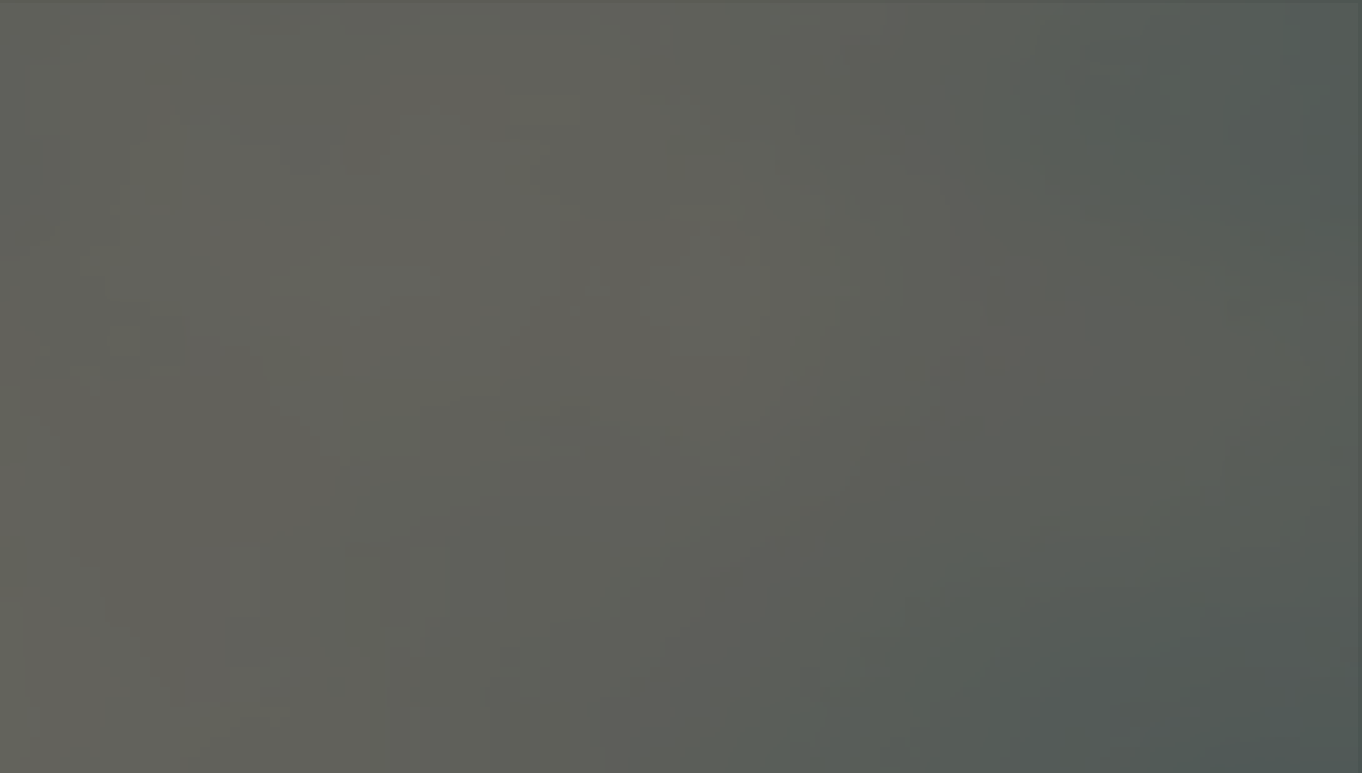




Optimizing Dart Applications



+John McCutchan
@johnmccutchan



OBSERVATORY

Photo source info here





View &
Evaluate

CPU
Profile

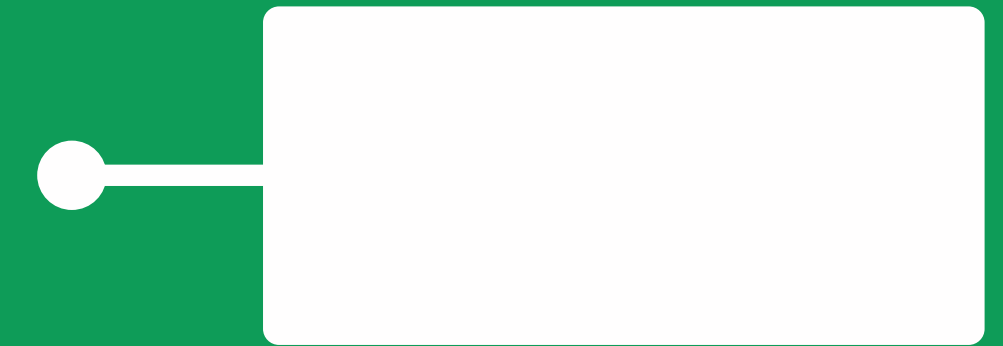
Stack trace

Code
Coverage

Allocation
Profile

Visual
Heap





Code Coverage



```
159     Vector2 a = cc.normal;
160
161     double vRel = a.x * templ.x + a.y * templ.y;
162
163     if (vRel < -Settings.VELOCITY_THRESHOLD) {
164         ccp.velocityBias = -restitution * vRel;
165     }
166 }
167
168 // If we have two points, then prepare the block
169 if (cc.pointCount == 2) {
170     ContactConstraintPoint ccp1 = cc.points[0];
171     ContactConstraintPoint ccp2 = cc.points[1];
172
173     double invMassA = bodyA.invMass;
174     double invIA = bodyA.invinertia;
175     double invMassB = bodyB.invMass;
176     double invIB = bodyB.invinertia;
177
178     double rn1A = ccp1.rA.cross(cc.normal);
179     double rn1B = ccp1.rB.cross(cc.normal);
180     double rn2A = ccp2.rA.cross(cc.normal);
181     double rn2B = ccp2.rB.cross(cc.normal);
```

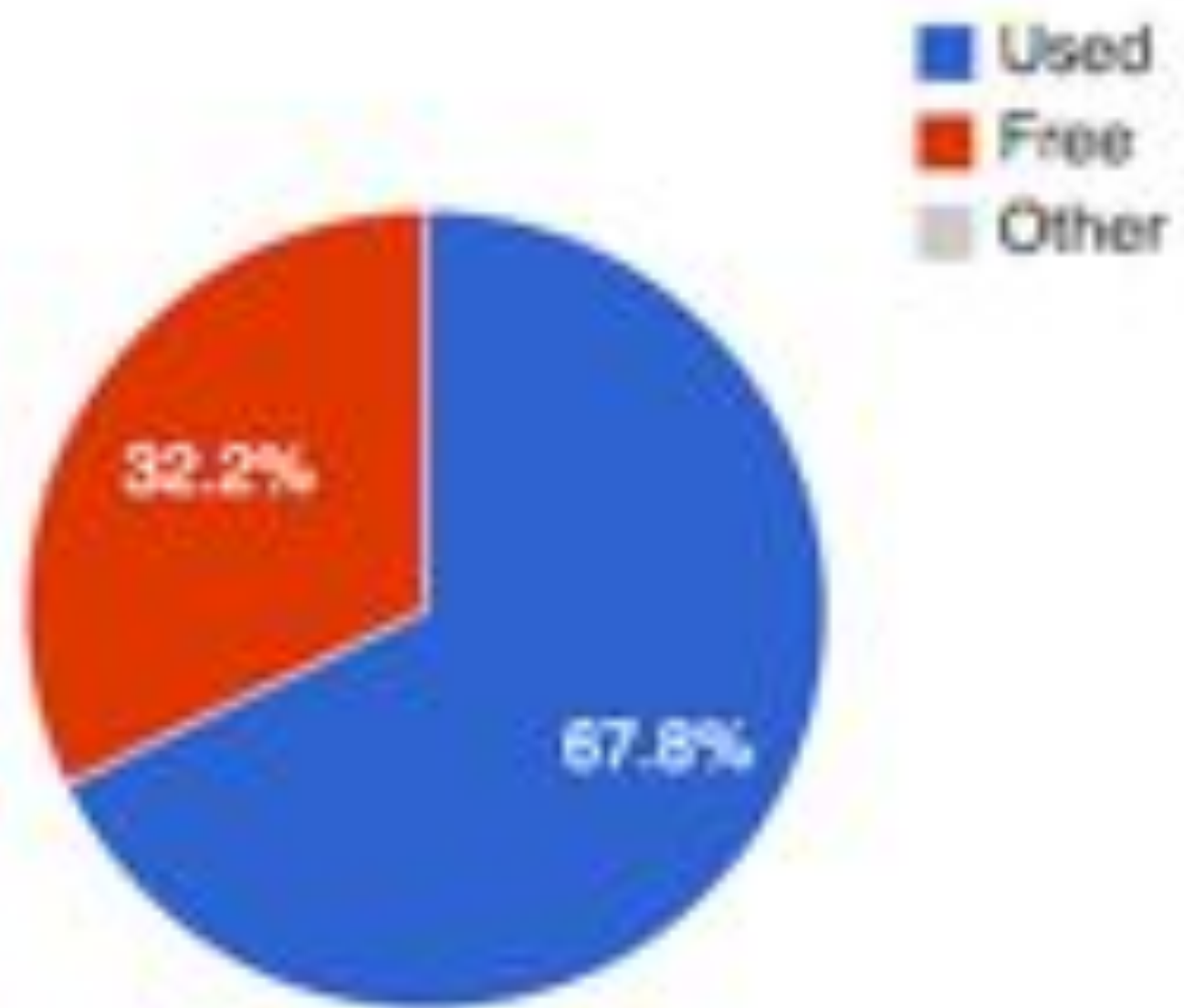




Allocation Profile

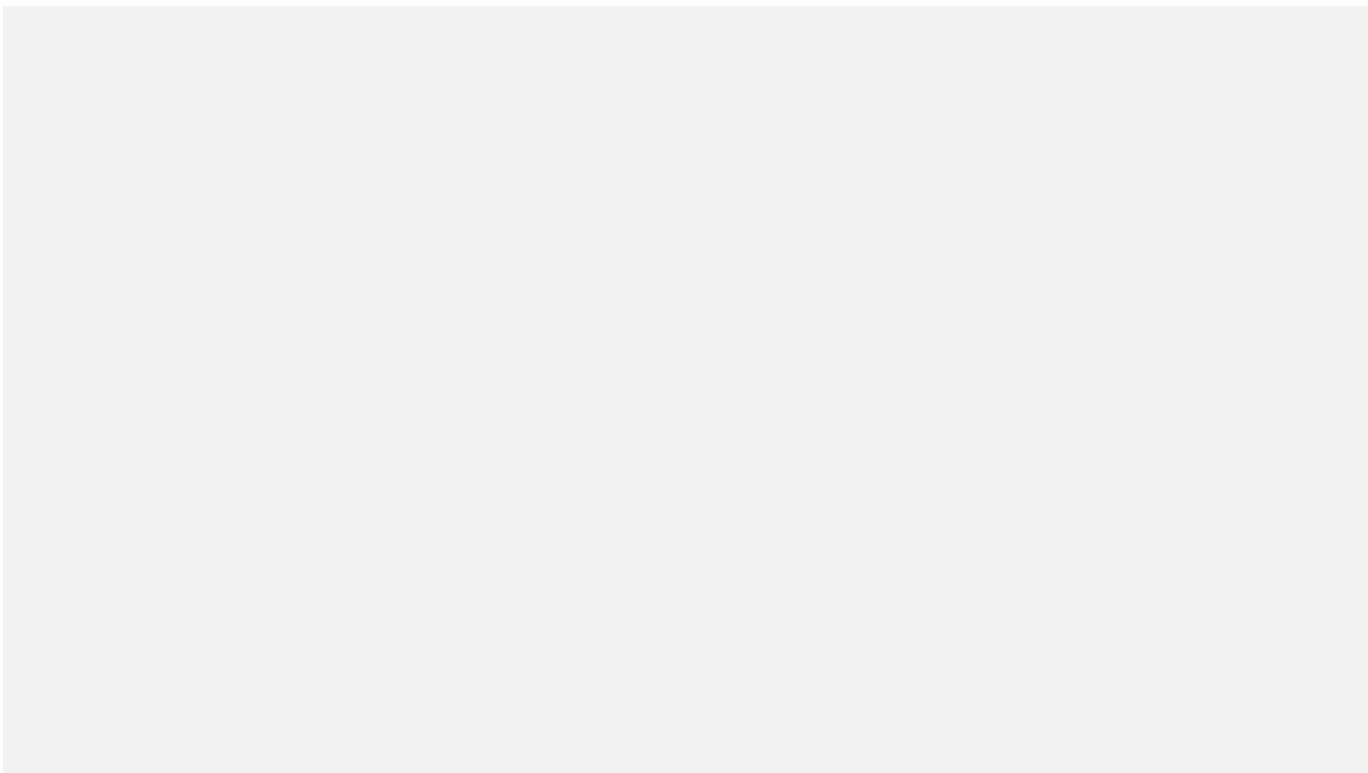


New Space



Collections	598
Average Collection Time	2.11 ms
Cumulative Collection Time	1.26 secs





