

Sealed Experiment Record

Sealed 2026-10-10 · Signed by the K-Veritas server
Session bc75a73a · Data hash d5f0...feff

Abstract

This record seals 1 run (kv_run.sh) executed on Intel(R) Xeon(R) W-2145 CPU @ 3.70GHz between 2026-10-10 21:04 and 21:11 UTC. Reported results: eager_generate_ms 1221.03, thunder_generate_ms 2554.79. 1 invocation in total, 0 failed. Produced with K-Veritas [1].

What this record proves

These numbers came from the sealed code at this time, unchanged since. Whether the experiment is sound is for the reader to judge.

Verify: kveritas verify <this file> or kveritas.org/verify

1 Setup

Item	Value
Session	bc75a73a-85ba-4c14-82c2-fb6f81287bd8
Initialized	2026-10-10T21:04:36Z
Machine	167ec0d6dc9a8170
Operating system	linux / amd64
CPU	Intel(R) Xeon(R) W-2145 CPU @ 3.70GHz, 16 cores
Memory	31.0 GB
GPU	NVIDIA GeForce RTX 5060 Ti, 16311 MiB
Environment, run 1	0cde9e1c17041e46acd3bac335d289e18922068987885975dea5e0bfccaccede
Disclosure	open
Source code, run 1	7bfdc9252af8f0c719695ed8b5bac6205b14ce3a6262f253362171e6e2ad9618

2 Runs

#	Command	Duration	Exit	Anchored
1	bash kv_run.sh	7 minutes 3 seconds	0	at run end

1 invocation in total: 1 kept in this record, 0 failed, 0 interrupted. Every invocation is recorded by the server, including the ones not kept.

3 Results

Run 1: kv_run.sh

Metric	Final value	Step	Source
eager_generate_ms	1221.03		explicit
thunder_generate_ms	2554.79		explicit

Inline claim	Value	Phase	Output line
eager_generate_ms	1221.03		8
thunder_generate_ms	2554.79		9

4 Execution evidence

Coherence

Coherent (0.22): the telemetry channels move together, as one process.

Telemetry

Run	Samples	CPU time	Peak memory	Peak GPU
1	4076	522.1 s	13.84 GB	79%

5 Provenance

Run 1: kv_run.sh

Disclosure open. 251 tracked files, 3 snapshots. Every snapshot is bound into the signature.

#	Snapshot	Time	Root	Changed
0	run_start	21:04:36	334284f692a68c74	251
2	run_end	21:11:39	334284f692a68c74	0

1 snapshot with no file change omitted here; full timeline in Appendix B.

Activity: 251 files read, 0 files written, 21 subprocesses. Full list in Appendix B.

6 Verification

Field	Value
Signer	Signed by the K-Veritas server
Signed at	2026-10-10T21:11:41.256288+00:00
Algorithm	RSA-PSS-SHA256, 4096-bit key
Key fingerprint	eeac81653cf44ac029c4069cf2a06d9f
Data hash	d5f0b916cca0952bbef89c86fb15264e33d54a4fbc9b0a4b3e48186de56ffe9ff
Code bundle hash	bd016a21116e9c54890828a70a7014367d9cb7cee9e4f75c498541741a8816b8

Run anchors: 1 invocations were anchored at the server when they ended.

Checks a verifier runs

1. The stored canonical data hashes to the data hash above, and the signature verifies over data_hash:nonce:signed_at.
2. The signing key is the K-Veritas server key, not one supplied by the author.
3. Nothing was appended after the seal, and these pages hash to the value bound in the seal.
4. Each run matches the digest the server received when it ended.
5. A supplied code bundle hashes to the code bundle hash above.

References

[1] M. K. Keita and C. Homan. Computer Science Conferences Should Require Nonrepudiable Experimental Results. NeurIPS 2026 Position Paper Track. arXiv:2605.08586.

