06\_MungeEngine

## What Is Munge?

Munge is Mango's automated discovery engine for transform sequences.

It systematically explores and evaluates millions of combinations to identify high-performing cryptographic pipelines tailored to a given InputType.

This engine is responsible for discovering the 'god-sequences' used in production today.

## Why Munge Still Matters

While Mango ships with four well-tuned InputProfiles, industries with specialized data formats may benefit from discovering sequences tailored to their domain.

Running Munge on real-world input allows developers to generate domain-optimized sequences that surpass generic profiles.

Munge is essential for extending Mango's adaptability.

## How Munge Works (Mechanics)

* 1. Sequence Generation — All valid transform chains up to the configured length (L1–L5) are constructed.

2. Evaluation — Each sequence is scored using metrics like entropy, avalanche, bit variance, and more.

3. Filtering — Sequences that fail to meet the pass count threshold are discarded.

4. Contender Ranking — High-performing sequences are saved in a Contenders file.

5. Snapshotting — Periodic state files allow for resumable Munges in the event of a failure.

## Cutlists and Acceleration

L5 Munge may explore over 90 million sequences and take several days.

At the end of a Munge run, a cutlist is derived from the top 10 contenders, reducing the transform pool for future runs.

This enables rerunning L5 (with a new transform added) in hours instead of days.

If the new transform does not perform well, you may delete the cutlist and original Contenders file to force a full Munge run and re-evaluate all sequences.

## Batch Processing Munge Jobs

Mango includes a `RunBatch.cmd` file for hands-off Munge execution.

This script runs L1–L5 discovery automatically across all four InputTypes.

Important command-line arguments used by the batch script:

* - `-RunCommand run munge(-restore)` — starts/resumes a Munge operation.
* - `-ExitJobComplete` — exits after job completes, ideal for unattended runs.
* - `-maxSequenceLen` — sets Munge level (e.g., L5 = 5).
* - `-inputType` — one of Combined, Random, Sequence, or Natural.
* - `-passCount` — the minimum number of metrics that must pass (e.g., 6).
* - `-mode` — evaluation mode (Cryptographic or Exploratory).
* - `-quiet` — suppresses real-time output for performance.
* - `-createMungeFailDB` — optionally logs failed sequences.

## From Munge to InputProfile

After Munge, the top contender(s) can be exported or copied into InputProfiles.

Optional tuning via `btr` (Best Transform Rounds) can be run to optimize per-transform settings.

The final result is a strong, domain-tuned, reproducible InputProfile ready for deployment.

## Closing Remarks

Munge is the research engine beneath Mango.

While end users benefit from built-in profiles, advanced users and industry specialists can rely on Munge to unlock new cryptographic optimizations.