# 1. Introduction

## 1.1 What is Mango?

Mango is a next-generation cryptographic platform designed to explore and surpass the capabilities of traditional encryption standards like AES. It provides a modular workbench for constructing, evaluating, and optimizing encryption sequences made from atomic transform operations. By embracing adaptive logic, deep scoring metrics, and exhaustive search techniques, Mango enables the discovery of encryption sequences tailored to specific data types—unlocking performance and security improvements that static ciphers cannot achieve.  
  
At its core, Mango represents a shift from static, one-size-fits-all ciphers to adaptive cryptography. Instead of applying the same sequence to all data, Mango profiles each input, classifies it (e.g., Natural, Random, Sequential), and dynamically selects the most effective transform chain. This allows it to maintain cryptographic strength while drastically improving performance in structured or semi-structured environments.

## 1.2 Philosophy & Goals

Mango is built on the belief that cryptography should be:

* - Transparent – Every decision, from transform logic to scoring outcomes, is measurable and explainable.
* - Modular – Small, composable units (transforms) empower rapid experimentation and evaluation.
* - Adaptive – Rather than applying a one-size-fits-all cipher, Mango discovers optimal sequences based on the input data's nature.
* - Provable – All sequences are evaluated with rigorous metrics, ensuring repeatable results across multiple test conditions.

The overarching goal is to create a flexible, cryptographically sound, and verifiably superior encryption system that evolves with the data it protects.

## 1.3 Key Features

* 🔐 Atomic Transform Engine – Over 30 customizable transforms enable fine-grained control over data processing.
* 🧠 Munge (Sequence Discovery Engine) – Automatically identifies top-performing sequences through multi-level, multi-metric optimization.
* 📊 Metric-Driven Scoring – Evaluates sequences on up to 9 independent metrics, including Avalanche, Frequency Distribution, Key Sensitivity, and more.
* 🧬 Input-Aware Adaptation – Supports data classification (Natural, Random, Sequence, Combined) to tailor sequences for maximum effectiveness.
* ♻️ Fully Reversible Design – Ensures all sequences and transforms are invertible and validated for correctness.
* 🚀 AES Benchmarking – Built-in comparative tools highlight where Mango outperforms AES in both strength and speed.