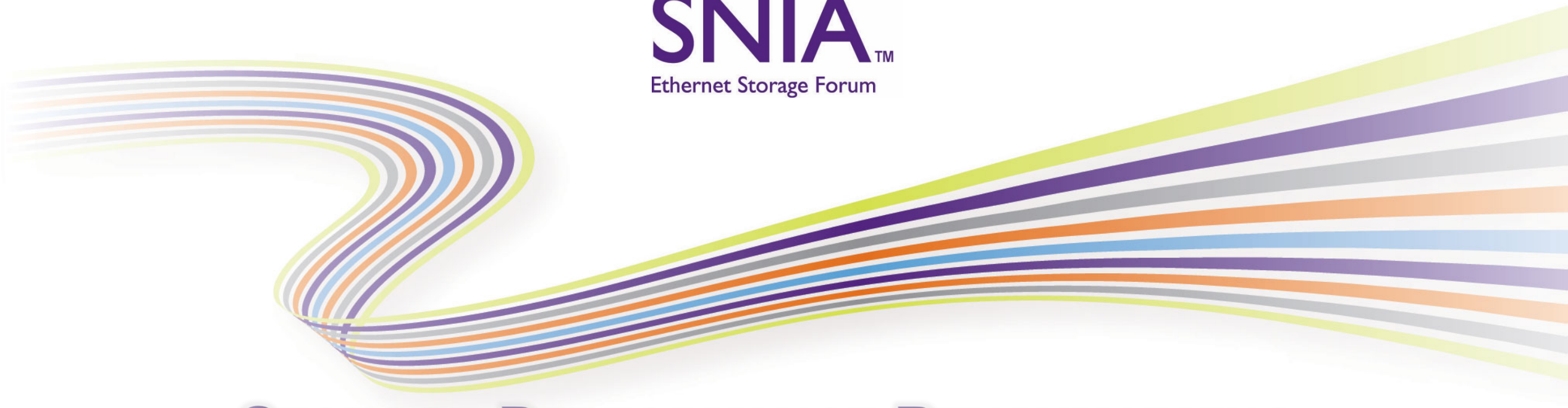

STORAGE PERFORMANCE BENCHMARKING: PART 2 – SOLUTION UNDER TEST

Ken Cantrell / NetApp
Mark Rogov / EMC
J Metz / Cisco

October 21, 2015

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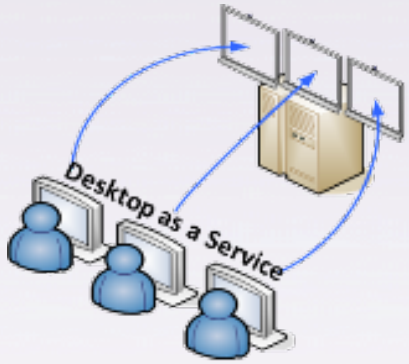
R&D Engineer
@drjmetz