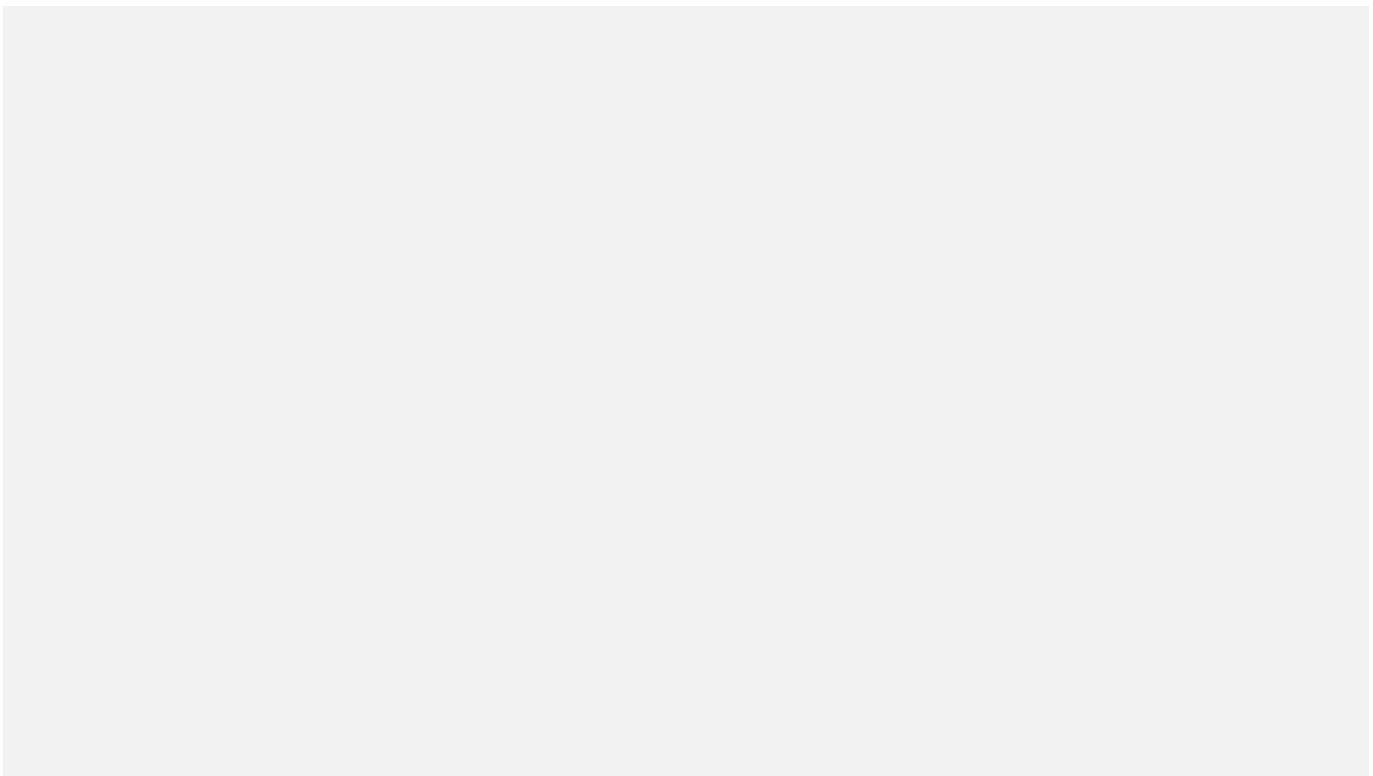
Class	Accumulator (New) ▼	Size (New)	Accumulator (New)	Current (New)	Size (New)	Current (New)	Accumulator Size (Old)	Accumulator (Old)	Current (Old)	Size (Old)	Current (Old)
_Double	5GB	305,157,620	5MB	349,541	1MB	82,303	1MB	82,057			
_Float64Array	3GB	142,156,484	4MB	160,089	453KB	18,417	452KB	18,374			
Vector2	684MB	89,590,789	806KB	103,159	133KB	17,045	133KB	17,004			
_OneByteString	358MB	17,723,386	421KB	20,691	1MB	21,832	2MB	36,031			
_List	282MB	3,832,751	309KB	4,411	2MB	74,243	2MB	44,398			
_GrowableList	2MB	119,038	2KB	111	105KB	6,716	24KB	1,504			
(dynamic, dynamic) => dynamic	1MB	92,075	1KB	84	0B	0	0B	0			
Features	929KB	39,646	0B	0	96KB	4,078	96KB	4,078			
ManifoldPoint	929KB	39,640	0B	0	95KB	4,072	95KB	4,072			
Matrix2	554KB	70,918	360B	45	11KB	1,370	11KB	1,368			
Context	498KB	21,521	600B	25	96B	4	112B	5			
_Mint	480KB	30,738	576B	36	48B	3	272B	17			
ContactEdge	465KB	19,820	0B	0	48KB	2,036	48KB	2,036			
Manifold	465KB	19,820	0B	0	48KB	2,036	48KB	2,036			
CircleContact	398KB	8,490	0B	0	40KB	858	40KB	858			
ContactID	310KB	39,646	0B	0	32KB	4,078	32KB	4,078			
ListIterator	240KB	10,248	264B	11	0B	0	0B	0			
SubListIterable	240KB	10,246	264B	11	0B	0	0B	0			
Transform	165KB	10,591	192B	12	5KB	346	5KB	344			





CPU Profile





Developed CPU profile

Frequency	3.00 GHz (3.00 GHz)
Core type	Core i7
Cache size	8 MB
Cache type	DDR3
Cache speed	4.00 GHz
Cache type	DDR3
Cache speed	4.00 GHz
Cache type	DDR3

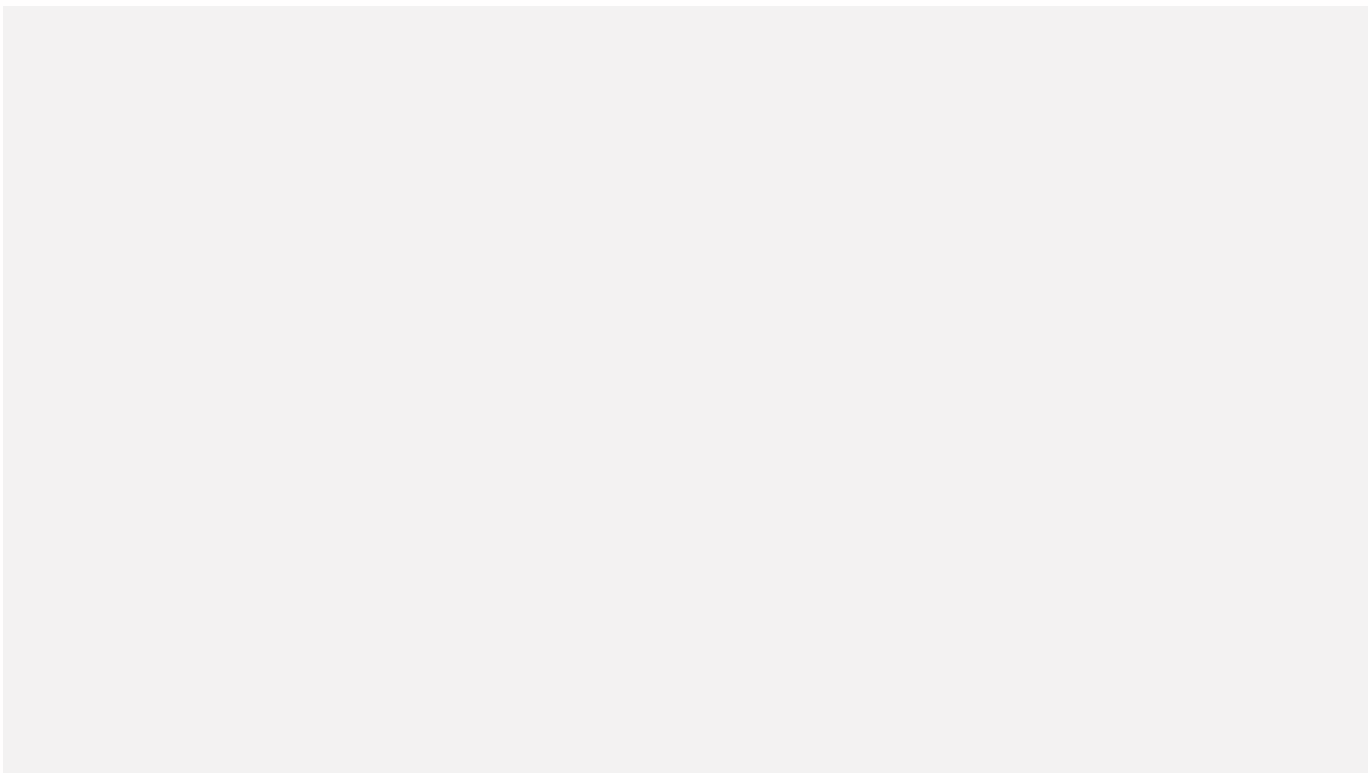
Cache

Cache	Size
Cache 0	8 MB
Cache 1	8 MB
Cache 2	8 MB
Cache 3	8 MB
Cache 4	8 MB
Cache 5	8 MB
Cache 6	8 MB
Cache 7	8 MB



Deployment/Configuration	
1. Deploy	Deployment to test environment
2. Test	Test the application
3. Deploy	Deploy to production
4. Monitor	Monitor the application
5. Update	Update the application
6. Rollback	Rollback the application
7. Cleanup	Cleanup the environment
8. Report	Report the results
9. Review	Review the process
10. Improve	Improve the process

