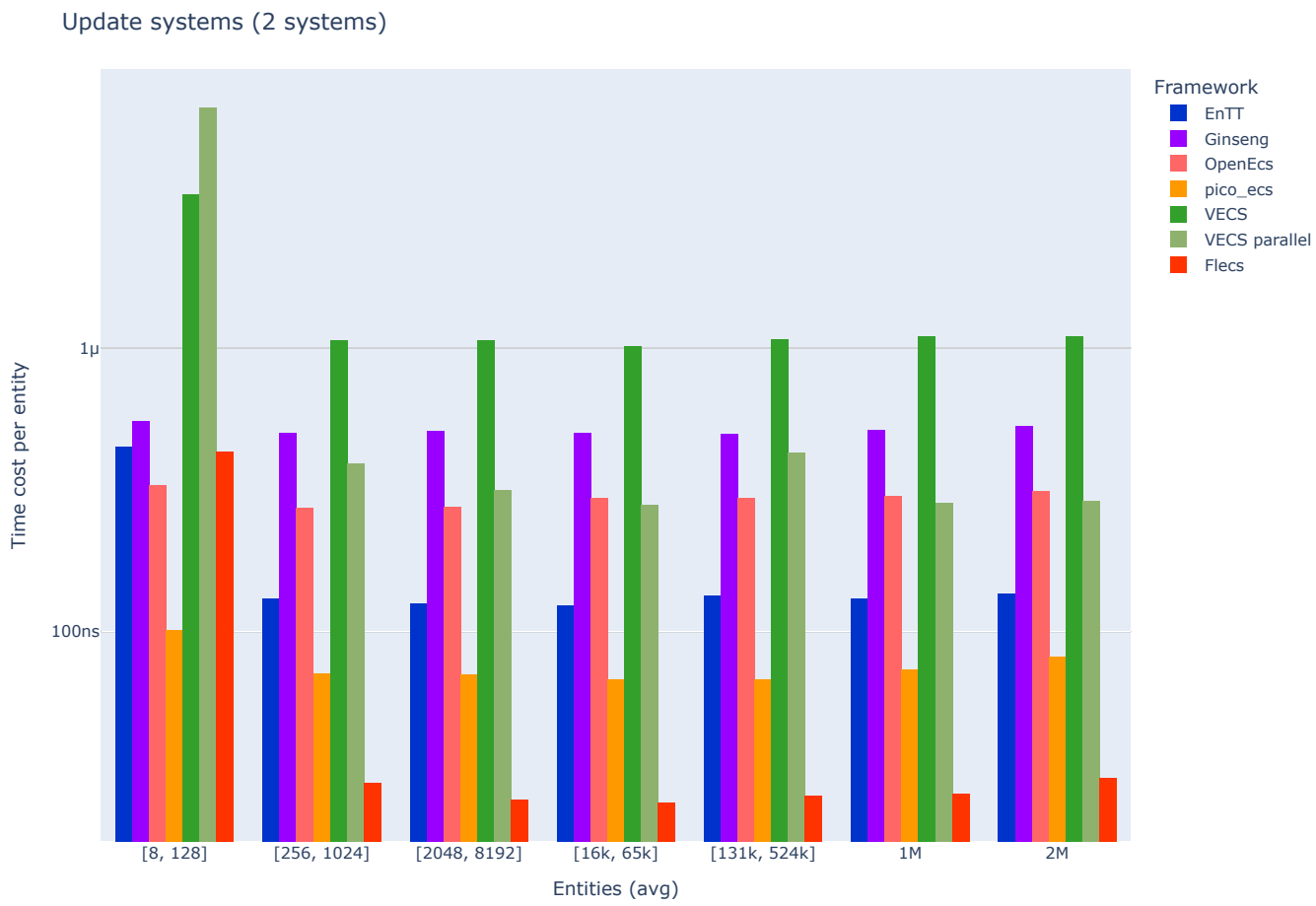
Results

TL;DR Results



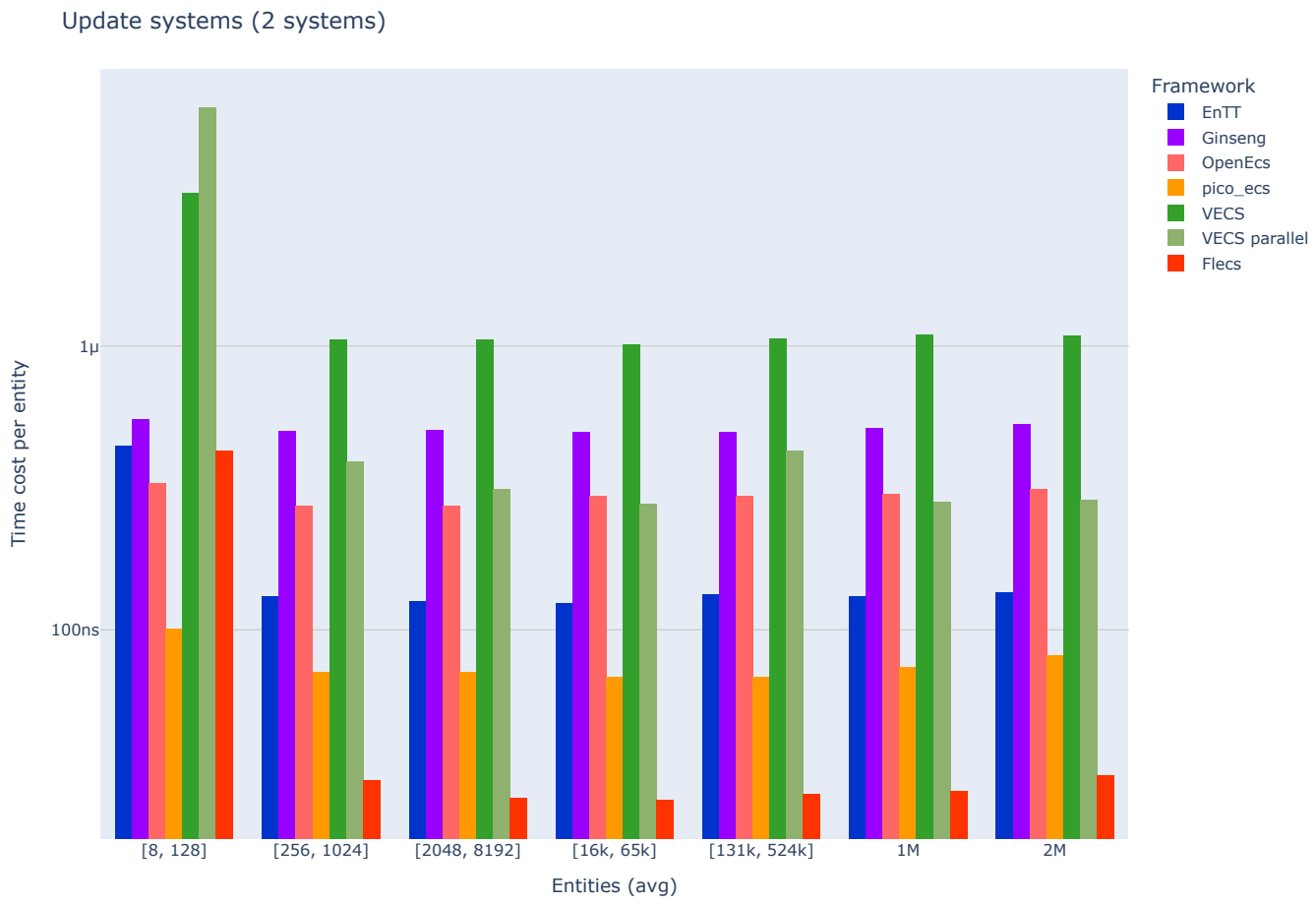
Graph shows cost per entity, tables shows total cost. lower is faster.