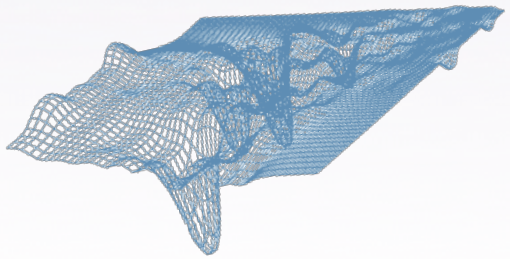
SPEC SFS® 2014

- See http://spec.org/sfs2014/ for details

SWBUILD



VDI



VDA

DATABASE

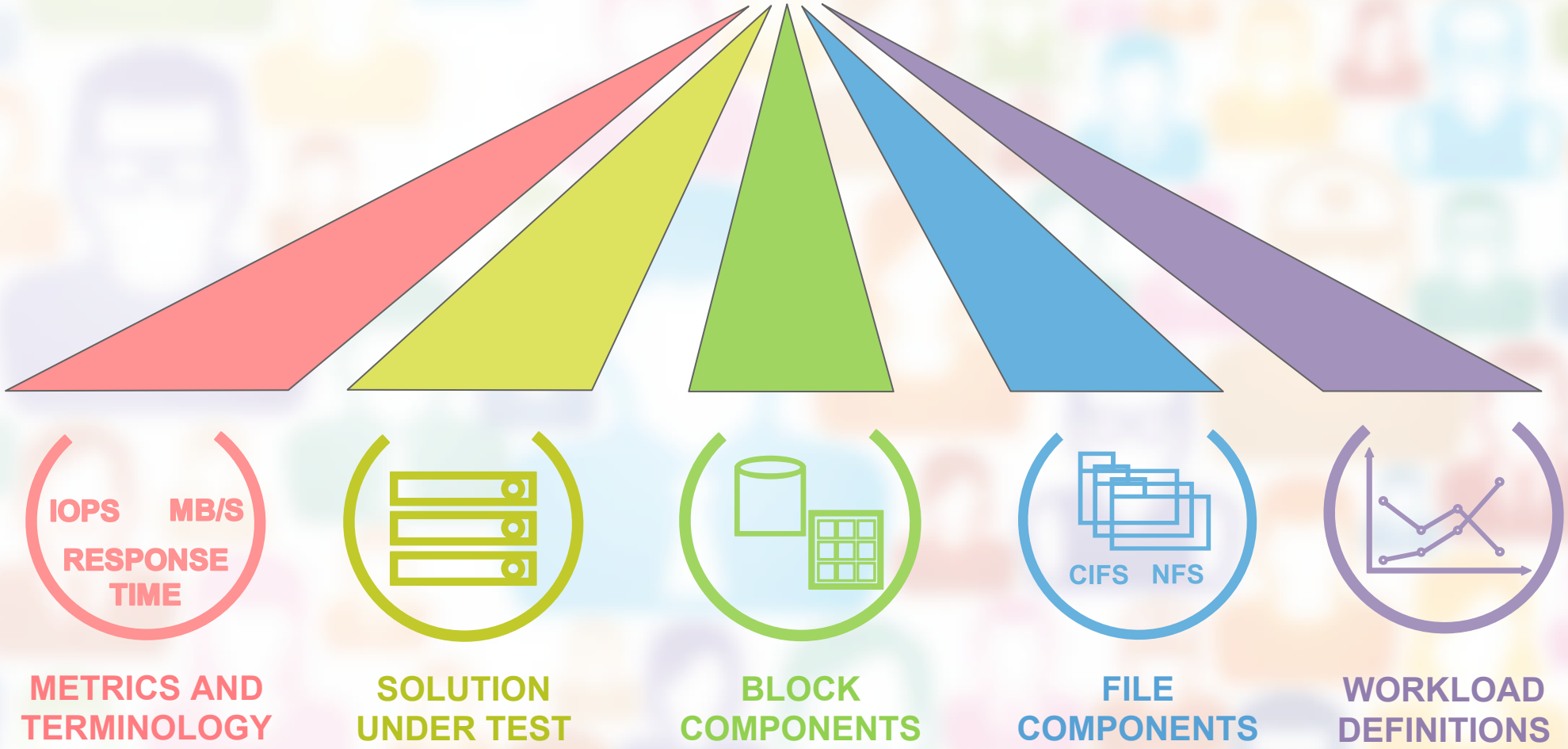
Protocol Support

- Any Transport Protocol
  - TCP/IP, FC, iSCSI, etc.
- Any Network Protocol
  - NFS, SMB, etc.
- Uses POSIX file operations