Task	Time
1. Deploy	10:00
2. Test	10:15
3. Deploy	10:30
4. Monitor	10:45
5. Update	11:00
6. Rollback	11:15
7. Cleanup	11:30
8. Report	11:45
9. Review	12:00
10. Improve	12:15



Department of Health	
1. Health Services	100.00
2. Health Services	100.00
3. Health Services	100.00
4. Health Services	100.00
5. Health Services	100.00
6. Health Services	100.00
7. Health Services	100.00
8. Health Services	100.00
9. Health Services	100.00
10. Health Services	100.00
11. Health Services	100.00
12. Health Services	100.00
13. Health Services	100.00
14. Health Services	100.00
15. Health Services	100.00
16. Health Services	100.00
17. Health Services	100.00
18. Health Services	100.00
19. Health Services	100.00
20. Health Services	100.00
21. Health Services	100.00
22. Health Services	100.00
23. Health Services	100.00
24. Health Services	100.00
25. Health Services	100.00
26. Health Services	100.00
27. Health Services	100.00
28. Health Services	100.00
29. Health Services	100.00
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37. Health Services	100.00
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43. Health Services	100.00
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82. Health Services	100.00
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88. Health Services	100.00
89. Health Services	100.00
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91. Health Services	100.00
92. Health Services	100.00
93. Health Services	100.00
94. Health Services	100.00
95. Health Services	100.00
96. Health Services	100.00
97. Health Services	100.00
98. Health Services	100.00
99. Health Services	100.00
100. Health Services	100.00



VM Tag

User Tag

Exclusive

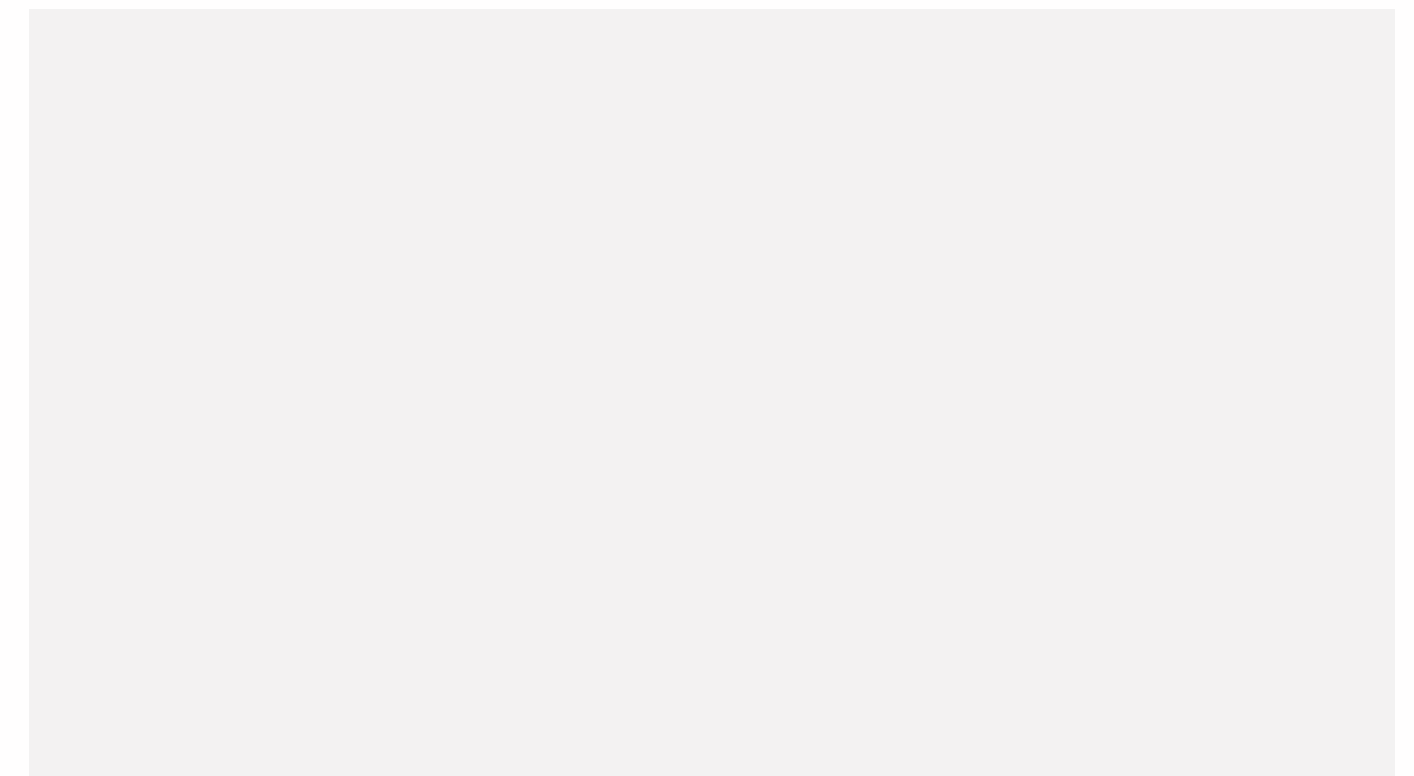
Inclusive

User Tag

VM Tag

Exclusive

Inclusive



Sampled CPU profile

Timestamp 2014-05-08 09:08:10.928

Time span 2m 11s

Sample count 120000

Sample rate 1000 Hz

Sample depth 8 stack frames

Display cutoff 0.02%

Tags



Method	Self
↳ 100.00% Default	100.00%
→ 96.45% Script	96.45%
→ 3.05% GCNewSpace	3.05%
→ 0.38% GCOldSpace	0.38%
→ 0.05% Runtime	0.05%
→ 0.05% Native	0.05%



Tag / function
name

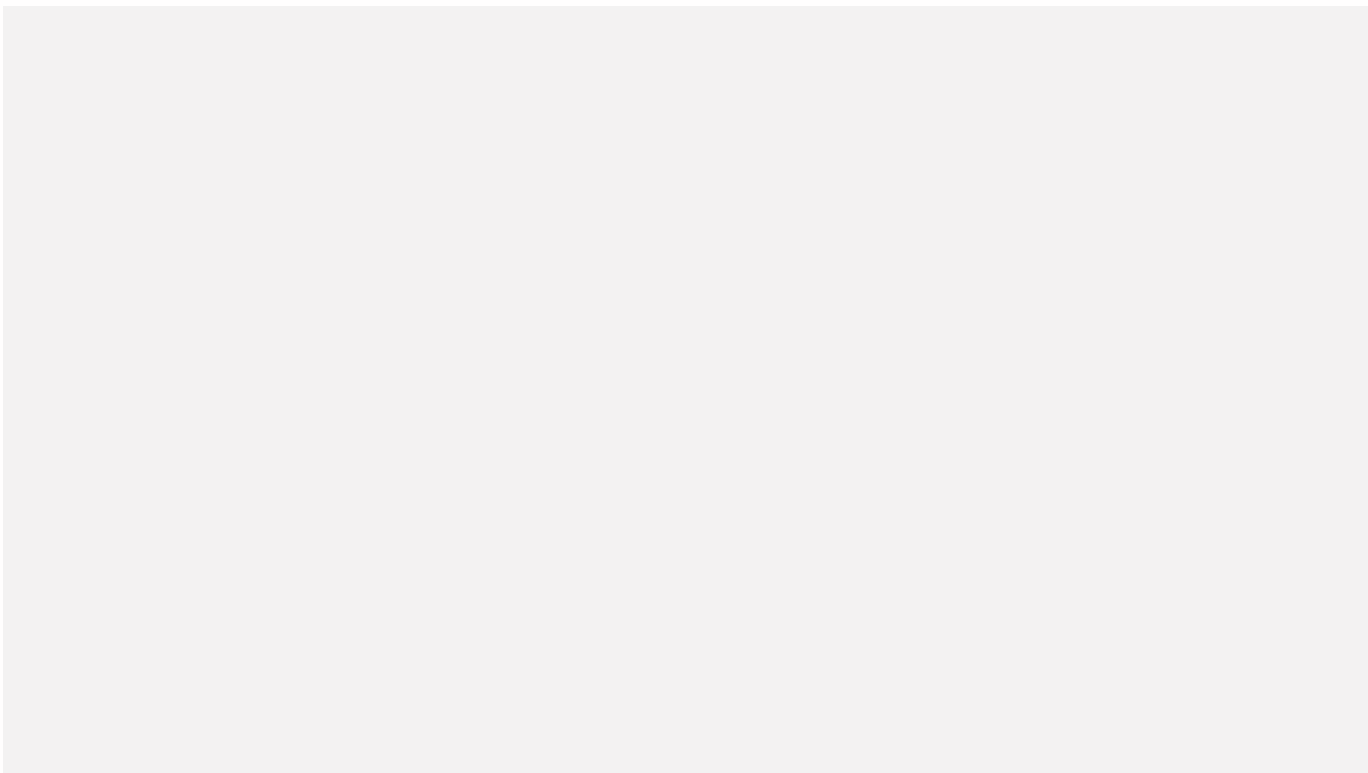
Method	Self
↳ 100.00% Default	100.00%
→ 96.45% Script	96.45%
→ 3.05% GCNewSpace	3.05%
→ 0.38% GCOldSpace	0.38%
→ 0.05% Runtime	0.05%
→ 0.05% Native	0.05%



Method	Self
↳ 100.00% Default	100.00%
→ 96.45% Script	96.45%
→ 3.05%	3.05%
→ 0.38%	0.38%
→ 0.05% Runtime	0.05%
→ 0.05% Native	0.05%

Percentage
of parent

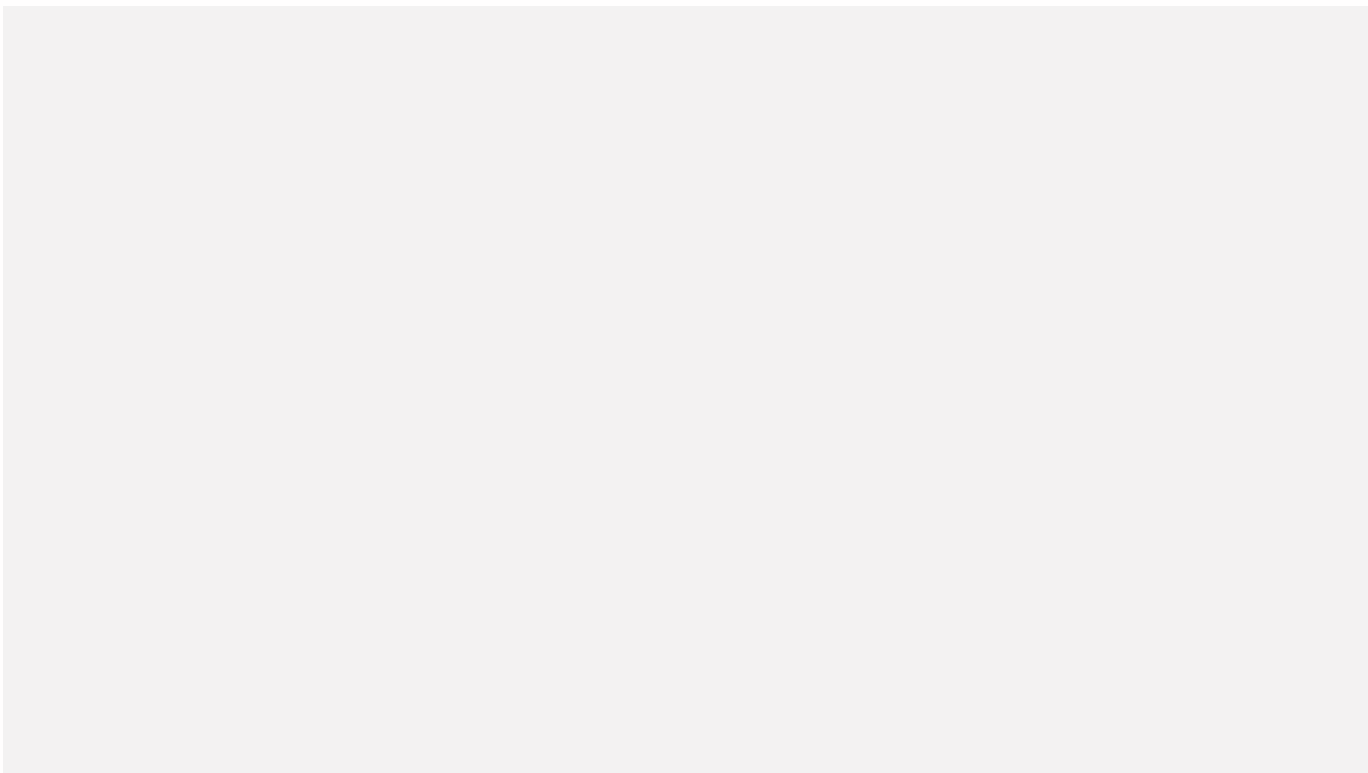




Method	Self
↳ 100.00% Default	100.00%
→ 96.45% Script	96.45%
→ 3.05% GCNewSpace	3.05%
→ 0.38% GCOldSpace	0.38%
→ 0.05% Runtime	0.05%
→ 0.05% Native	0.05%

