Proof-of-Concept Report:-

Tool Name:

Pe_unmapper & PE Bear

Description:-

PE Bear:

PE Bear is a lightweight and flexible tool designed for analyzing Windows PE (Portable Executable) files. It provides a clean interface to explore headers, sections, and import/export tables.

PE Unmapper:
pe_unmapper is a complementary tool or plugin that unmapped memory-loaded PE files (such as packed or injected executables) and reconstructs them into valid, analyzable binaries.

What Is This Tool About?

These tools are essential for reverse engineering and malware analysis. PE Bear offers a detailed static view of the PE structure, while pe_unmapper reconstructs executables from memory dumps, correcting headers, IATs, and entry points, making post-dump binaries useful for further investigation.

Key Characteristics / Features:

- Portable, no installation required
- PE header parsing (DOS, NT, Optional, Section)
- Rebuilds memory-resident PE structures
- Entry Point (OEP) recovery
- IAT and section header reconstruction

- Supports x86 and x64 binaries
- Plugin support (PE Bear)
- Fast binary analysis with hex editor
- CLI and GUI available
- Minimal resource usage
- Visual section mapping and entropy graphs
- Integration with debuggers like x64dbg
- Unpacking support for packed malware
- Can process malformed or corrupted PE dumps
- Signature and timestamp inspection

Types / Modules Available:

- PE Header Viewer
- Section Viewer
- Hex Editor
- Section Rebuilder (pe_unmapper)
- Import Address Table Fixer
- Entry Point Finder
- CLI Dump Tool

How Will This Tool Help?

- Analyzes malicious binaries and detects packing
- Reconstructs and dumps memory-injected payloads

- Supports reverse engineering in malware analysis
- Prepares executables for loading into IDA Pro or Ghidra
- Useful in forensic memory dump analysis
- Allows section and IAT analysis even after in-memory execution

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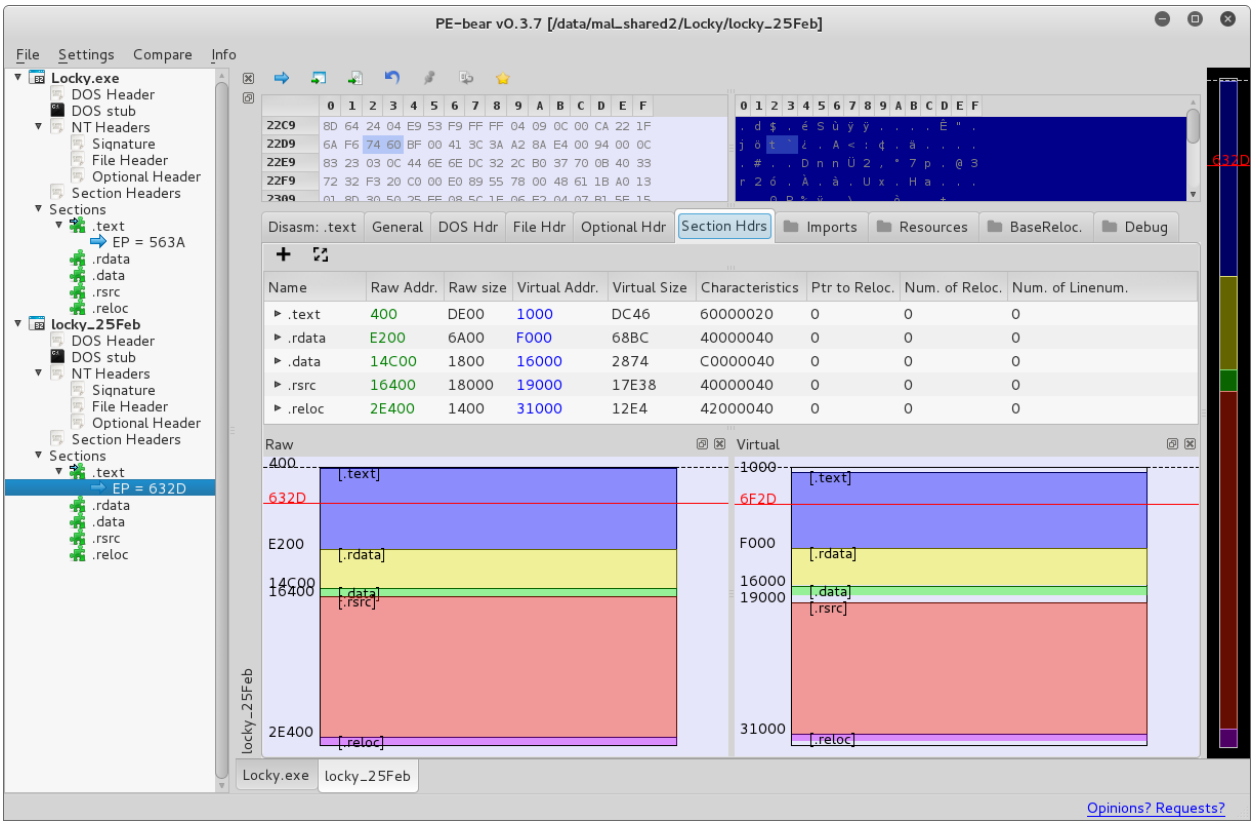
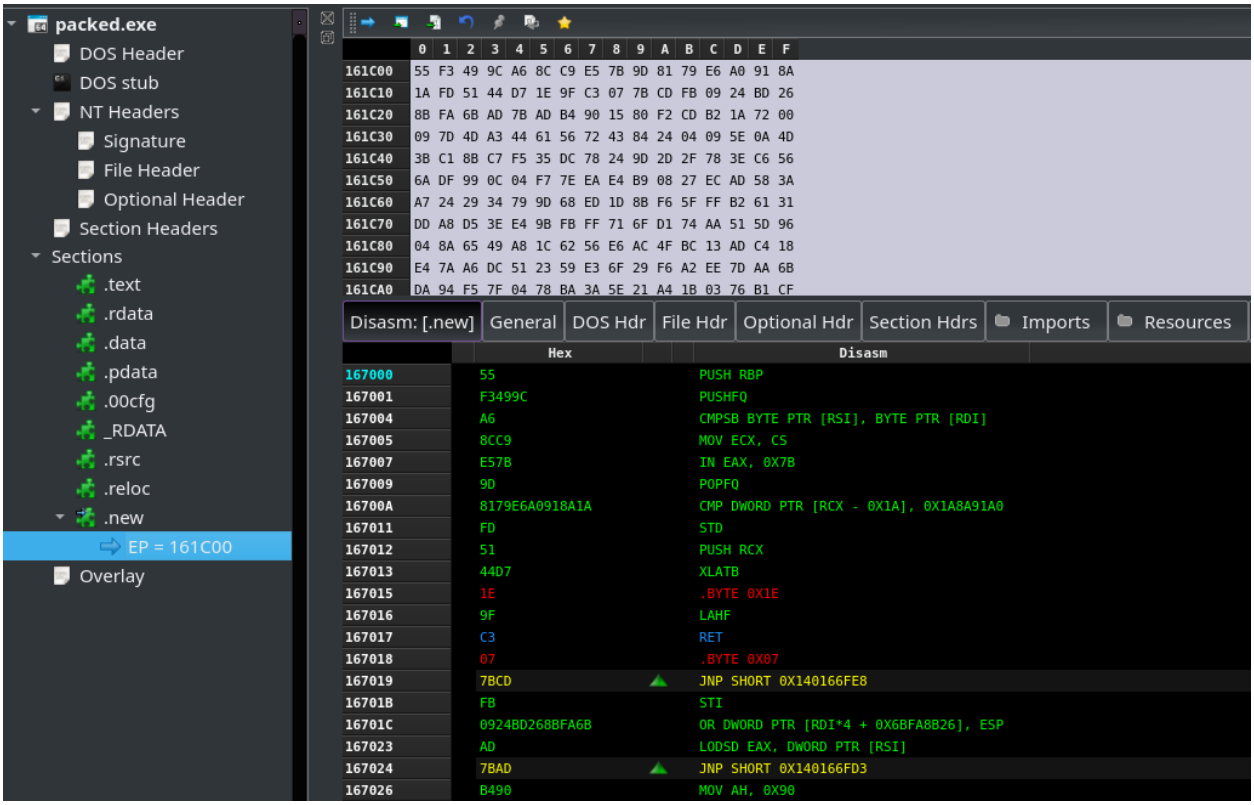
Proof of Concept (POC) Images:

PE-Bear:



pe_unmapper CLI finding and fixing OEP:

https://github.com/hasherezade/pe-bear/issues/11#issuecomment-1428172722



15-Liner Summary:

- Static PE analysis with PE Bear
- Portable and lightweight
- Memory dump rebuilding with pe_unmapper
- Entry Point (OEP) recovery
- Import Table reconstruction
- Supports x86/x64 binaries
- CLI automation supported
- Detects packing/obfuscation
- Great for malware RE workflows

- Integrated hex editing
- Signature and timestamp parsing
- Entropy-based analysis
- Plugin extensibility
- Cross-platform via Wine (for PE Bear)
- Used by REs, IR teams, and forensic units

Time to Use / Best Case Scenarios:

- After capturing a memory dump of a suspicious process
- When static PE fails to load in IDA/Ghidra
- While analyzing packed or obfuscated malware
- After process hollowing detection
- During red-team operations to unpack payloads

When to Use During Investigation:

- Post-infection memory analysis
- Reverse engineering of custom loaders
- Packed malware reconstruction
- Forensic analysis of malicious binaries
- Reconstruction before AV/sandbox testing

Best Person to Use This Tool & Required Skills:

Best Users:

- Malware Analysts
- Reverse Engineers
- Incident Responders
- Threat Researchers

Required Skills:

- Understanding of PE file structure
- Familiarity with debuggers (e.g., x64dbg, WinDbg)
- Experience with memory dump acquisition
- Optional: scripting with Batch/Python for automation

Flaws / Suggestions to Improve:

- Limited support for .NET or managed PE files
- No GUI integration for pe_unmapper (CLI only)
- Lack of in-tool logging panel (for pe_unmapper)
- Suggestion: Add automatic import resolution using debug symbols
- Suggestion: Integration with Ghidra via API plugin

Good About the Tool:

- Accurate and fast PE parsing
- Excellent for binary repair and unpacking workflows
- Portable with no dependencies

- Helpful for both manual and automated RE workflows
- Continuously updated and well-documented