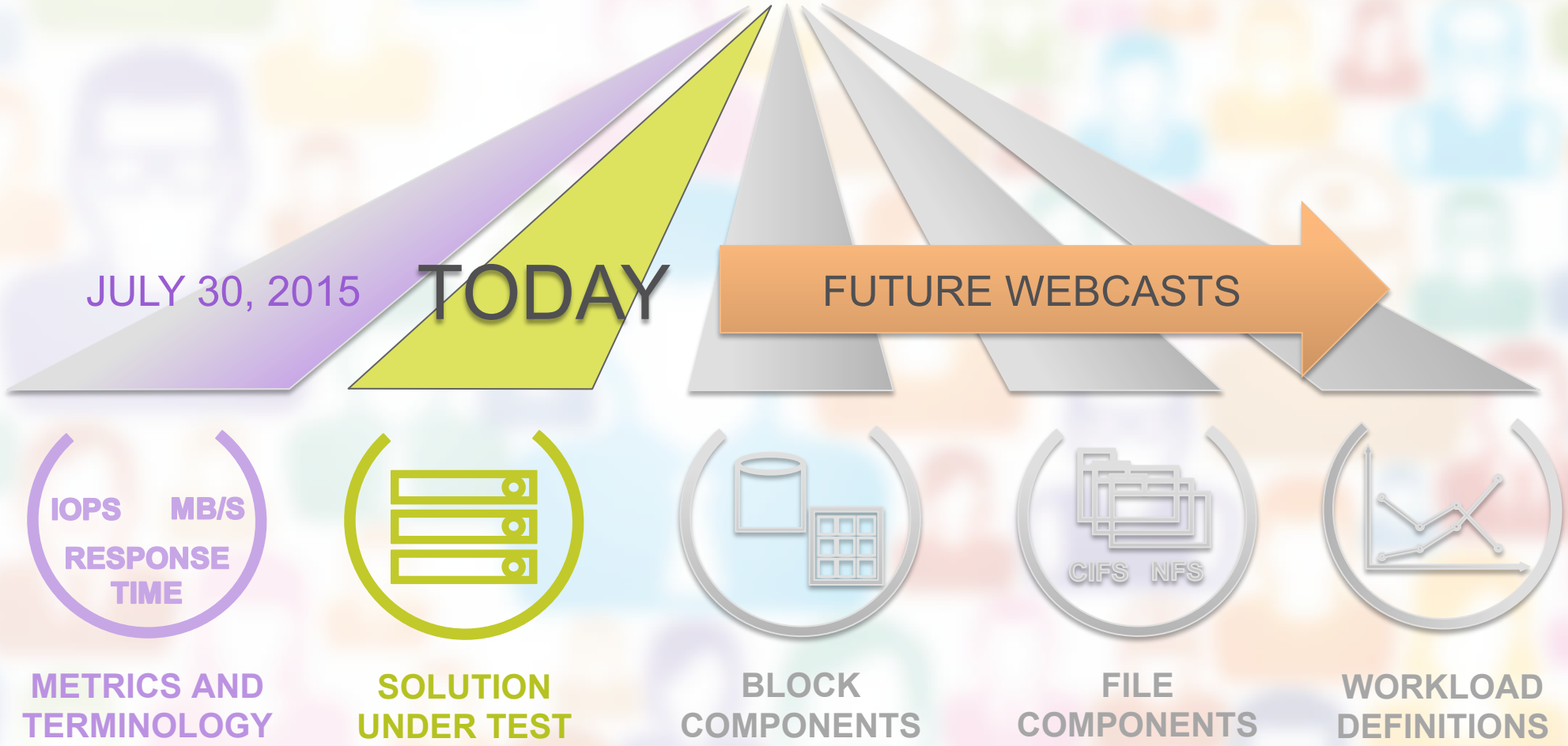
Metrics

- Business metrics counts
  - software builds, virtual desktops, video streams, databases
- Response time