Exclusive



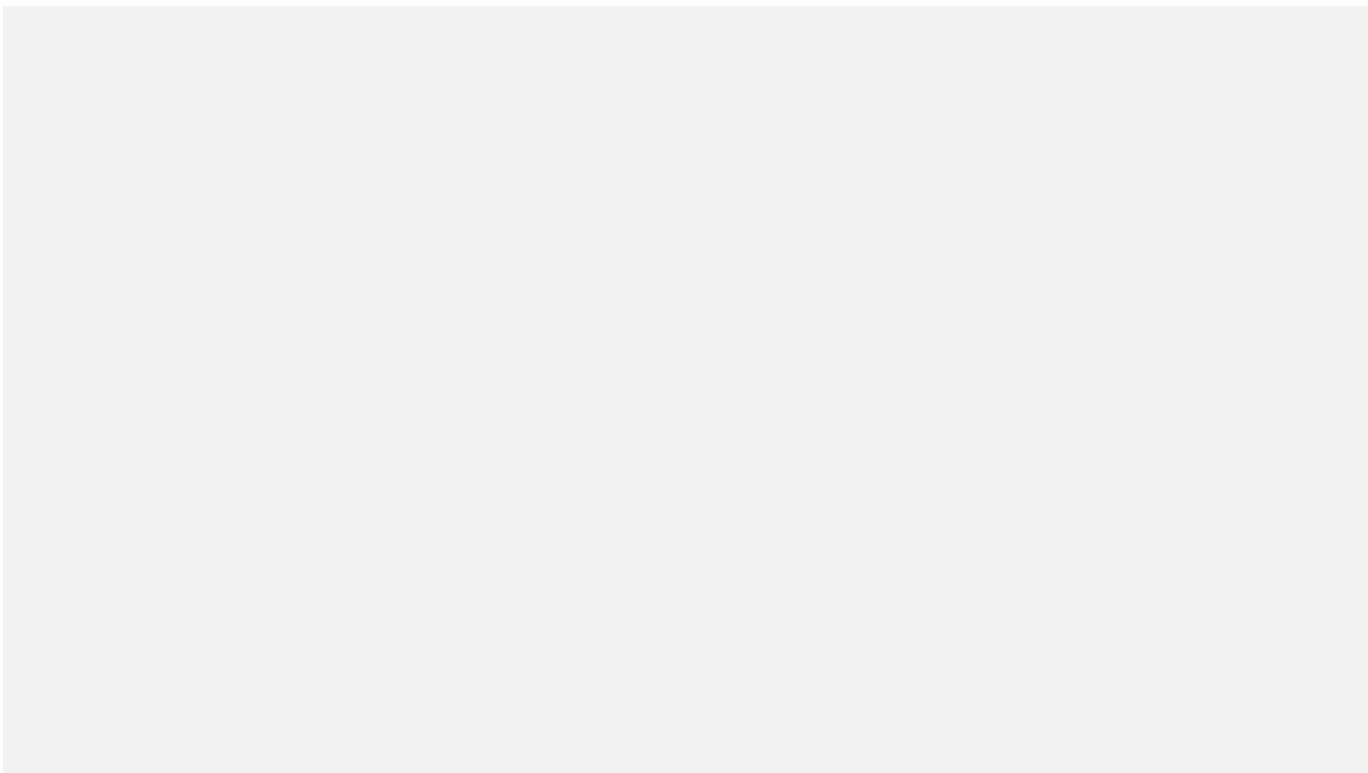


Method

Self

↳ 100.00% Default	100.00%
↳ 96.45% Script	96.45%
→ 8.92% *ContactSolver.solveVelocityConstraints	8.60%
→ 7.44% *ContactSolver.solvePositionConstraints	7.17%
→ 7.34% cos	7.08%

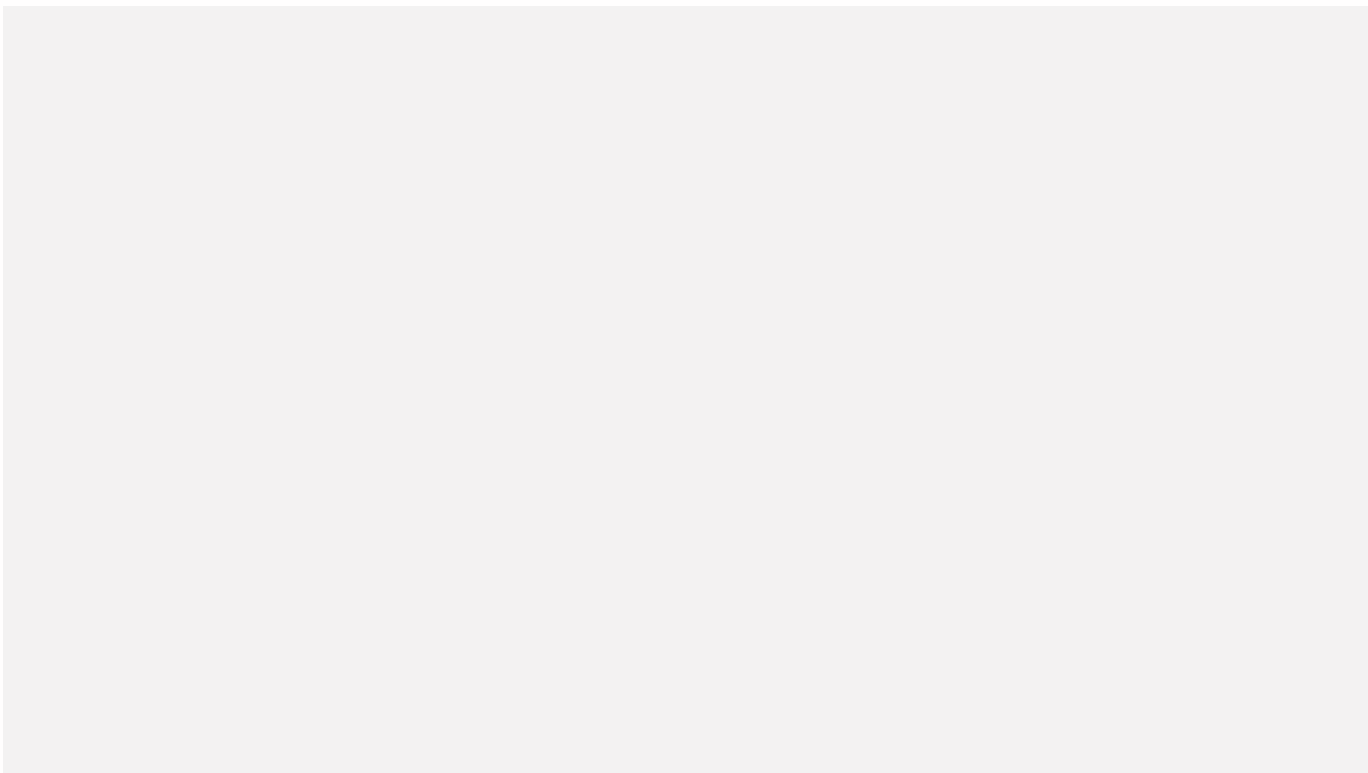




Method	Self
↳ 100.00% Default	100.00%
↳ 96.45% Script	96.45%
→ 8.92% *ContactSolver.solveVelocityConstraints	8.60%
→ 7.44% *ContactSolver.solvePositionConstraints	7.17%
→ 7.34% *ContactSolver.solvePositionConstraints	7.08%

Percentage
of parent

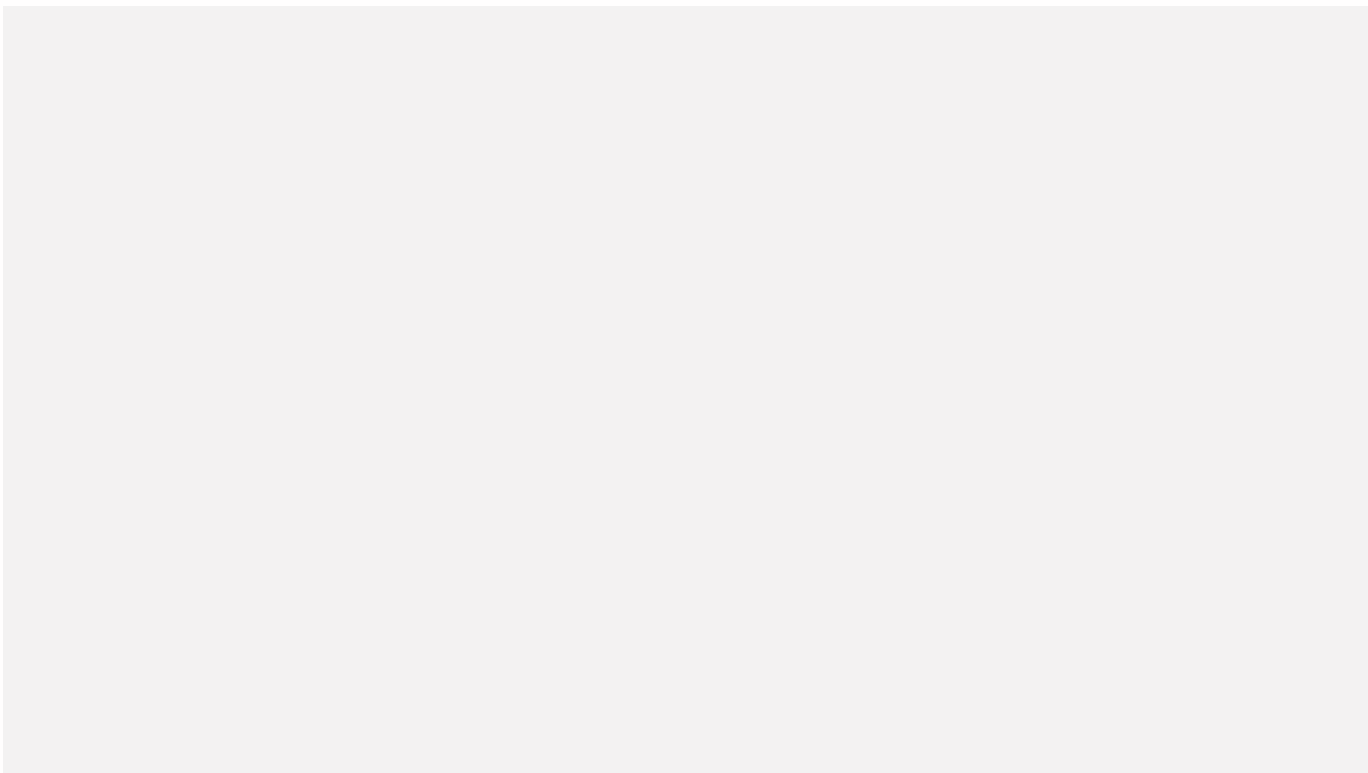




Method	Self
↳ 100.00% Default	100.00%
↳ 96.45% Script	96.45%
→ 8.92% *ContactSolver.solveVelocityConstraints	8.60%
→ 7.44% *ContactSolver.solvePositionConstraints	7.11%
→ 7.34% cos	7.00%