Appendix

A Full metric series

Run 1: kv_run.sh

Metric	Value	Step	Line	Source
eager_generate_ms	1221.03		6	explicit
thunder_generate_ms	2554.79		7	explicit

Phase	Line	Time	CPU time	Memory	GPU
generate	1	21:04:37	1.6 s	0.61 GB	

B Provenance timeline and activity map

Run 1: kv_run.sh

#	Snapshot	Time	Root	Changed
0	run_start	21:04:36	334284f692a68c74	251
1	phase generate	21:04:37	334284f692a68c74	0
2	run_end	21:11:39	334284f692a68c74	0

Event	Path or command	Hash
read	kv_run.sh	
read	examples/quickstart/hf_llm.py	
read	.azure/docker-build.yml	
read	.azure/gpu-coverage.yml	
read	.azure/gpu-tests.yml	
read	.azure/notebook-runs.yml	
read	.codecov.yml	
read	.github/dependabot.yml	
read	.github/labeling-config.yml	
read	.github/lightning-probot.yml	
read	.github/load-jit-coverage-report.py	
read	.github/load-quickstart-report.py	
read	.github/run-benchmark-as-lit-jobs.py	
read	.github/run-jit-coverage-as-lit-studios.py	
read	.github/run-quickstart-as-lit-jobs.py	
read	.github/workflows/auto-cc.yml	
read	.github/workflows/ci-benchmark.yml	
read	.github/workflows/ci-checks.yml	
read	.github/workflows/ci-jit-coverage.yml	
read	.github/workflows/ci-quickstart.yml	
read	.github/workflows/ci-testing.yml	
read	.github/workflows/docs-build.yml	
read	.github/workflows/release-nightly.yml	
read	.github/workflows/release-pypi.yml	
read	.github/workflows/stale-branches.yml	
read	.lightning/workflows/all-tests.yml	
read	.lightning/workflows/notebooks.yml	
read	.lightning/workflows/transformer-engine.yml	

Event	Path or command	Hash
read	.pre-commit-config.yaml	
read	docs/.build_docs.sh	
read	docs/.readthedocs.yaml	
read	docs/source/_static/copybutton.js	
read	docs/source/conf.py	
read	examples/coverage/jit_coverage_hf.py	
read	examples/quickstart/hf_bert.py	
read	examples/quickstart/mlp.py	
read	examples/quickstart/vit_hf.py	
read	examples/quickstart/vit_tv.py	
read	notebooks/adding_custom_operator.ipynb	
read	notebooks/adding_custom_operator_backward.ipynb	
read	notebooks/dev_tutorials/extend.ipynb	
read	notebooks/dev_tutorials/fsdp_tutorial.ipynb	
read	notebooks/extend_thunder_with_cuda_python.ipynb	
read	notebooks/hello_world_thunderfx.ipynb	
read	notebooks/liger_kernel.ipynb	
read	notebooks/thunder_trace_intro.ipynb	
read	notebooks/writing_a_trace_transform_cpu_offloading.ipynb	
read	notebooks/zero_to_thunder.ipynb	
read	pyproject.toml	
read	scripts/bisect_nvfuser.py	
read	scripts/build_from_source.sh	
read	scripts/remove-torch-lines.sh	
read	scripts/sanity-check.sh	
read	scripts/validate_build.py	
read	setup.py	
read	thunder/__about__.py	
read	thunder/__init__.py	
read	thunder/benchmarks/__init__.py	
read	thunder/benchmarks/benchmark_hf.py	
read	thunder/benchmarks/benchmark_inference.py	
read	thunder/benchmarks/benchmark_litgpt.py	
read	thunder/benchmarks/benchmark_peft.py	
read	thunder/benchmarks/conftest.py	
read	thunder/benchmarks/distributed.py	
read	thunder/benchmarks/einsum.py	
read	thunder/benchmarks/layers_for_inference_benchmark.py	
read	thunder/benchmarks/targets.py	
read	thunder/benchmarks/test_benchmark_litgpt.py	
read	thunder/benchmarks/utils.py	
read	thunder/clang/__init__.py	
read	thunder/clang/langctx.py	
read	thunder/clang/utils.py	
read	thunder/common.py	
read	thunder/core/__init__.py	
read	thunder/core/baseutils.py	
read	thunder/core/codeutils.py	
read	thunder/core/compile_data.py	
read	thunder/core/devices.py	