Storage Performance Benchmarking



Storage Performance Benchmarking

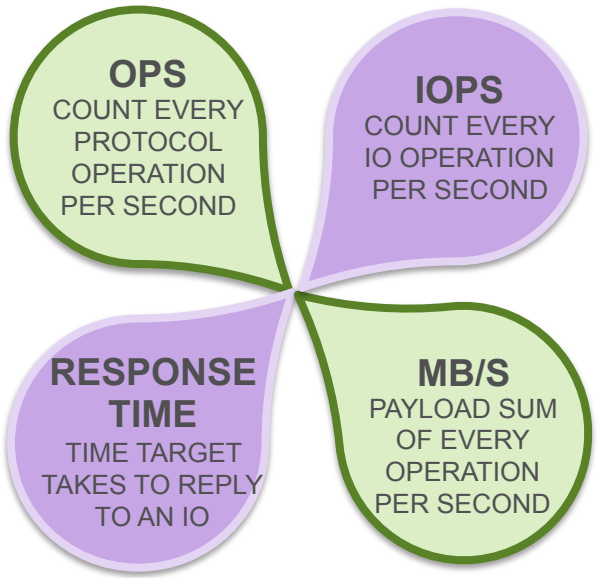


INTRO > SUT > CACHE > MOLE > HERO > MiB/S > END

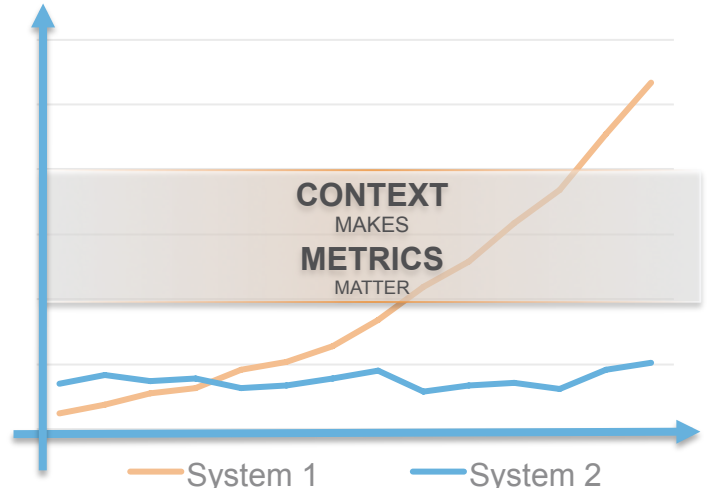

INTRO
SUT
CACHE
MOLE
HERO
MiB/S
END

Metrics and Terminology Review

- Part 1: http://www.snia.org/forums/esf/knowledge/webcasts (Both PDF and PPT available)