Exclusive



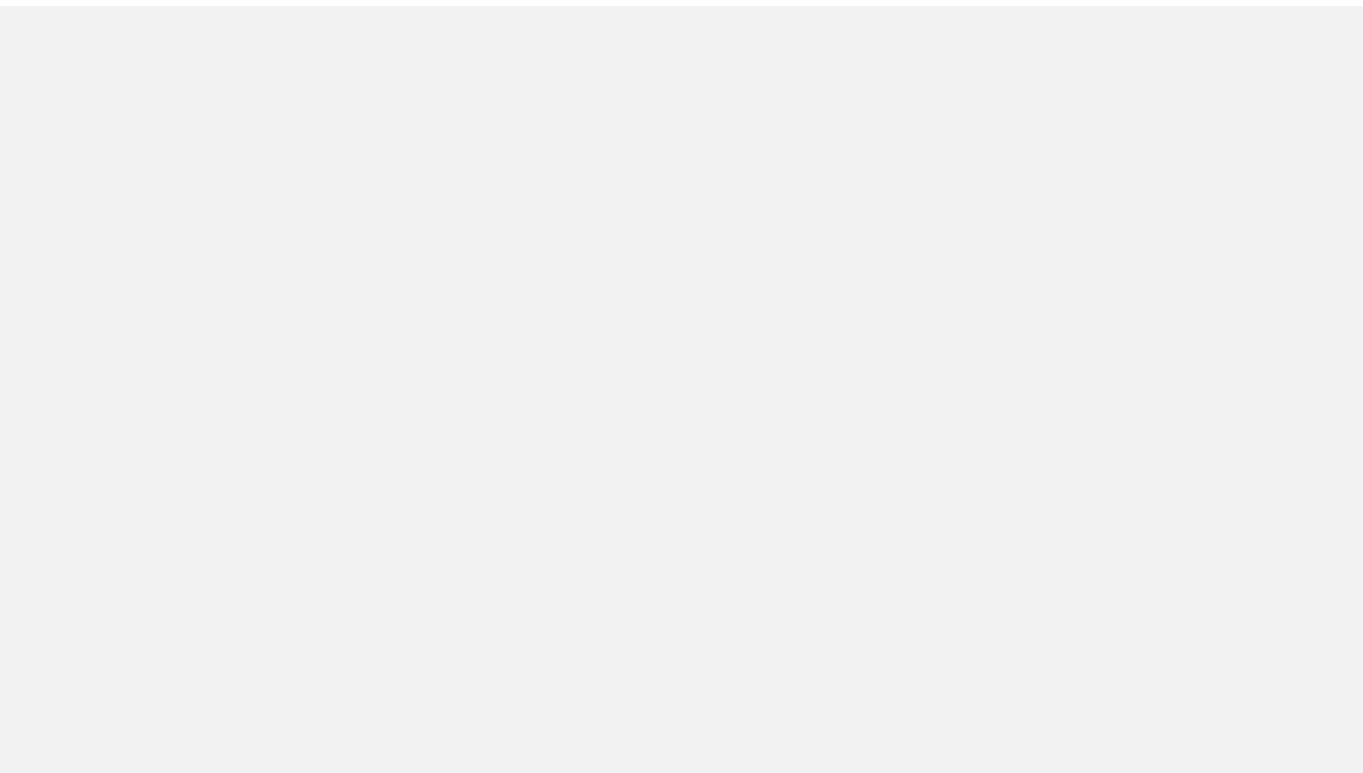


Method

Self

↳ 100.00% Default	100.00%
↳ 96.45% Script	96.45%
→ 8.92% *ContactSolver.solveVelocityConstraints	8.60%
→ 7.44% *ContactSolver.solvePositionConstraints	7.17%
→ 7.34% cos	7.08%





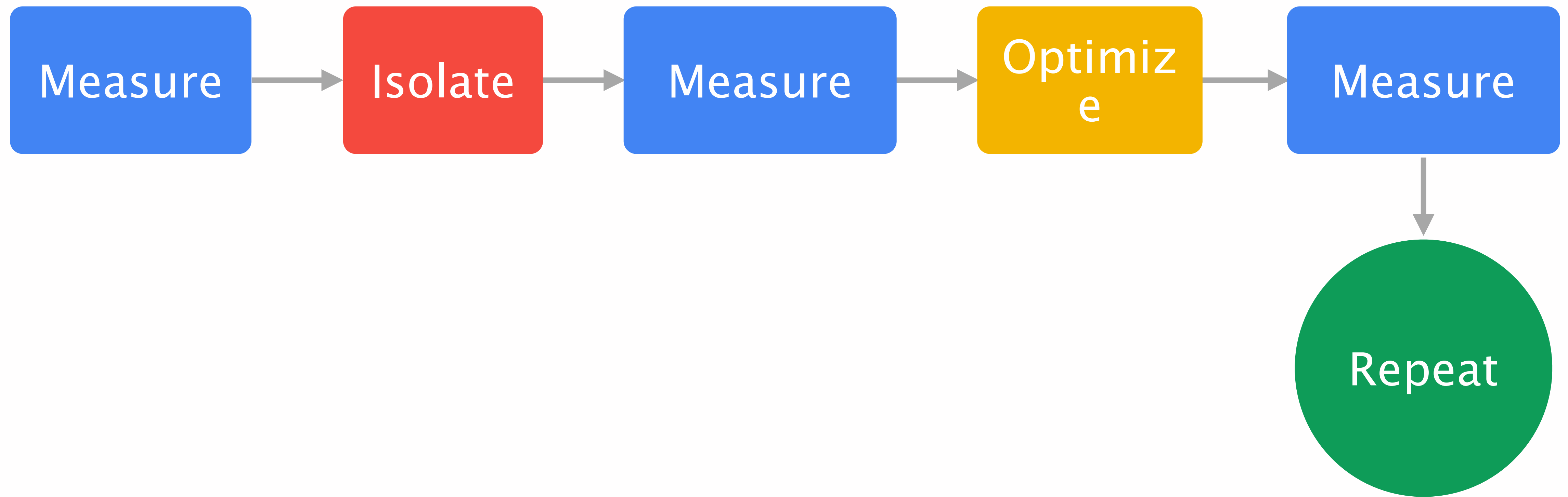
Method	Self
↳ 100.00% Default	100.00%
↳ 96.45% Script	96.45%
↳ 8.92% *ContactSolver.solveVelocityConstraints	8.60%
↳ 100.00% *Island.solve	1.28%
↳ 100.00% *World.solve	1.28%
↳ 100.00% *World.step	0.12%
↳ 54.31% *Box2DBench.step	0.00%
↳ 96.84% Box2DBench.exercise	0.00%
→ 100.00% BenchmarkBase.measure.<anonymous closure>	0.00%

