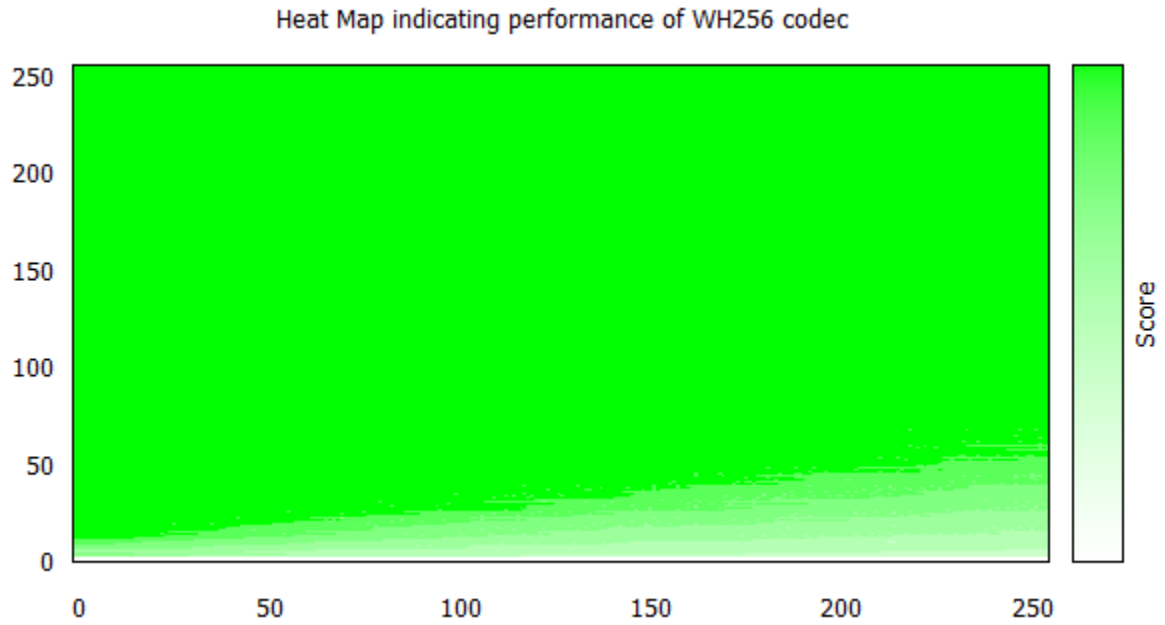
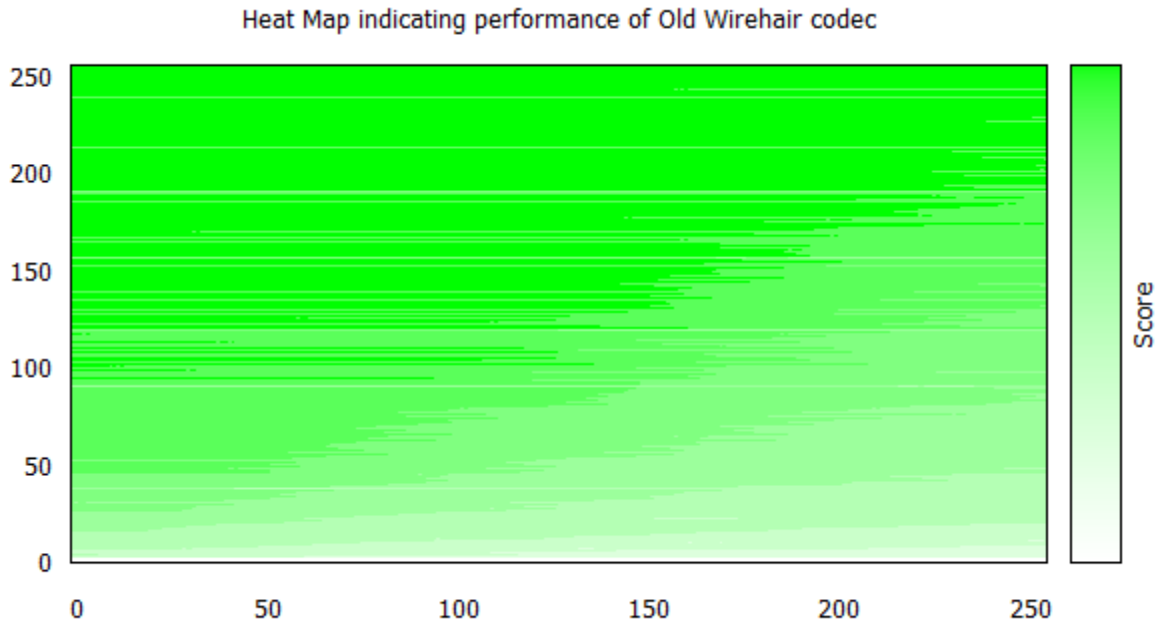
Results: (Dark Green means > 500 MB/s for file transfer error correction)