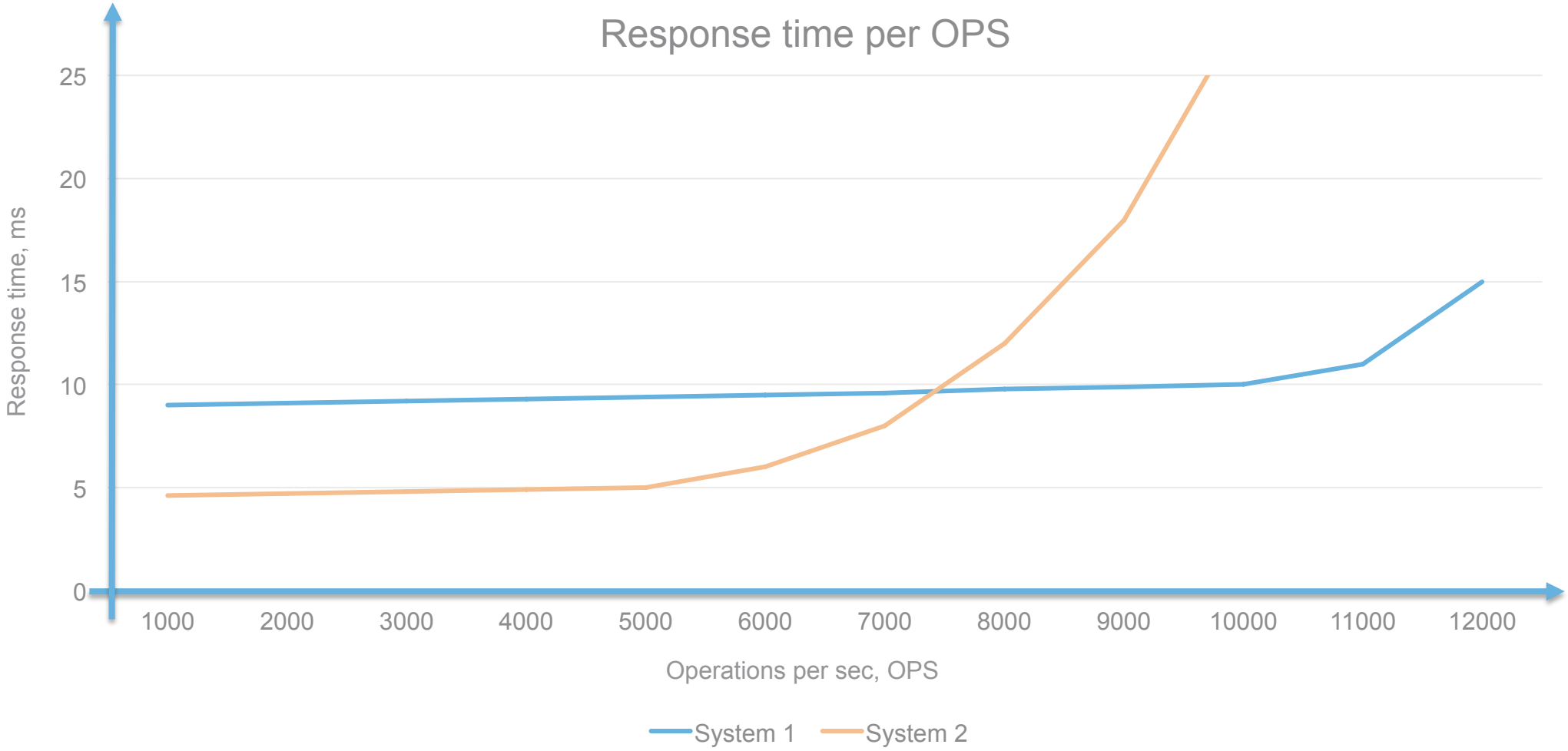


TERMINOLOGY



GRAPH FUN

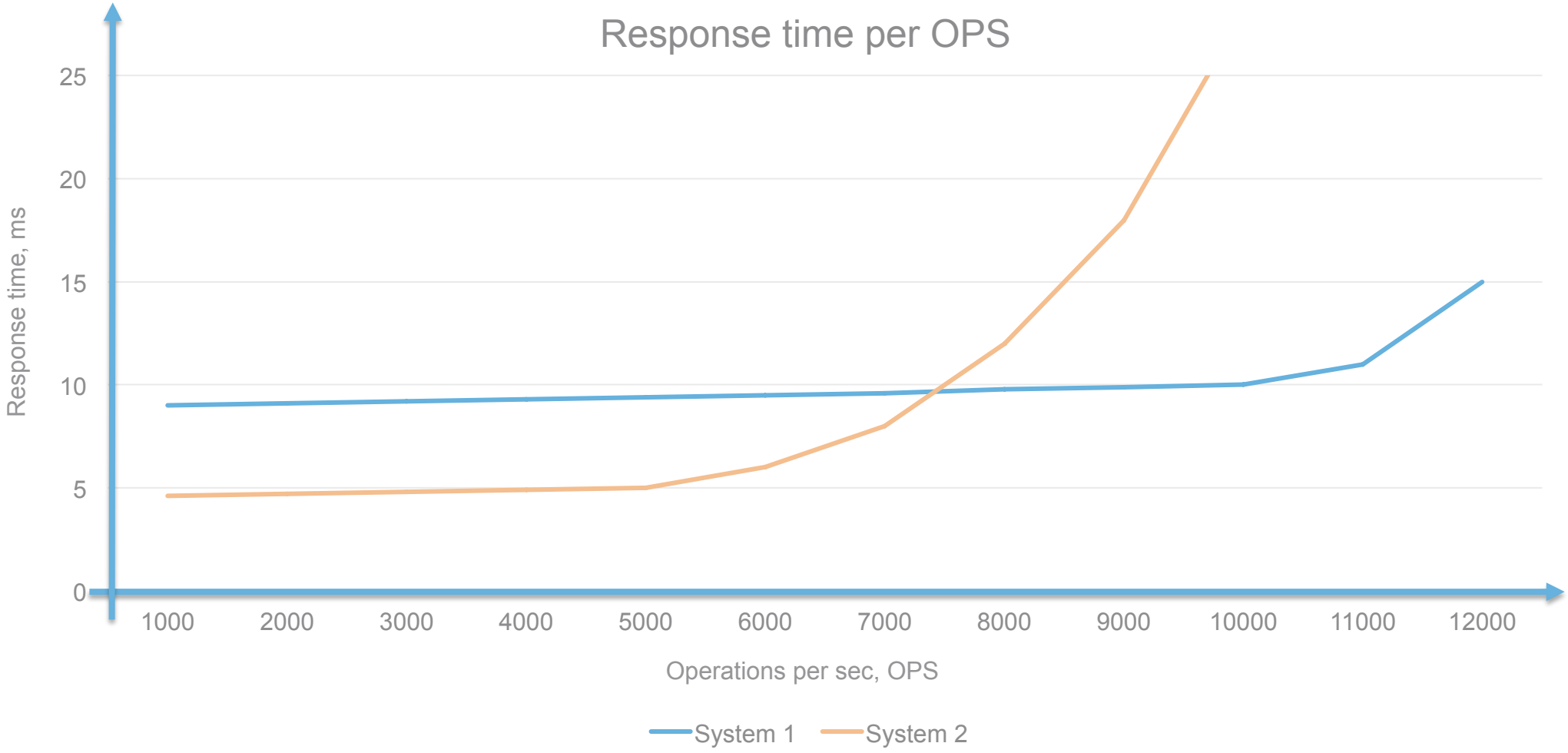
Last Time: Which is Better?