Event	Path or command	Hash
read	thunder/core/dtypes.py	
read	thunder/core/interpreter.py	
read	thunder/core/jit_ext.py	
read	thunder/core/langctxs.py	
read	thunder/core/module.py	
read	thunder/core/options.py	
read	thunder/core/patterns.py	
read	thunder/core/prims.py	
read	thunder/core/profile.py	
read	thunder/core/proxies.py	
read	thunder/core/pytree.py	
read	thunder/core/recipe.py	
read	thunder/core/rematerialization.py	
read	thunder/core/symbol.py	
read	thunder/core/trace.py	
read	thunder/core/trace_interpreter.py	
read	thunder/core/transform_common.py	
read	thunder/core/transforms.py	
read	thunder/core/update_aliases.py	
read	thunder/core/utils.py	
read	thunder/core/vjp_utils.py	
read	thunder/dev_utils/__init__.py	
read	thunder/dev_utils/benchmark.py	
read	thunder/dev_utils/check_trace.py	
read	thunder/dev_utils/debug_transform.py	
read	thunder/dev_utils/nvtx_profile_transform.py	
read	thunder/dev_utils/profile_transform.py	
read	thunder/dev_utils/utils.py	
read	thunder/distributed/__init__.py	
read	thunder/distributed/bucketing.py	
read	thunder/distributed/checkpoint.py	
read	thunder/distributed/prims.py	
read	thunder/distributed/tensor_parallel/__init__.py	
read	thunder/distributed/tensor_parallel/column_wise.py	
read	thunder/distributed/tensor_parallel/common.py	
read	thunder/distributed/tensor_parallel/optimize_comm.py	
read	thunder/distributed/tensor_parallel/row_wise.py	
read	thunder/distributed/transforms/__init__.py	
read	thunder/distributed/transforms/ddp.py	
read	thunder/distributed/transforms/ddp_v2.py	
read	thunder/distributed/transforms/fsdp.py	
read	thunder/distributed/transforms/fsdp_v2.py	
read	thunder/distributed/utils.py	
read	thunder/dynamo/__init__.py	
read	thunder/dynamo/benchmark_utils.py	
read	thunder/dynamo/compiler.py	
read	thunder/dynamo/compiler_graph_benchmark.py	
read	thunder/dynamo/report.py	
read	thunder/dynamo/repro_script_template.py	
read	thunder/dynamo/splitter.py	

Event	Path or command	Hash
read	thunder/dynamo/utils.py	
read	thunder/examine/__init__.py	
read	thunder/examine/memory_calculation.py	
read	thunder/executors/__init__.py	
read	thunder/executors/apex_entropyex_impl.py	
read	thunder/executors/apex_fused_rms_norm_impl.py	
read	thunder/executors/apexex.py	
read	thunder/executors/cudnn_layernormex.py	
read	thunder/executors/cudnn_sdpa.py	
read	thunder/executors/cudnnex.py	
read	thunder/executors/custom_op_ex.py	
read	thunder/executors/data_dependent_partition.py	
read	thunder/executors/fa3ex.py	
read	thunder/executors/nvfuserex.py	
read	thunder/executors/nvfuserex_impl.py	
read	thunder/executors/passes.py	
read	thunder/executors/pythonex.py	
read	thunder/executors/sdpaex.py	
read	thunder/executors/torch_autograd.py	
read	thunder/executors/torch_compile.py	
read	thunder/executors/torchex.py	
read	thunder/executors/transformer_engineex.py	
read	thunder/executors/transformer_engineex_impl.py	
read	thunder/executors/triton_crossentropy.py	
read	thunder/executors/triton_crossentropy_impl.py	
read	thunder/executors/triton_utils.py	
read	thunder/executors/utils.py	
read	thunder/extend/__init__.py	
read	thunder/numpy/__init__.py	
read	thunder/numpy/langctx.py	
read	thunder/plugins/__init__.py	
read	thunder/plugins/distributed.py	
read	thunder/plugins/fp8.py	
read	thunder/plugins/profile.py	
read	thunder/plugins/quantization.py	
read	thunder/plugins/reduce_overhead.py	
read	thunder/recipes/__init__.py	
read	thunder/recipes/base.py	
read	thunder/recipes/hf_transformers.py	
read	thunder/tests/__init__.py	
read	thunder/tests/bf16.py	
read	thunder/tests/conftest.py	
read	thunder/tests/coverage_tests/__init__.py	
read	thunder/tests/coverage_tests/test_coverage_hf_diffusers.py	
read	thunder/tests/coverage_tests/test_coverage_trace.py	
read	thunder/tests/distributed/__init__.py	
read	thunder/tests/distributed/helper.py	
read	thunder/tests/distributed/modules.py	
read	thunder/tests/distributed/test_checkpoint.py	
read	thunder/tests/distributed/test_ddp.py	

