

Temporal and Spatial Complexity per CF Configuration and Size-Class

	malloc	free	latency
1-CF(∞, ∞)	$O(n)$	$O(n)$	$O(1)$
1-CF(κ, ∞)	$O(n)$	$O(n + \beta)$	$O(\beta)$
n -CF(∞, ∞)	$O(1)$	$O(1)$	$O(1)$
n -CF(κ, ∞)	$O(1)$	$O(\beta)$	$O(\beta)$
1-CF(κ, ι)	$O(n)$	$O(n + \beta + \lfloor \frac{\beta}{\iota} \rfloor)$	$O(\min(\beta, \iota))$

	memory size	size-class fragmentation
1-CF(∞, ∞)	$O(n * m * \pi * \beta)$	$O(n * m * (\pi - 1) * \beta)$
1-CF(κ, ∞)	$O((n * m + \kappa * (\pi - 1)) * \beta)$	$O(\kappa * (\pi - 1) * \beta)$
n -CF(∞, ∞)	$O(n * m * \pi * \beta)$	$O(n * m * (\pi - 1) * \beta)$
n -CF(κ, ∞)	$O(n * (m + \kappa * (\pi - 1)) * \beta)$	$O(n * \kappa * (\pi - 1) * \beta)$
1-CF(κ, ι)	$O((n * m + n * \pi + \kappa * (\pi - 1)) * \beta)$	$O((n * \pi + \kappa * (\pi - 1)) * \beta)$

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1-CF(κ, ι)	$O(n + \beta + \lfloor \frac{\beta}{\iota} \rfloor)$	$O(\min(\beta, \iota))$	

n is the # of threads

	size	size-class fragmentation
1-CF(∞, ∞)	$O(n * m * \pi * \beta)$	$O(n * m * (\pi - 1) * \beta)$
1-CF(κ, ∞)	$O((n * m + \kappa * (\pi - 1)) * \beta)$	$O(\kappa * (\pi - 1) * \beta)$
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n -CF(∞, ∞)	$O(1)$	$O(1)$	$O(1)$
n -CF(κ, ∞)	$O(1)$	$O(\beta)$	$O(\beta)$
1-CF(κ, ι)	$O(n)$	$O(\beta)$	$O(\beta)$

β is the page-block size

	memory size	temporal complexity
1-CF(∞, ∞)	$O(n * m * \pi * \beta)$	$O(n * m * (\pi - 1) * \beta)$
1-CF(κ, ∞)	$O((n * m + \kappa * (\pi - 1)) * \beta)$	$O(\kappa * (\pi - 1) * \beta)$
n -CF(∞, ∞)	$O(n * m * \pi * \beta)$	$O(n * m * (\pi - 1) * \beta)$
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Temporal and Spatial Complexity per CF Configuration and Size-Class

	latency
1-CF	$O(1)$
1-CF(κ)	$O(\beta)$
n -CF	$O(1)$
n -CF(κ)	$O(\beta)$
1-CF(κ, ι)	$O(\min(\beta, \iota))$