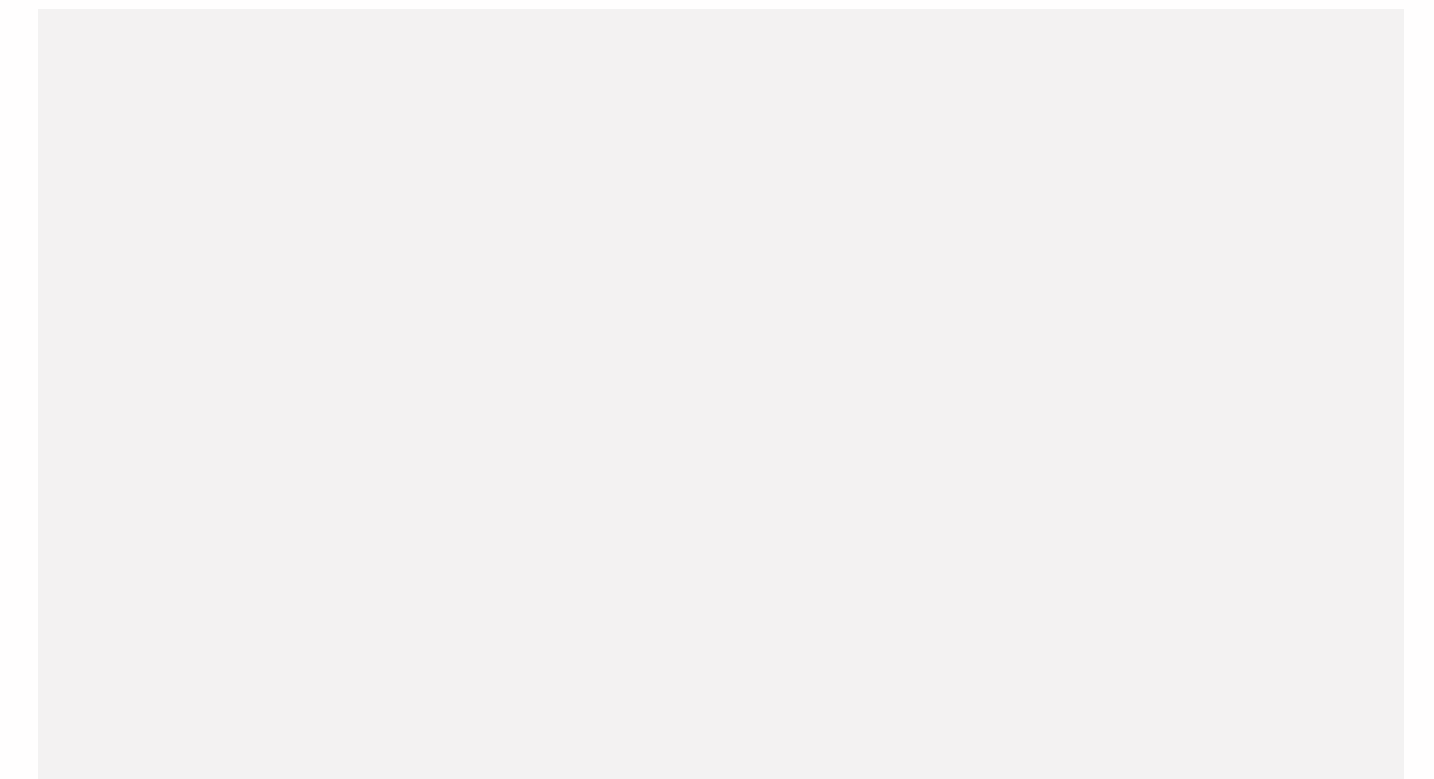




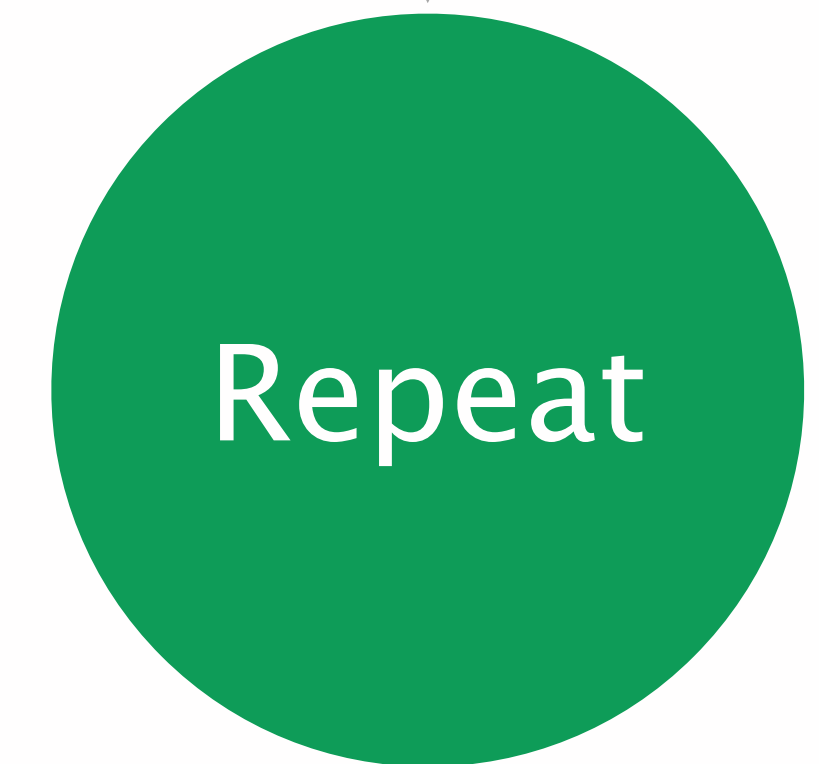
Cycle of Optimization

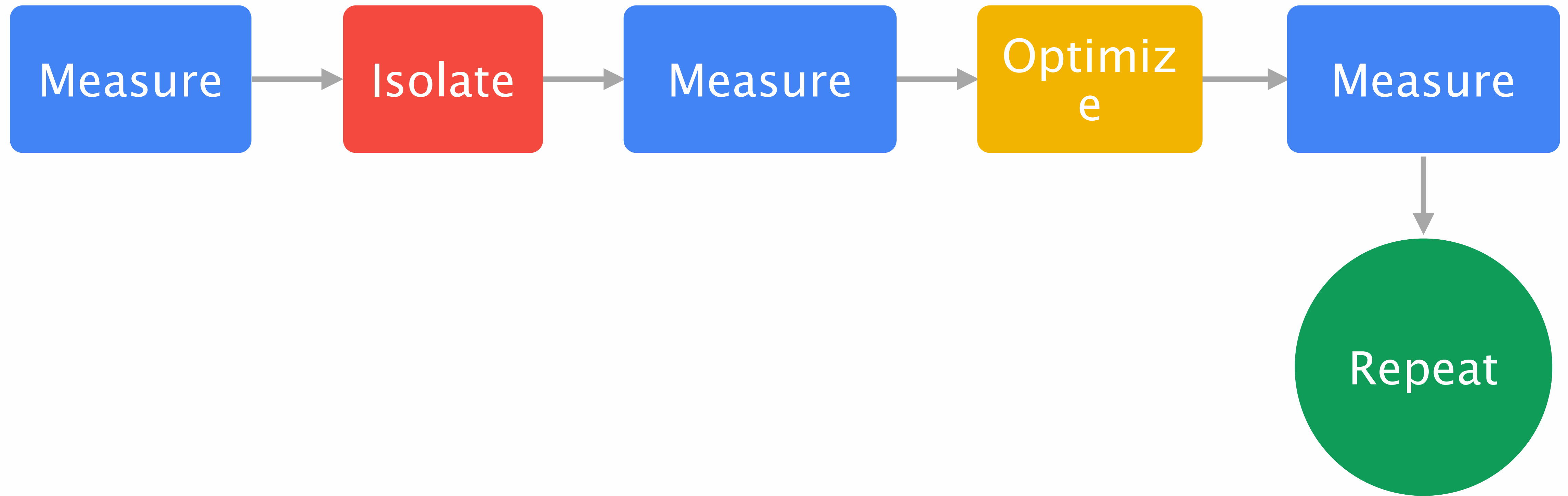


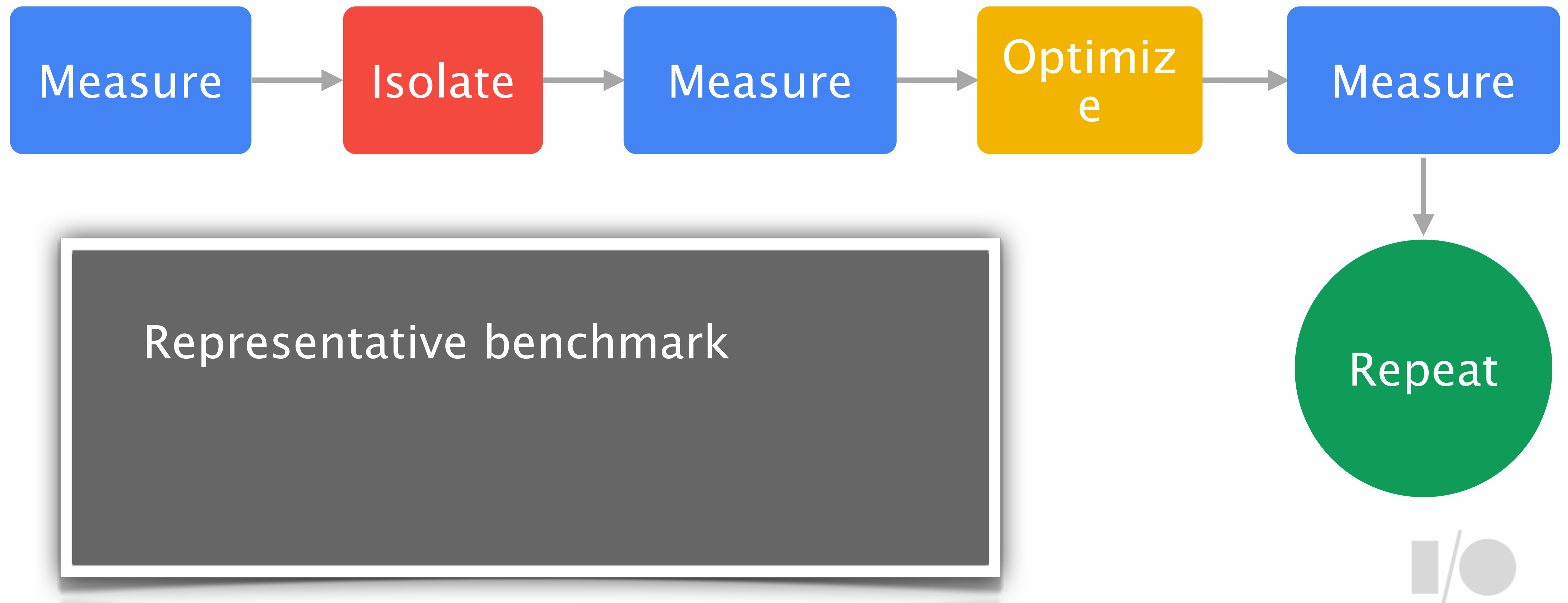




Identify hot spots



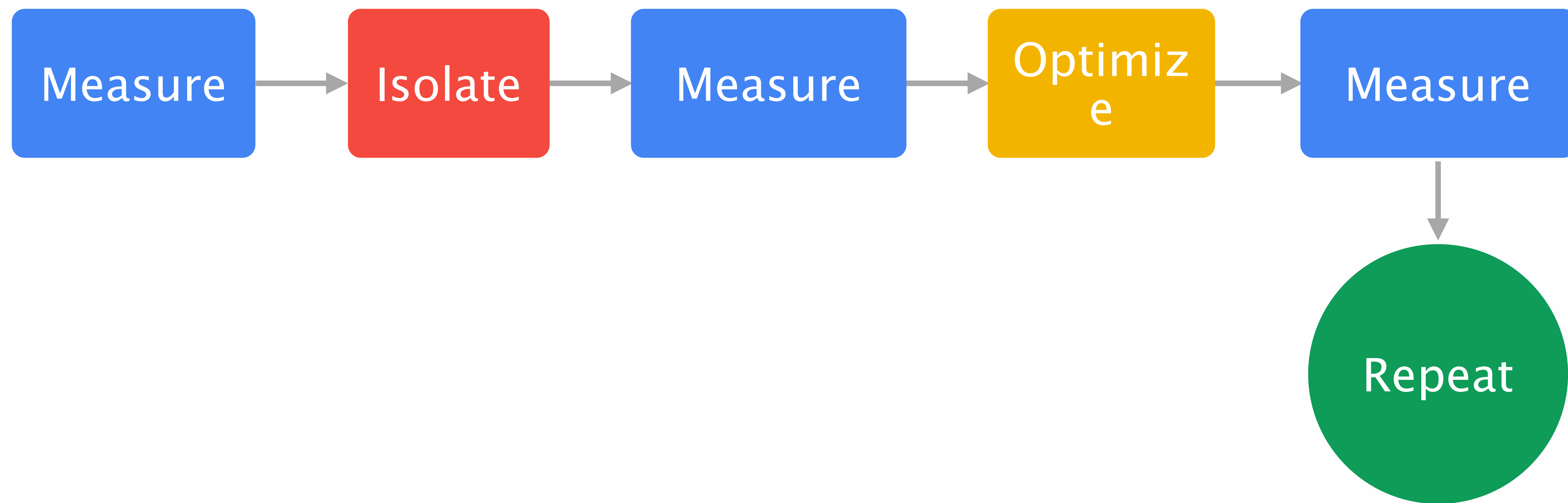


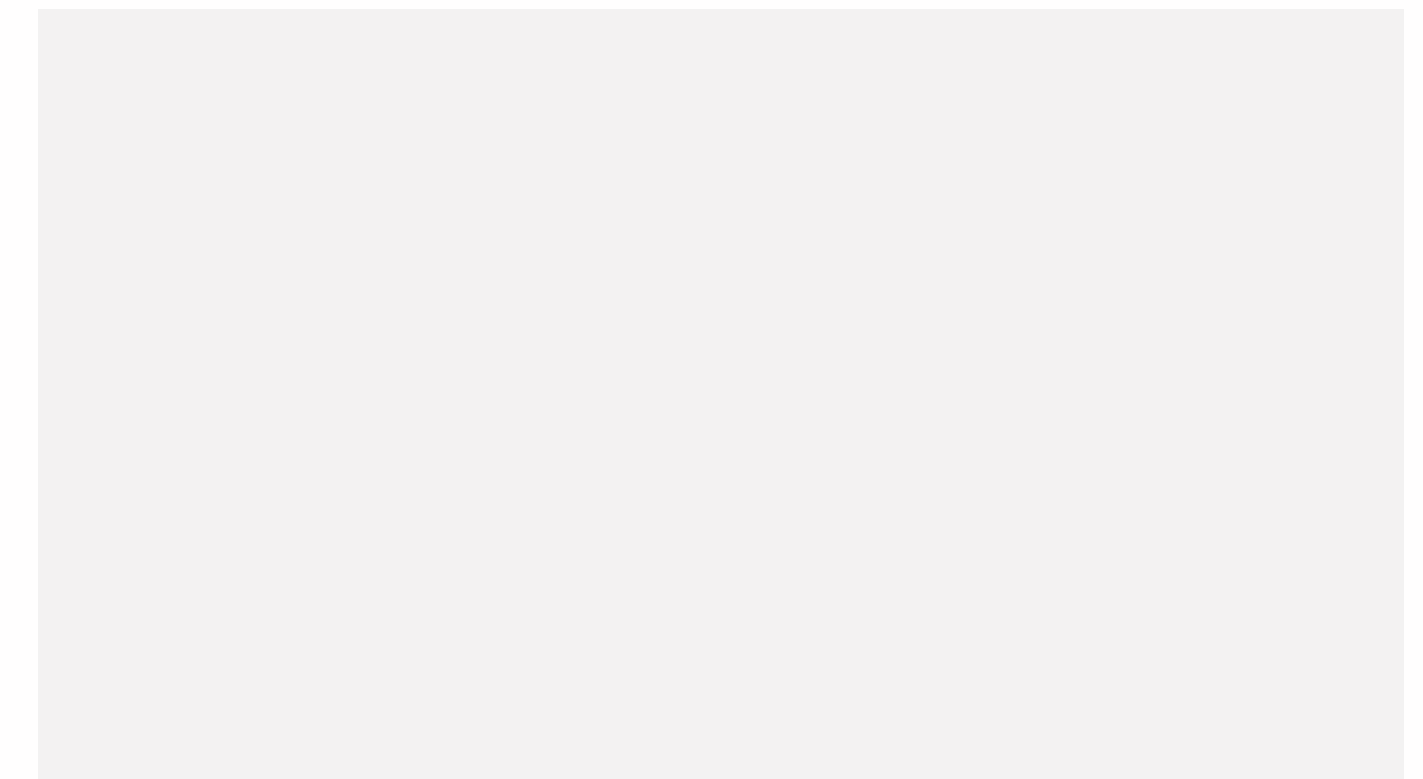


Representative benchmark