Event	Path or command	Hash
read	thunder/tests/distributed/test_dtensor.py	
read	thunder/tests/distributed/test_fsdp.py	
read	thunder/tests/distributed/test_moe.py	
read	thunder/tests/distributed/test_ops.py	
read	thunder/tests/distributed/test_tensor_parallel.py	
read	thunder/tests/framework.py	
read	thunder/tests/hf_bart_self_attn.py	
read	thunder/tests/litgpt_model.py	
read	thunder/tests/llama2_model.py	
read	thunder/tests/llama4_moe.py	
read	thunder/tests/make_tensor.py	
read	thunder/tests/module_example.py	
read	thunder/tests/nanogpt_model.py	
read	thunder/tests/opinfos.py	
read	thunder/tests/test_apex_cross_entropy_executor.py	
read	thunder/tests/test_apex_fused_norms.py	
read	thunder/tests/test_auto_register_torchops.py	
read	thunder/tests/test_autocast.py	
read	thunder/tests/test_check_trace.py	
read	thunder/tests/test_core.py	
read	thunder/tests/test_cudnn_executor.py	
read	thunder/tests/test_dynamo.py	
read	thunder/tests/test_einops.py	
read	thunder/tests/test_elementwise.py	
read	thunder/tests/test_examine.py	
read	thunder/tests/test_examine_memory.py	
read	thunder/tests/test_extend.py	
read	thunder/tests/test_fa3_executor.py	
read	thunder/tests/test_grad.py	
read	thunder/tests/test_inplace_copy.py	
read	thunder/tests/test_interpreter.py	
read	thunder/tests/test_jit_general.py	
read	thunder/tests/test_networks.py	
read	thunder/tests/test_numpy_langctx.py	
read	thunder/tests/test_nvfuser.py	
read	thunder/tests/test_nvfuser_remat.py	
read	thunder/tests/test_ops.py	
read	thunder/tests/test_patterns.py	
read	thunder/tests/test_pythonex.py	
read	thunder/tests/test_randomness.py	
read	thunder/tests/test_recipes.py	
read	thunder/tests/test_reductions.py	
read	thunder/tests/test_sdpaex_executor.py	
read	thunder/tests/test_shape_ops.py	
read	thunder/tests/test_torch_compile_executor.py	
read	thunder/tests/test_torch_library_custom_op.py	
read	thunder/tests/test_torch_library_custom_op_with_lists.py	
read	thunder/tests/test_transformer_engine_executor.py	
read	thunder/tests/test_transforms.py	
read	thunder/tests/test_triton_ce.py	

[illegible]

C Run history

Invocation 1, OK, 7 minutes 3 seconds, 9 output lines, started 2026-10-10T21:04:36

```
metric_hash 4e38e11b41881fcd9554c411cb1a57da4453f99f6055d9119c177412d6545055
run_digest  1d250df07c830d957f2a0c52c7e028ef10c80e9ebb7d141c8afb86ec82a8b084
anchored    at run end
```

D Raw seal fields and hashes

Seal

```
data_hash      d5f0b916cca0952bbef89c86fb15264e33d54a4fbc9b0a4b3e48186de56ffeff
signed_message_hash 18feebb6b7476cb363988b19a2e0cc79ac0d7320c3df5e3fcede76adf73232a9
nonce          931b15368c9bb8da328b7bfe5067a8fa
signed_at      2026-10-10T21:11:41.256288+00:00
sealed_at      2026-10-10T21:11:41.328376672Z
checkout_bundle bd016a21116e9c54890828a70a7014367d9cb7cee9e4f75c498541741a8816b8
```