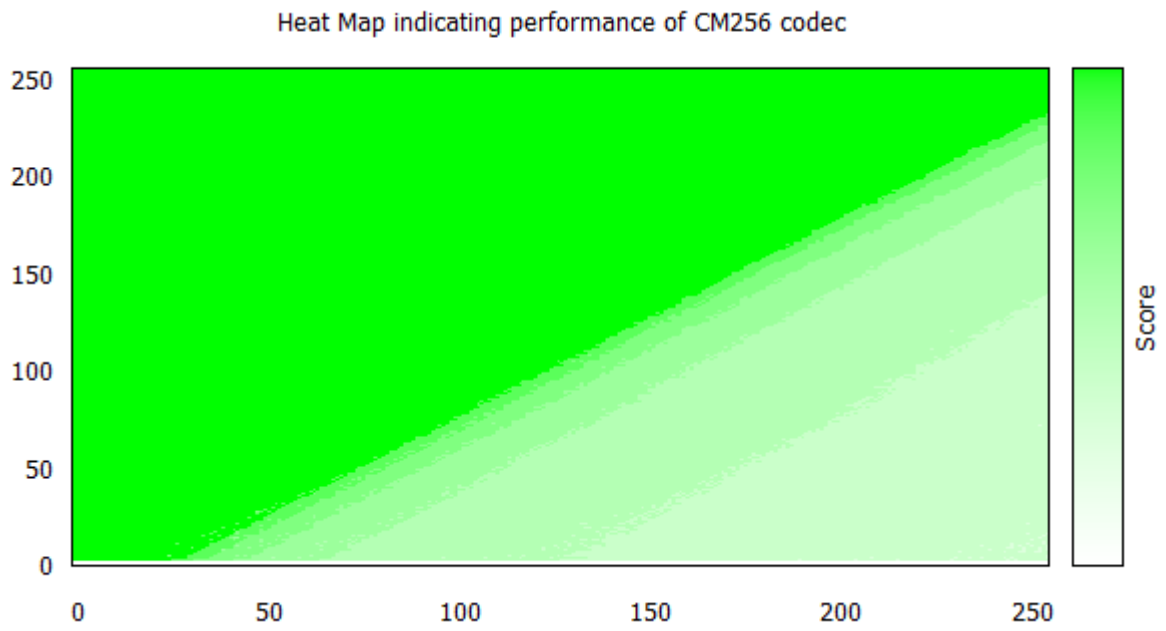
LDPC codec:

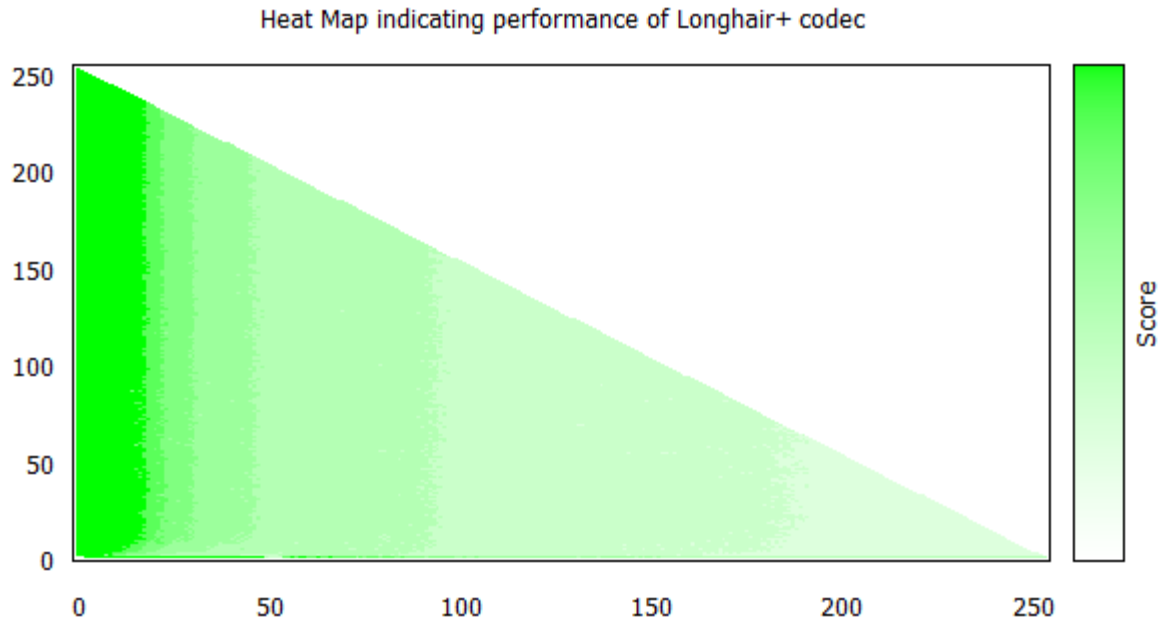


Improvement on previous performance:

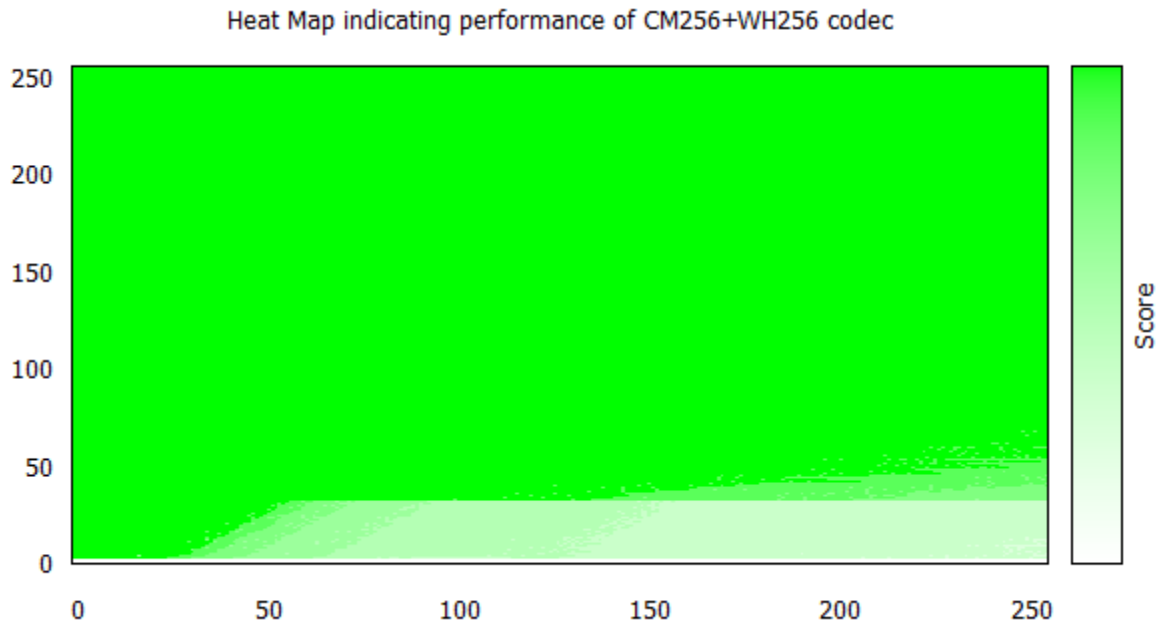


Two variants of standard Reed-Solomon codes:




Heat Map indicating performance of Longhair+ codec
250
200
150
100
50
0
0
50
100
150
200
250
Score

LDPC + RS codec (switch over at N=32):



Independent benchmarking from Yutaka Sawada:

Calculation time with single core of Celeron G1620 2.7 GHz

Redundancy = 20%

Data size = 468.75 MB

= 10240 * 48000, (n, k) = (57600, 48000)

= 12288 * 40000, (n, k) = (48000, 40000)

= 16384 * 30000, (n, k) = (36000, 30000)

= 49152 * 10000, (n, k) = (12000, 10000)

= 163840 * 3000, (n, k) = (3600, 3000)

= 491520 * 1000, (n, k) = (1200, 1000)

= 1638400 * 300, (n, k) = (360, 300)

= 4915200 * 100, (n, k) = (120, 100)

James Plank style 16-bit Reed-Solomon Erasure Codes (used in PAR2)

Blocks |4.69MB * 100|1.56MB * 300|480KB * 1000|160KB * 3000|48KB * 10000|16KB * 30000|

no-SIMD| 4.9 sec | 15.1 sec | 50.5 sec | 152.1 sec | 511.1 sec | 1559.2 sec |

MMX | 4.5 sec | 13.7 sec | 45.9 sec | 138.2 sec | 464.9 sec | 1424.7 sec |

SSSE3 | 2.7 sec | 8.3 sec | 27.6 sec | 81.4 sec | 265.6 sec | 803.5 sec |

Frederic Didier's 16-bit Reed-Solomon Erasure Codes with FWT

Blocks |4.69MB * 100|1.56MB * 300|480KB * 1000|160KB * 3000|48KB * 10000|16KB * 30000|12KB * 40000|10KB * 48000|

no-SIMD| 170.4 sec | 242.9 sec | 312.8 sec | 222.5 sec | 283.4 sec | 397.9 sec | | |

SSE2 | 24.9 sec | 35.7 sec | 47.9 sec | 40.1 sec | 51.4 sec | 70.4 sec | 55.0 sec | 48.6 sec |

Michael Niedermayer style 16-bit Reed-Solomon Codes with FFT (Error Correction requires double more time.)

Blocks |4.69MB * 100|1.56MB * 300|480KB * 1000|160KB * 3000|48KB * 10000|16KB * 30000|12KB * 40000|10KB * 48000|

no-SIMD| 8.7 sec | 15.0 sec | 21.0 sec | 20.2 sec | 23.2 sec | 36.4 sec | 28.5 sec | 28.9 sec |

LDPC-Staircase style LDGM (MMX, Require 24% redundancy to recover 20% lost.)