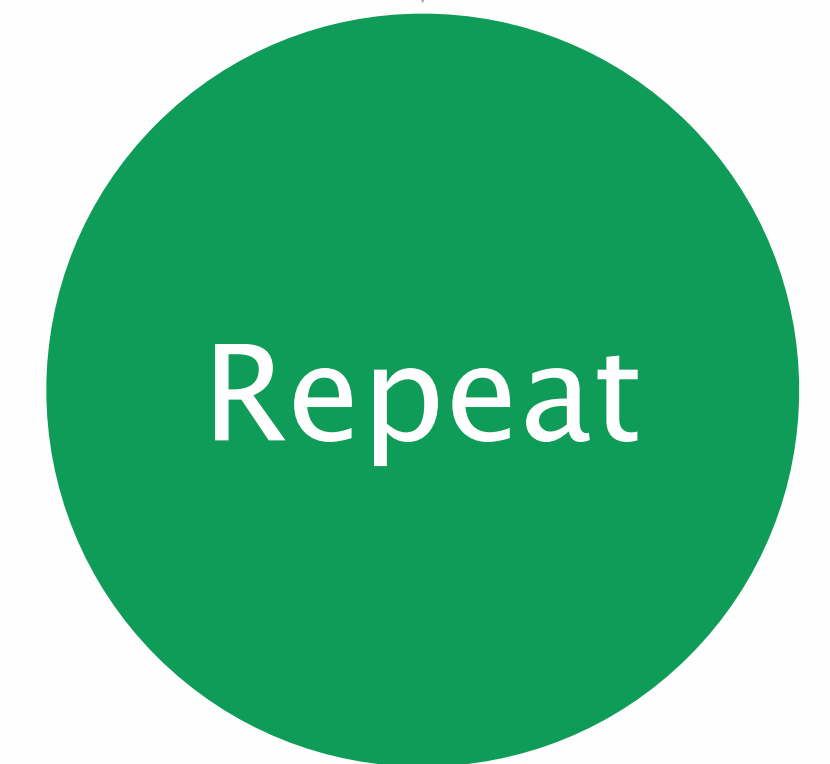
Repeat

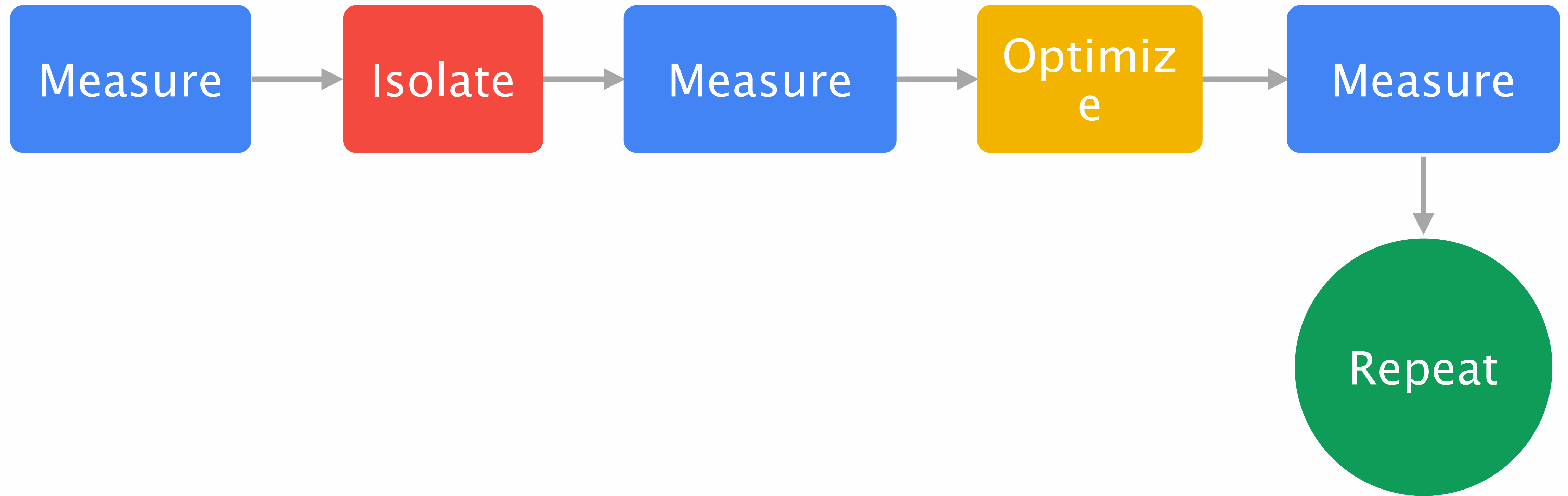


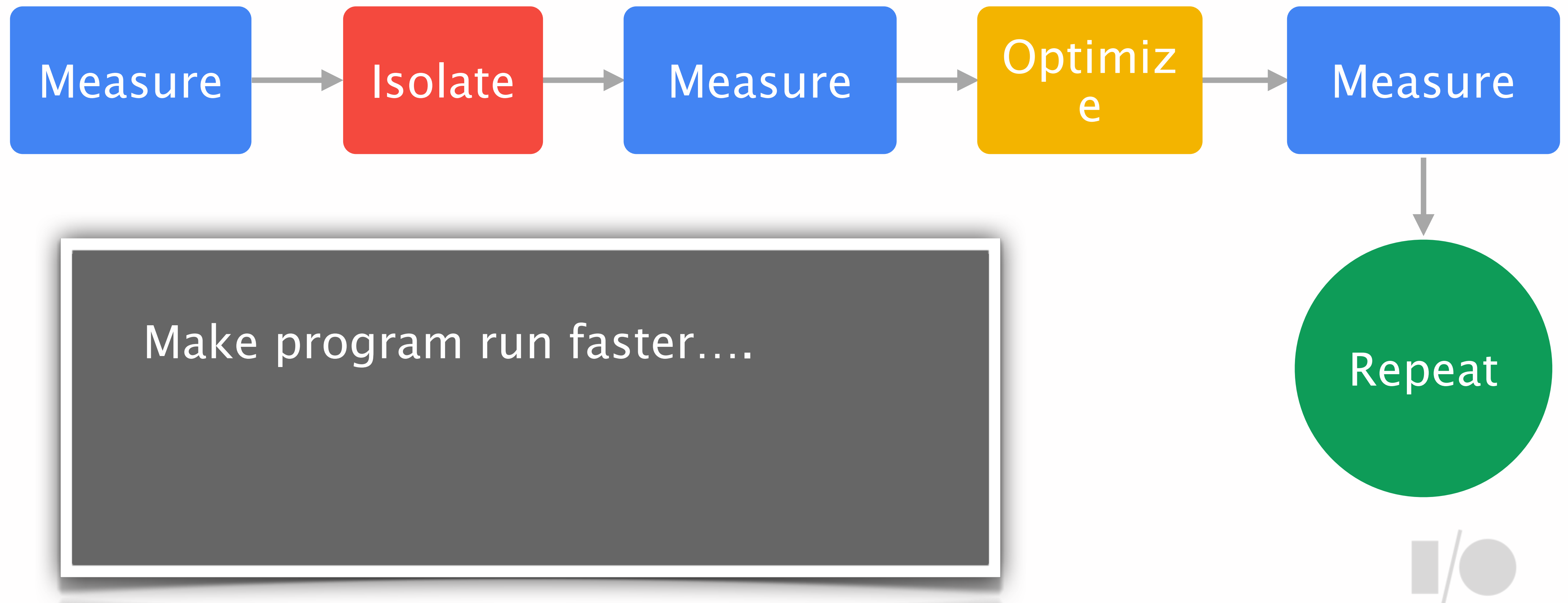


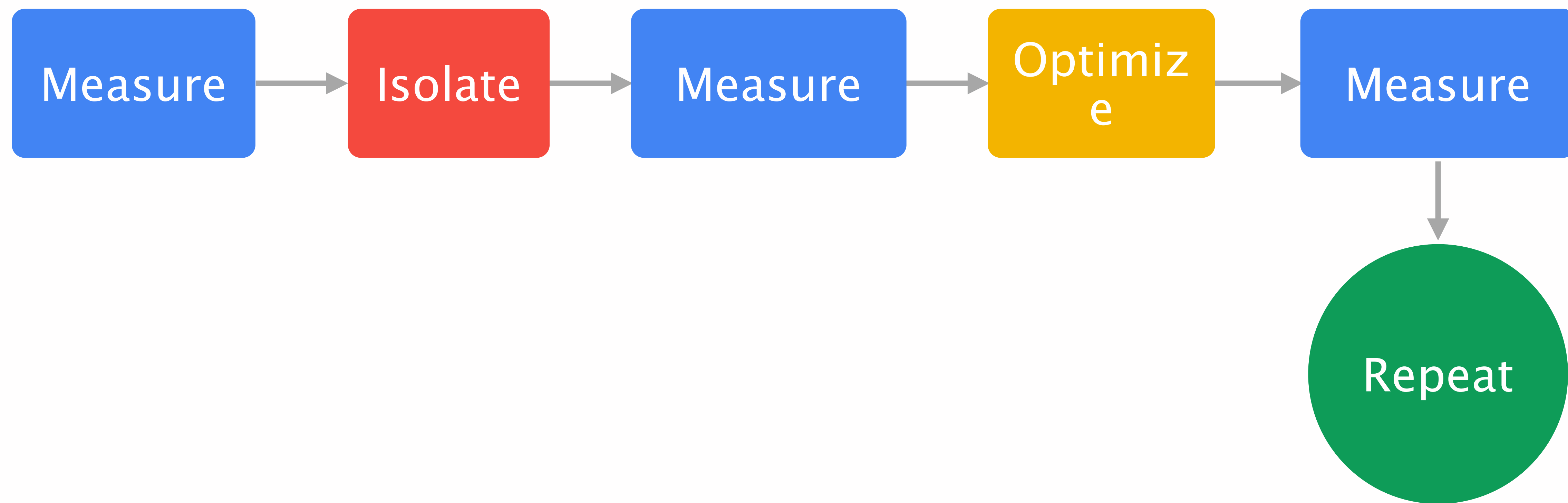


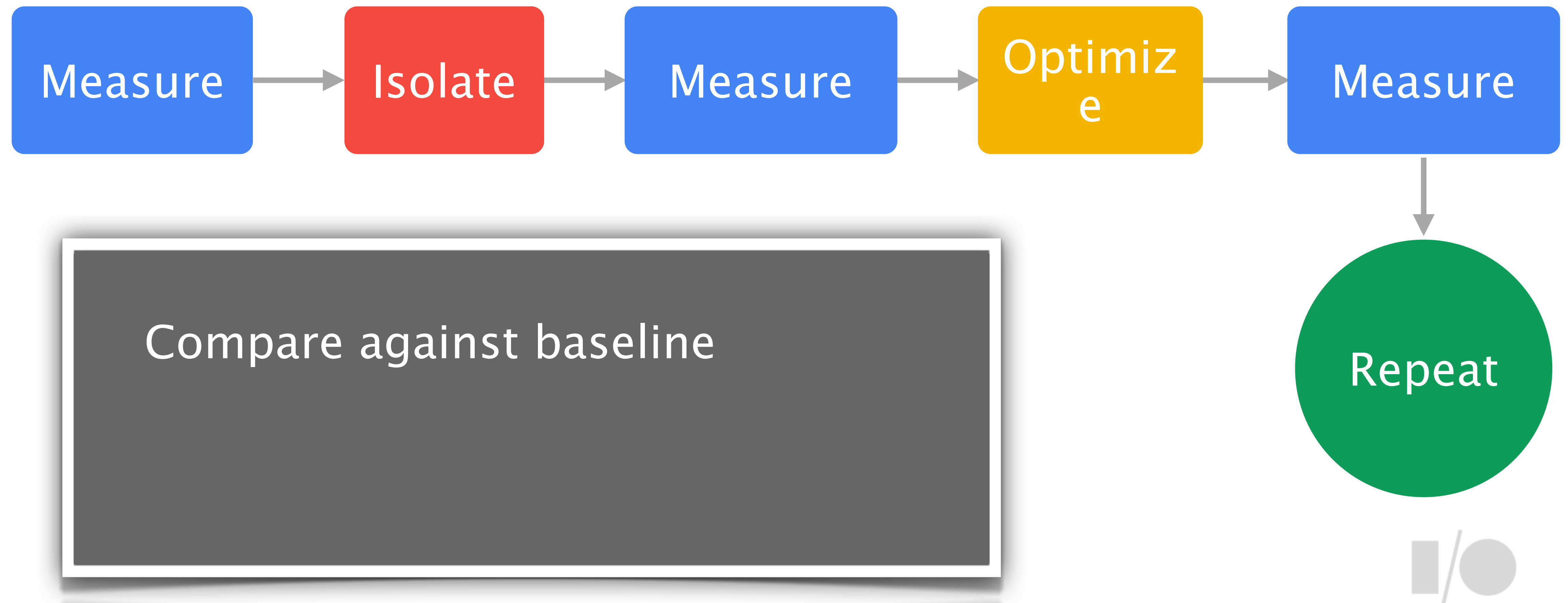
Measure a baseline

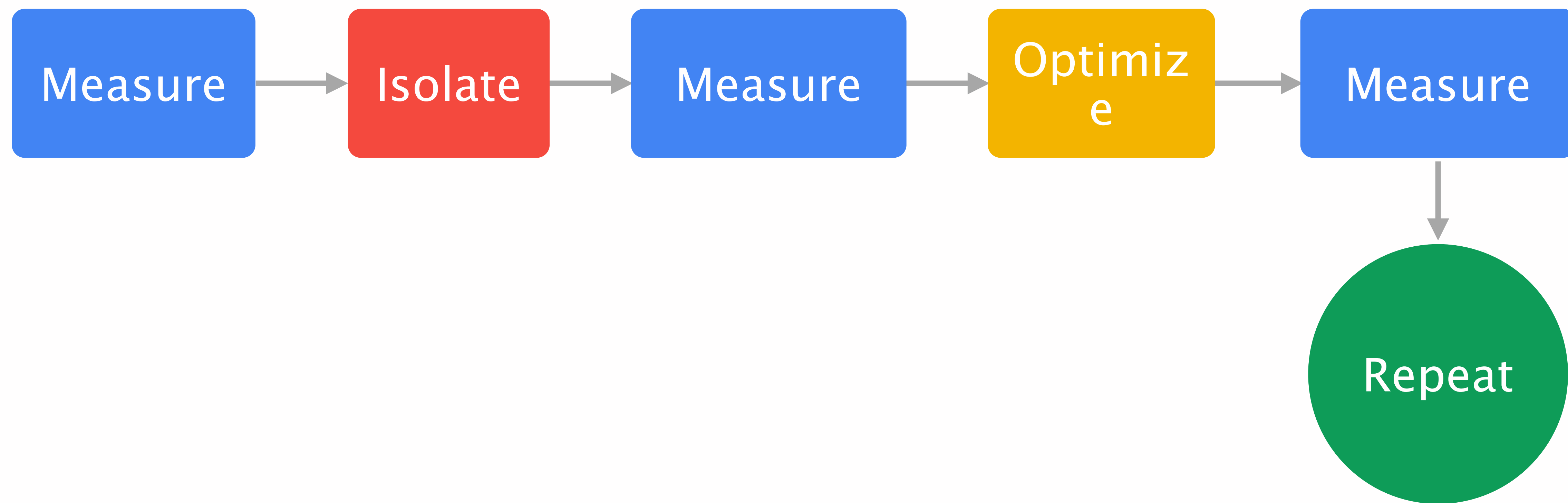












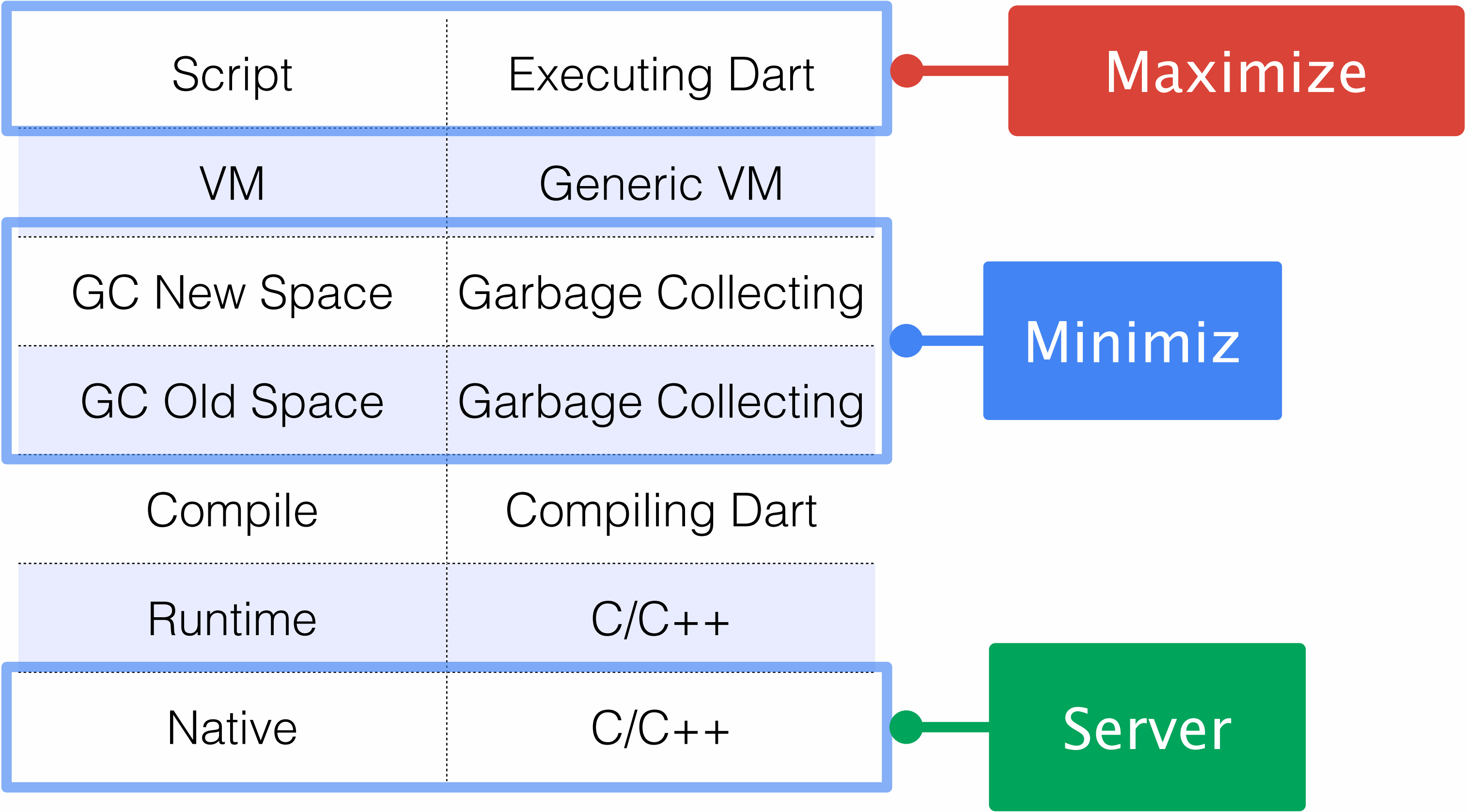
Tips

What to expect and what to look out for

Photo source info here



VM Tags



User Tag

VM Tag

*optimizedFunction

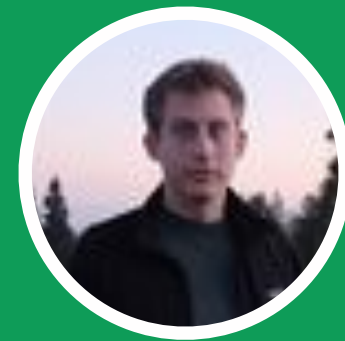
Optimized *

unoptimizedFunc



Thank you!

TODO: optimize
your first Dart app!



+John McCutchan
@johnmccutchan

#perfmatters

www.dartlang.org