	EnTT	Ginseng	OpenEcs	pico_ecs	VECS	VECS parallel	Flecs
Update 256 entities with 2 systems	33us	125us	69us	17us	266us	115us	8us
Update ~1K entities with 2 systems	132us	521us	282us	78us	1131us	361us	27us
Update ~4K entities with 2 systems	505us	2035us	1114us	303us	4303us	1341us	103us
Update ~16K entities with 2 systems	1991us	7752us	4704us	1141us	16609us	4608us	410us
	EnTT	**Ginseng**	**OpenEcs**	**pico_ecs**	**VECS**	**VECS parallel**	**Flecs**

	EnTT	Ginseng	OpenEcs	pico_ecs	VECS	VECS parallel	Flecs
Update ~65K entities with 2 systems	8ms	33ms	19ms	4ms	66ms	18ms	1ms
Update 262K entities with 2 systems	32ms	126ms	78ms	18ms	292ms	177ms	6ms
Update ~1M entities with 2 systems	137ms	539ms	315ms	77ms	1150ms	297ms	28ms
Update ~2M entities with 2 systems	284ms	1111ms	655ms	170ms	2294ms	604ms	63ms

Benchmarks

Update systems (for-each entities in 2 systems)



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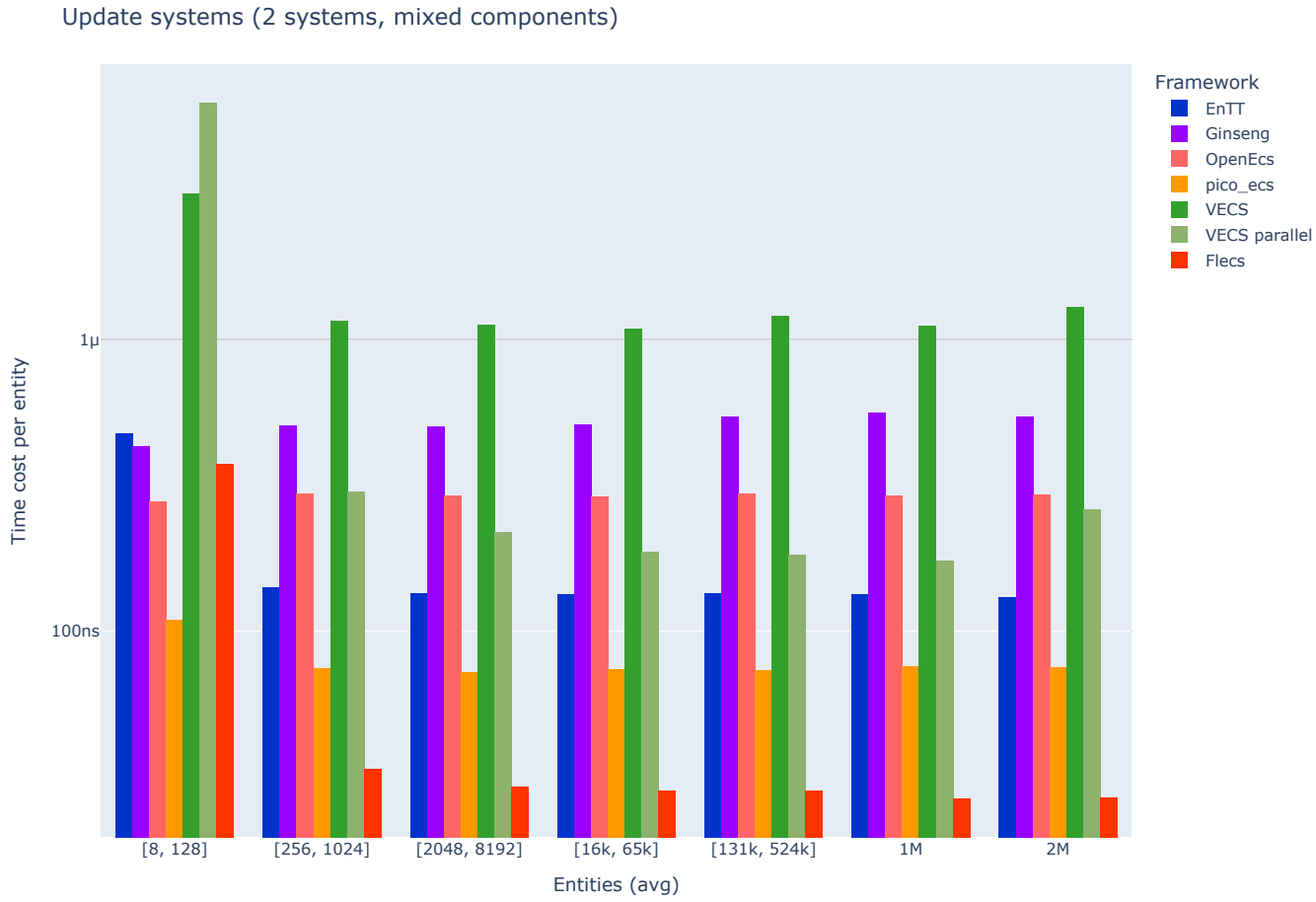
	EnTT	Ginseng	OpenEcs	pico_ecs	VECS	VECS parallel	Flecs
Update ~65K entities with 2 systems	8ms	33ms	19ms	4ms	66ms	18ms	1ms
Update 262K entities with 2 systems	32ms	126ms	78ms	18ms	292ms	177ms	6ms
Update ~1M entities with 2 systems	137ms	539ms	315ms	77ms	1150ms	297ms	28ms
Update ~2M entities with 2 systems	284ms	1111ms	655ms	170ms	2294ms	604ms	63ms