m is the # of per-thread-allocated page-blocks

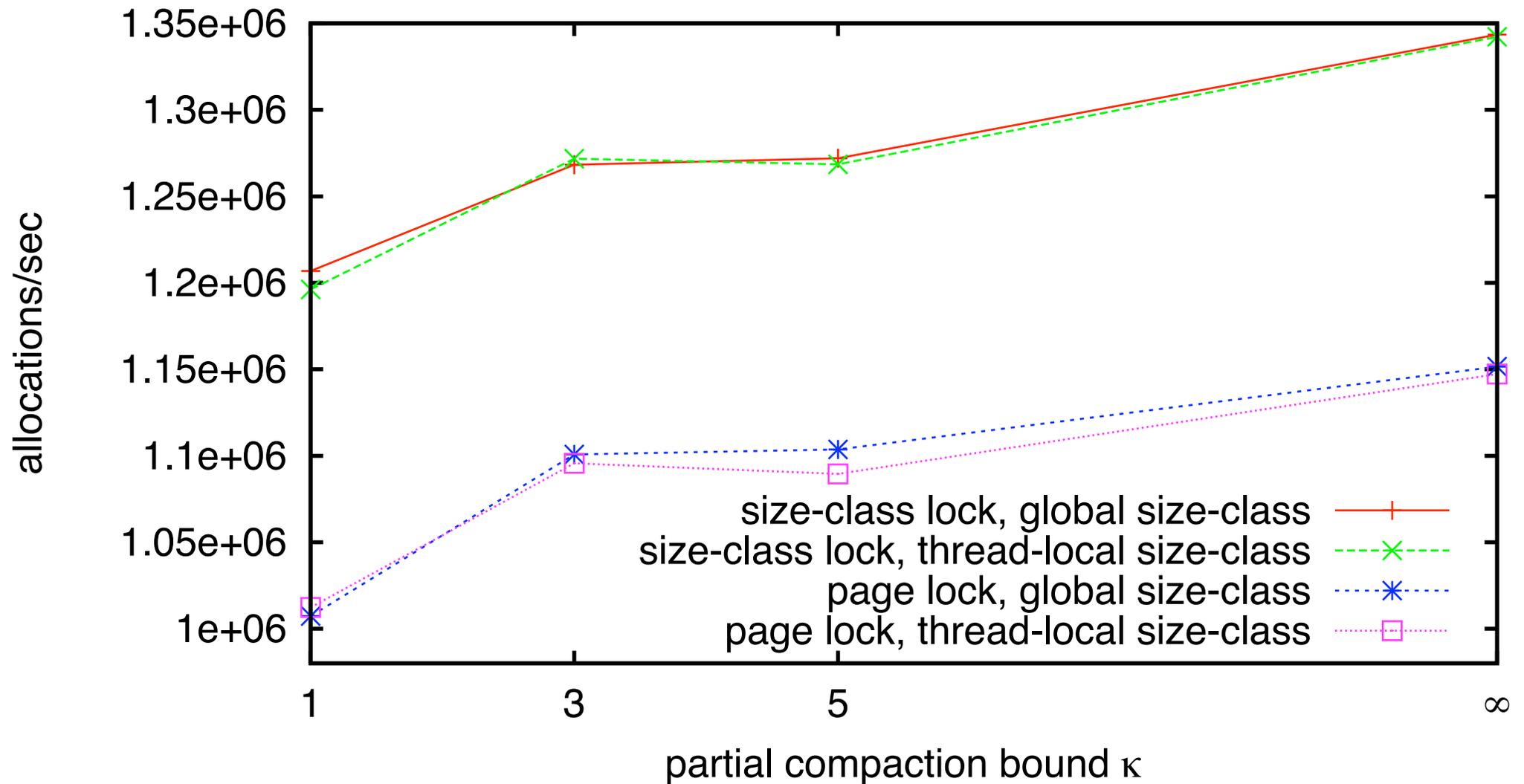
	memory size	size-class fragmentation
1-CF(∞, ∞)	$O(n * m * \pi * \beta)$	$O(n * m * (\pi - 1) * \beta)$
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n -CF(∞, ∞)	$O(1)$	$O(1)$	$O(1)$
n -CF(κ, ∞)	$O(1)$	$O(\beta)$	$O(\beta)$
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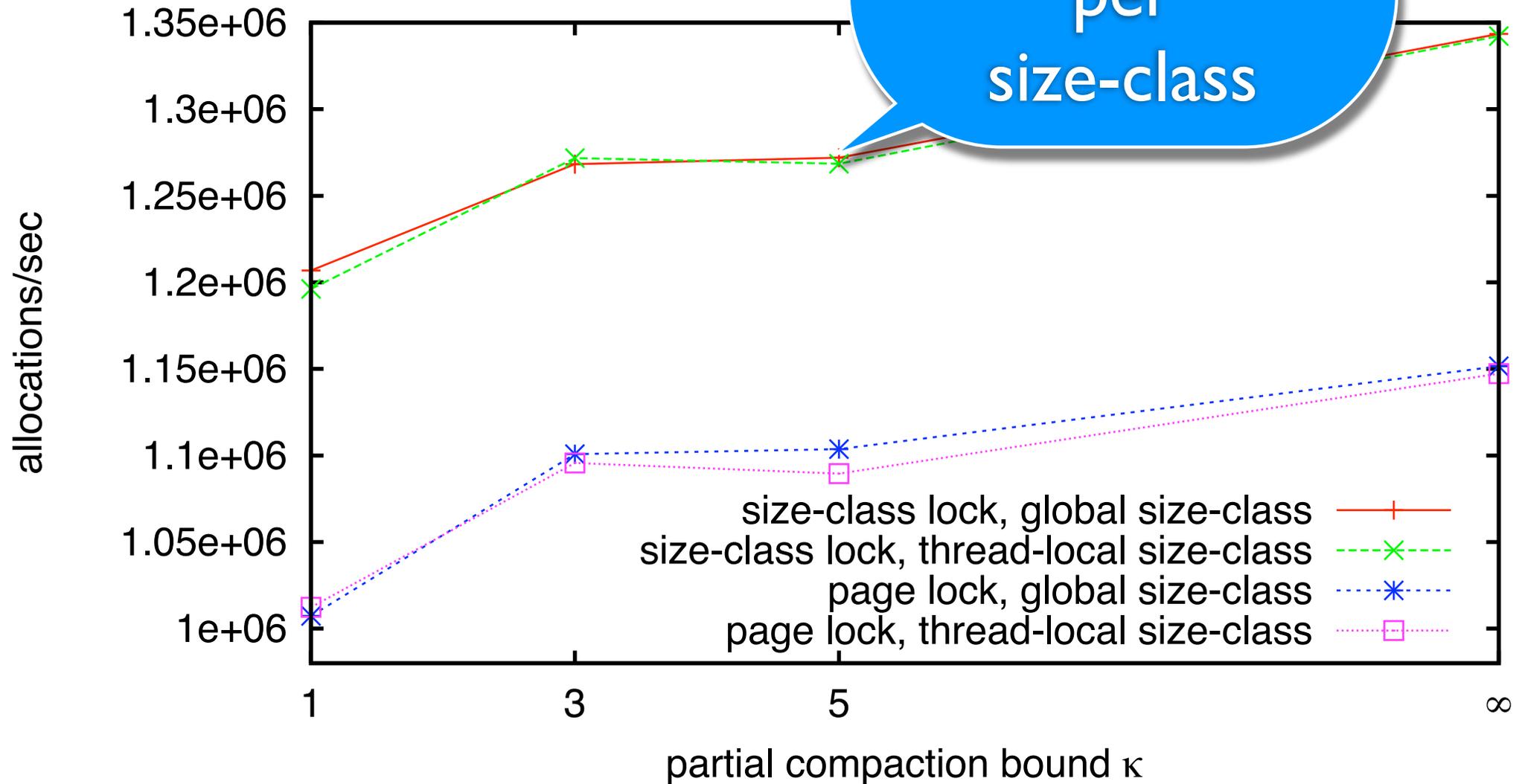
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Single Thread Allocation Throughput