Last Time: Which is Better?

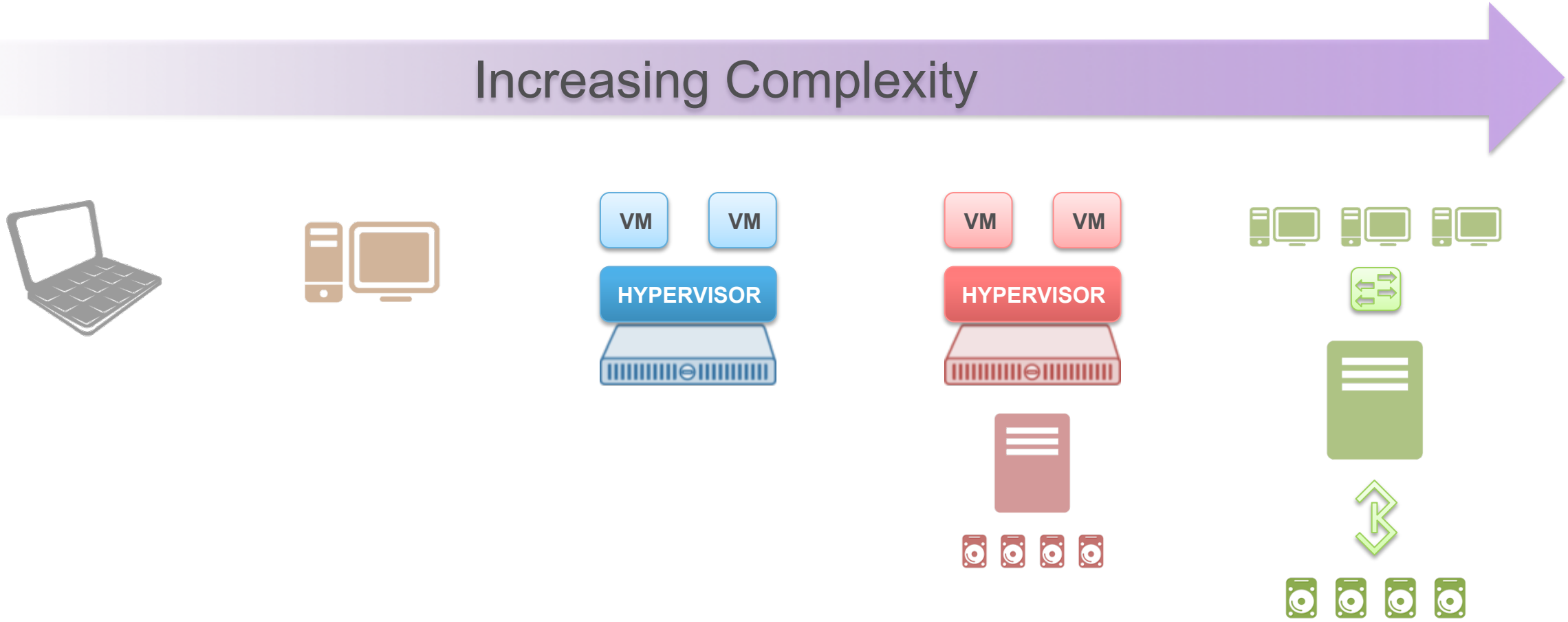
CONTEXT MAKES METRICS MATTER

This Time: Why Are They Different?