Signature (base64)

```
W+5848qan4EsxvsdLLQeZAKbSZv5I51LZmG73YnCyMDhxyMxh7LxpF0ZtAH0DFfa3eTUNXbEwE300GVLyieV20
enk+RaBFZ5JDWkCLEM04bkqc5x6RGVS7QLf7UtT6iy7+xNs1SUy6mwYKGhrZabitNvCLh++0Vp12IjLwMVfjTx53
h/C7PA9fzrDrNdtQfVM6shT07kv+E5sBRjrqvVKMHaSiw+M4ZI10k2pqwZ6AGtqL0zReWzJhwY26BFuf8qRaTbTA
38PwlN6GixSHJvtW8d5bky+rcSe5DDtte5t3QctFXBSuPKMpUoi0NgwL0a91ta61b7Pm1awNp2RBLCSXkaA6cGZc
aT1R0zdQ+zlnunkwPyQX/CrinTfFtXb0VU0uAA7RnAZNXi5rdJkoCITQK8LIUAXXfI4G6rb/tMZQ9ITY+vcna49o
MZ0PoGhbEzIRNPN9Aq55NgFs69ibYALd97hCouoeq71HLXQXLv+AkqtqayJoDJkixq9uCDI4eSP1haJx+vHaLeaB
zsJxtlvzJzGXzpYyPpw+AZatfjjXv0E510GPftiX3HepcneFuYGDz42jTDLHPyUee+rTbfW453gwqq/HUIrsUgc
07sNLBr3awKfoeMkbioxYrOzaw1KNgK9cvU3VV/zQX041J/+JfHA32QailTXZ04oi7U=
```

Public key

```
-----BEGIN PUBLIC KEY-----
MIICIjANBgkqhkiG9w0BAQEFAAOCAg8AMIICCgKCAgEAlQL3YyMgeShx8IhTC7jb
sM0w2BnRXgsBn3+SMXKjtwHATqdekmlPlcjayJxD5fcPrOPPCqp/LouFz5CUZzRi
6+8FTv70dHuIz5A4LAt4vcgwP+iWscPc3HzpmjpsKbTmOemqgp6RB6GnnPpxYa5X
7qU95EfEisX/GfoS9ToxtgPBwCcVWSPBX8efec4TC58m96Fsp4mC8KicEadbIbHN
av0JjdTJ//CM0WZSIbdzE6qvEbNfCqDB5tNU7oHfYvBenLrvPU9TAqdbtozdHq+D
AhfTRuJNgWEkjdW5lb0Vhi4qlkweSOEMTKT3ye9Il5xEaJn4bku4eKqes7VSzt3o
XbUcmr2H5mKcKsvt6bXmX6ajAmgi900Cm9QJlAQkJM6z2iITnyvDMgueJtFxQpC9
HNBPgPZ242NH8JgE6CNF7ToL9syasS67u7UMgIcNgeNHNcy9bLgpU5annzP9gN2l
6HEmlKXNdKQRb1rDwyEJf3N/50YHnXXPmuf5sb8R/pxWNqtF04R5UGVV92qd2Mi
1GN7lE3mbQRbPsLL/JApDXMNzNikaFfBsQK7iKxr7vIaTeZckFZWfThcYNT7Hasg
+eE4bf/olCHBCf1VIDCkDxoehdZ0WRRcgM9iK3I/0zZdaBsgdc8WuJRmb8LPP9v
8Jap/1PWjNcNku5cdw3gHLcCAwEAAQ==
-----END PUBLIC KEY-----
```

Run 1 outputs

```
stdout cdee01937d6c3c6fc3bc6367697a414da8277df1f00b6f20b166be69381ec516
stderr e3b0c44298fc1c149afb4c8996fb92427ae41e4649b934ca495991b7852b855
metrics 4e38e11b41881fcd9554c411cb1a57da4453f99f6055d9119c177412d6545055
digest  1d250df07c830d957f2a0c52c7e028ef10c80e9ebb7d141c8afb86ec82a8b084
kv_run.sh (unchanged)
pre c15357f3b4dfab904c83d54eec5f48c64aa056a895f7909759d288cef12163c8
post c15357f3b4dfab904c83d54eec5f48c64aa056a895f7909759d288cef12163c8
```

E BibTeX for [1]

```
@misc{keita2026computerscienceconferencesrequire,  
  title={Computer Science Conferences Should Require Nonrepudiable Experimental Results},  
  author={Mamadou K. Keita and Christopher Homan},  
  year={2026},  
  eprint={2605.08586},  
  archivePrefix={arXiv},  
  primaryClass={cs.CR},  
  url={https://arxiv.org/abs/2605.08586},  
}
```