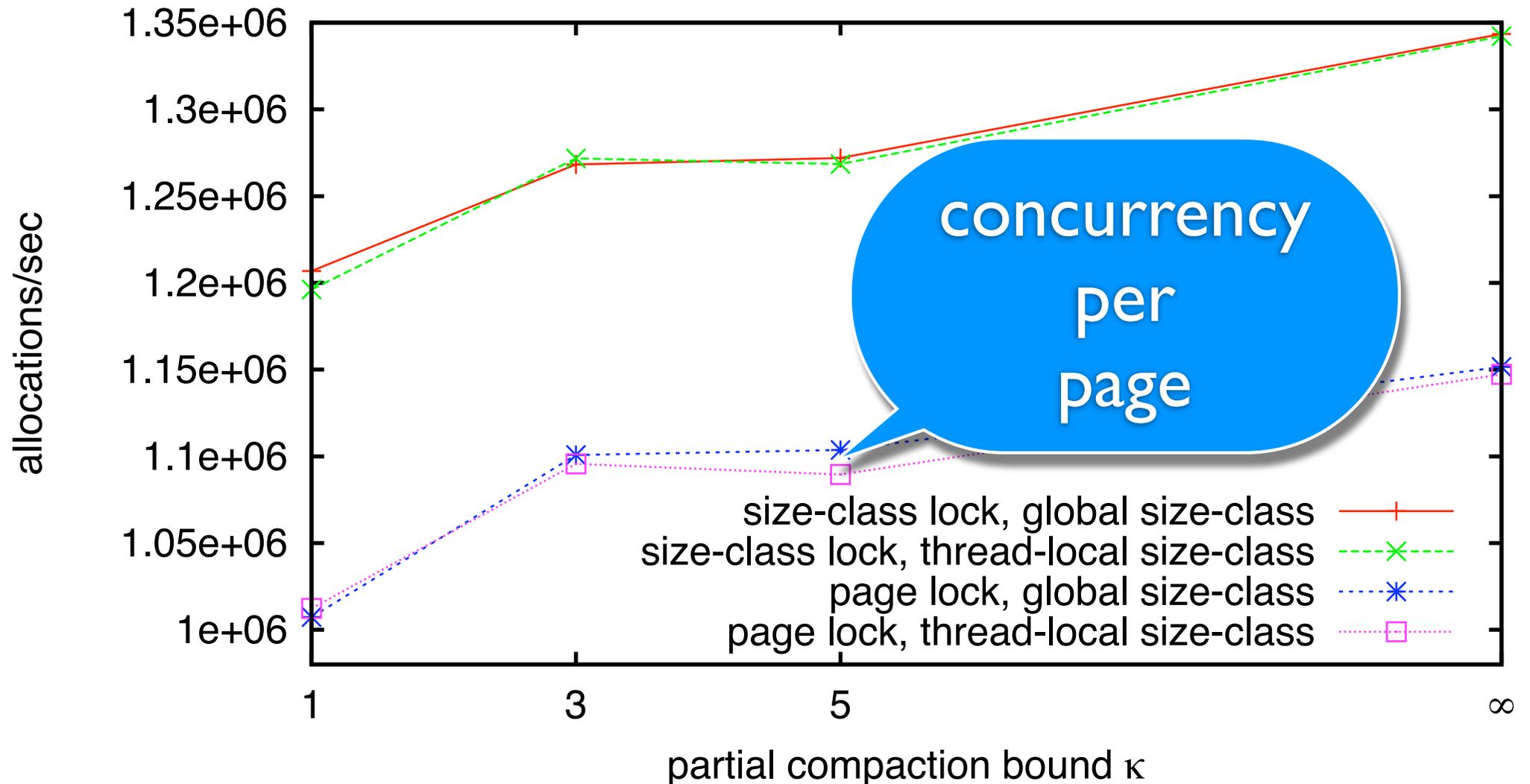


Single Thread Allocation Throughput

concurrency
per
size-class



Single Thread Allocation Throughput



- **less** compaction **may** result in **better** allocation throughput
- size-class locks **better** than page locks