Blocks |4.69MB * 100|1.56MB * 300|480KB * 1000|160KB * 3000|48KB * 10000|16KB * 30000|

Encode | 0.4 sec | 0.4 sec | 0.4 sec | 0.3 sec | 0.4 sec | 0.4 sec |

Decode | 0.4 sec | 0.5 sec | 0.5 sec | 0.7 sec | 1.7 sec | 3.9 sec |

Sian-Jheng Lin's 16-bit Reed-Solomon Erasure Codes with FLT

Blocks |4.69MB * 100|1.56MB * 300|480KB * 1000|160KB * 3000|48KB * 10000|16KB * 30000|12KB * 40000|10KB * 48000|

Encode | 26.1 sec | 18.3 sec | 20.0 sec | 22.7 sec | 22.7 sec | 27.3 sec | 26.1 sec | 29.3 sec |

Decode | 43.6 sec | 38.8 sec | 49.6 sec | 40.9 sec | 50.9 sec | 67.7 sec | 55.9 sec | 51.1 sec |

***** These are results from the old library:**

Wirehair's Non-Binary Hybrid LDPC over GF(256)

Blocks |4.69MB * 100|1.56MB * 300|480KB * 1000|160KB * 3000|48KB * 10000|16KB * 30000|8KB * 60000|

Encode | 2.6 sec | 1.9 sec | 1.6 sec | 1.6 sec | 1.7 sec | 1.8 sec | 2.0 sec |

Decode | 2.9 sec | 2.3 sec | 1.9 sec | 1.9 sec | 2.0 sec | 2.1 sec | 2.3 sec |

Wirehair's Non-Binary Hybrid LDPC over GF(65536)

Blocks |4.69MB * 100|1.56MB * 300|480KB * 1000|160KB * 3000|48KB * 10000|16KB * 30000|8KB * 60000|

Encode | 3.3 sec | 2.2 sec | 1.7 sec | 1.7 sec | 1.7 sec | 1.8 sec | 2.0 sec |

Decode | 3.7 sec | 2.5 sec | 2.0 sec | 2.0 sec | 2.0 sec | 2.1 sec | 2.3 sec |

RSC32 v3.18 is used in following tests.

RSC32's Reed-Solomon 16-bit with Cauchy matrix (-tm0)

Blocks |4.69MB * 100|1.56MB * 300|480KB * 1000|160KB * 3000|

SSE2 | 19 sec | 29 sec | 75 sec | 238 sec |

RSC32's PRPC (-tm1, needs 15 extra recovery volumes)

Blocks |480KB * 1000|160KB * 3000|

Encode | 12 sec | 35 sec |

Decode | 9 sec | 29 sec |

RSC32's LDPC (-tm2, needs at least 1000 recovery volumes and 20 extra recovery volumes)

Blocks |48KB * 10000|16KB * 30000|

Encode | 15 sec | 33 sec |

Decode | 27 sec | 90 sec |

RSC32's QDPC (-tm6, needs at least 70 recovery volumes and 5 extra recovery volumes)

Blocks |480KB * 1000|160KB * 3000|48KB * 10000|

Encode | 15 sec | 19 sec | 68 sec |

Decode | 12 sec | 36 sec | 175 sec |

RSC32's Reed-Solomon 32-bit with FFT (-tm7)

Blocks |4.69MB * 100|1.56MB * 300|480KB * 1000|160KB * 3000|48KB * 10000|16KB * 30000|

SSE2 | 14 sec | 17 sec | 24 sec | 23 sec | 27 sec | 43 sec |

RSC32's Reed-Solomon 32-bit with FLI (-tm8)

Blocks |4.69MB * 100|1.56MB * 300|480KB * 1000|160KB * 3000|48KB * 10000|16KB * 30000|

SSE2 | 11 sec | 16 sec | 22 sec | 18 sec | 24 sec | 38 sec |

RSC32's Reed-Solomon 32-bit with DFT (-tm11)

Blocks |288052 * 1707|144088 * 3412|36084 * 13622|18104 * 27150|9052 * 54300| continued to

SSE2 | 9 sec | 10 sec | 10 sec | 11 sec | 12 sec | next line...

Blocks |4588 * 107132|1240 * 396388|620 * 792775|372 * 1321291|

SSE2 | 12 sec | 14 sec | 18 sec | 23 sec |

[Appendix]

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