Update systems (for-each entities (with mixed components) in 2 systems)



Graph shows cost per entity, tables shows total cost. lower is faster.

	EnTT	Ginseng	OpenEcs	pico_ecs	VECS	VECS parallel	Flecs
Update 256 entities with 2 systems	36us	129us	75us	18us	307us	94us	9us
Update ~1K entities with 2 systems	135us	515us	299us	78us	1182us	255us	33us
Update ~4K entities with 2 systems	549us	2066us	1198us	282us	4611us	942us	116us
Update ~16K entities with 2 systems	2151us	8226us	4751us	1225us	17727us	3161us	461us

	EnTT	Ginseng	OpenEcs	pico_ecs	VECS	VECS parallel	Flecs
Update ~65K entities with 2 systems	8ms	34ms	18ms	4ms	71ms	11ms	1ms
Update 262K entities with 2 systems	34ms	149ms	76ms	18ms	326ms	47ms	7ms

	EnTT	Ginseng	OpenEcs	pico_ecs	VECS	VECS parallel	Flecs
Update ~1M entities with 2 systems	139ms	587ms	305ms	79ms	1164ms	182ms	27ms
Update ~2M entities with 2 systems	273ms	1136ms	613ms	157ms	2717ms	547ms	56ms

Candidates

EntityX by @alecthomas

> Entity Component Systems (ECS) are a form of decomposition that completely decouples entity logic and data from the entity "objects" themselves. The Evolve your Hierarchy article provides a solid overview of EC systems and why you should use them.

Version: 1.1.2 (Apr 2023)

EnTT by @skypjack

> EnTT is a header-only, tiny and easy to use library for game programming and much more written in modern C++.

Version: v3.13.2

Ginseng by @apples

> Ginseng is an entity-component-system (ECS) library designed for use in games.

The main advantage over similar libraries is that the component types do not need to be listed or registered. Component types are detected dynamically.

Any function-like object can be used as a system. The function's parameters are used to determine the required components.

Version: 1.1 (Dec 2021)

mustache by @kirillochnev

> A fast, modern C++ Entity Component System

Version: 0.2 (Feb 2024)

OpenEcs by @Gronis

> Open Ecs is an Entity Component System that uses metaprogramming, cache coherency, and other useful tricks to maximize performance and configurability. It is written in c++11 without further dependencies.

Version: 0.1.101 (Apr 2017)

Flecs by @SanderMertens

> Flecs is a fast and lightweight Entity Component System that lets you build games and simulations with millions of entities.

Version: v4.0.1

pico_ecs by @empyreanx

> A collection of cross-platform single header libraries written in C. Pure and simple ECS.

Version: 2.3 (Sep 2023)

gaia-ecs by @richardbiely

> Gaia-ECS is a fast and easy-to-use ECS framework.

Version: v0.8.6

VECS by @hlavacshelmut

> The Vienna Entity Component System (VECS) is a C++20 based ECS for game engines.

Version: 0.1

VECS parallel by @hlavacshelmut @hoelzlisabella

> The Vienna Entity Component System (VECS) is a C++20 based ECS for game engines.

Version: 0.1

Environment

- **OS:** Windows
- **CPU:** 2.11GHz @ 8Cores
- **RAM:** 15.78GB