive record of HTTP transactions, including request and response data, headers, cookies, and payloads. However, translating HAR data into actionable insights for performance testing frameworks like K6 requires considerable manual effort.

To address these challenges, we propose an automated utility for converting HAR files to K6 scripts. This utility bridges the gap between network activity monitoring and performance testing by streamlining the conversion process. By automating the parsing of HAR files and transforming their content into syntactically correct and optimized K6 scripts, this solution empowers testers to focus on executing and analyzing performance tests rather than preparing scripts.

2. Problem Statement

Manual conversion of HAR files to K6 scripts involves challenges such as:

1. Parsing the complex structure of HAR files.
2. Mapping request/response details to K6-compatible syntax.
3. Handling a large volume of requests efficiently.
4. Ensuring script accuracy without human error.
5. These limitations hinder the testing teams' ability to perform timely and efficient load testing, especially in agile environments requiring quick turnarounds.

3. Proposed Solution

The solution introduces an automated utility that parses HAR files and generates optimized K6 scripts. This utility ensures:

- Accurate mapping of HTTP transactions.
- Automatic handling of headers, query parameters, and payloads.
- Configurable options for test duration, iterations, and custom logic.

This automation enables QA engineers to focus on analyzing test results rather than spending time on script preparation.

4. METHODOLOGY

4.1 Input: HAR File

HAR files store network activity, including request and response data in JSON format. The tool extracts key details such as:

- URL
- HTTP method (GET, POST, etc.)
- Headers, cookies, and payloads

4.2 Output: K6 Script

K6 scripts are written in JavaScript and define HTTP requests for load testing. The utility transforms HAR data into syntactically correct and optimized K6 scripts, ready for execution.

4.3 Conversion Process

1. Parsing HAR Files:
- JSON parsing libraries are used to extract data from HAR files.
- Filters are applied to exclude irrelevant requests (e.g., static assets).

2. Generating K6 Scripts:
- K6's 'http.request' is used to create scripts.
- Script modularization ensures reusability and maintainability.

3. Error Handling:
- Invalid or incomplete HAR data is flagged during parsing.
- Logs provide detailed error messages for debugging.

5. Benefits

The proposed utility offers the following advantages:
- Time Savings: Automates repetitive tasks, reducing manual effort.
- Accuracy: Eliminates errors in script creation.
- Scalability: Handles large HAR files efficiently.
- Usability: Generates scripts that integrate seamlessly with existing testing workflows.

6. Architecture

The architecture consists of three main components:
1. Input Layer: Accepts HAR files containing HTTP transactions.
- Key Data: URLs, methods, headers, payloads, cookies.

2. Processing Layer: The core of the tool, consisting of:
- HAR Parser: Extracts and organizes HTTP transaction data.
- Data Transformer: Maps extracted data to K6 script syntax.

3. Output Layer: Generates a final K6 script.
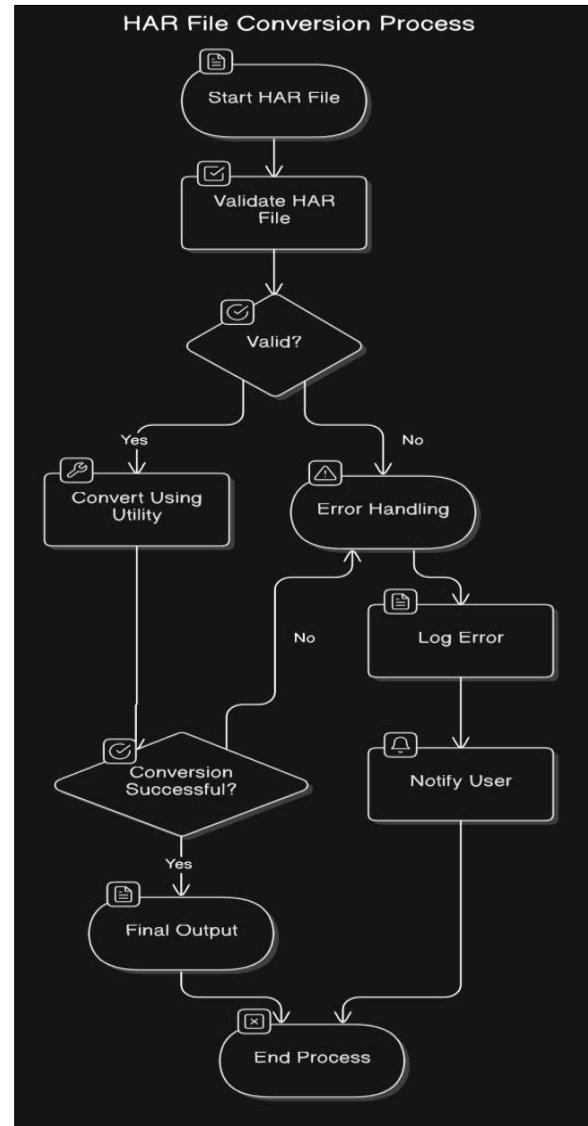
6.1 Architecture Diagram

Fig. 1

7. RESULTS AND DISCUSSION

The utility was tested on sample HAR files with varying complexity. Results indicated a significant reduction in script generation time and increased accuracy in replicating real-world HTTP transactions. Testers reported faster iteration cycles and improved focus on test execution.

8. CONCLUSION

The HAR to K6 script conversion utility bridges a critical gap in the performance testing workflow. By automating the conversion process, this tool empowers testing teams to optimize their efforts, delivering faster and more reliable performance insights. Future developments may include advanced analytics and integration with additional testing frameworks. The automated HAR-to-K6 conversion tool represents a

significant advancement in performance testing, addressing long-standing inefficiencies and empowering teams to optimize their workflows. By providing a seamless path from raw HTTP archive data to executable load-testing scripts, the tool ensures that organizations can meet the ever-growing demands of their users with robust, high-performing applications. It is a vital addition to the performance testing toolkit, paving the way for faster, more reliable, and scalable software delivery.

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