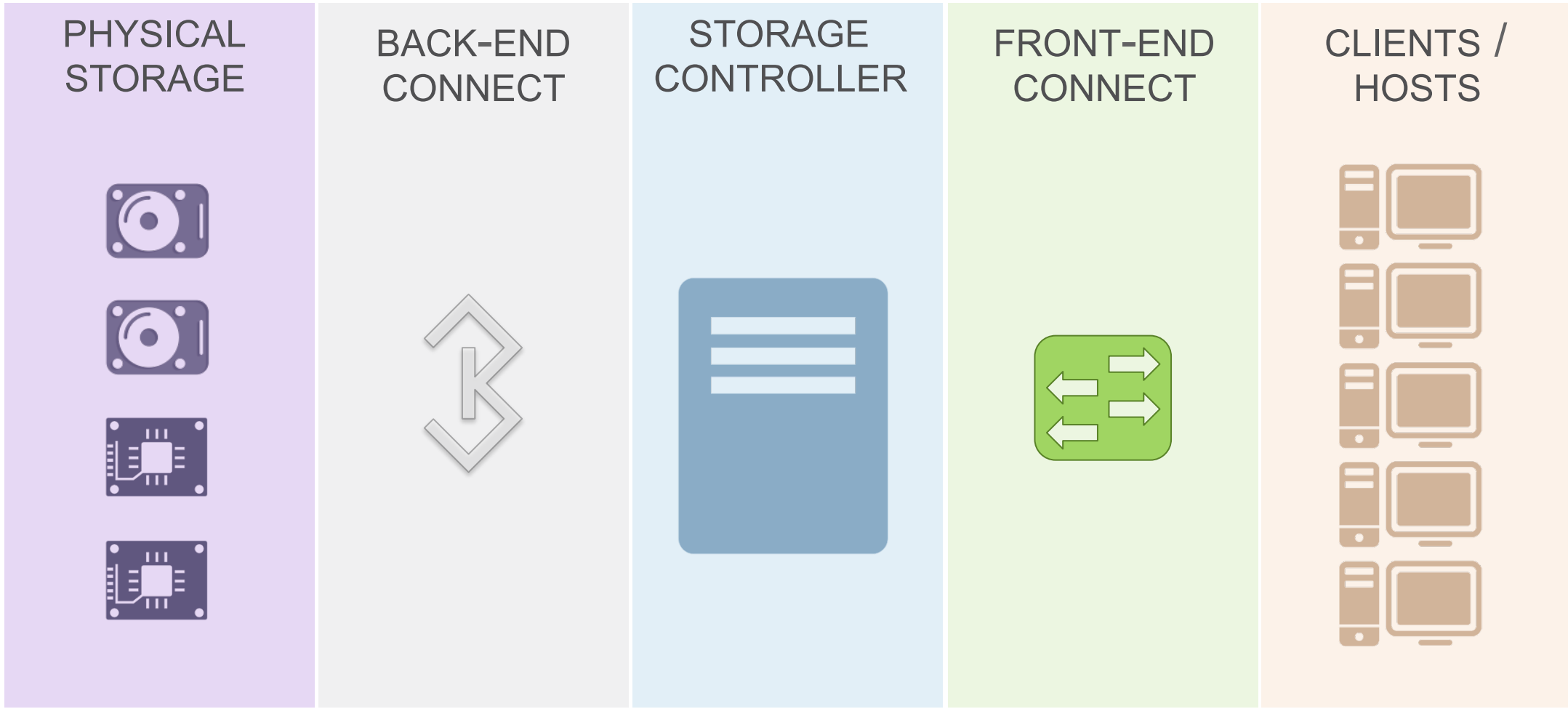



INTRO
SUT
CACHE
MOLE
HERO
MiB/S
END

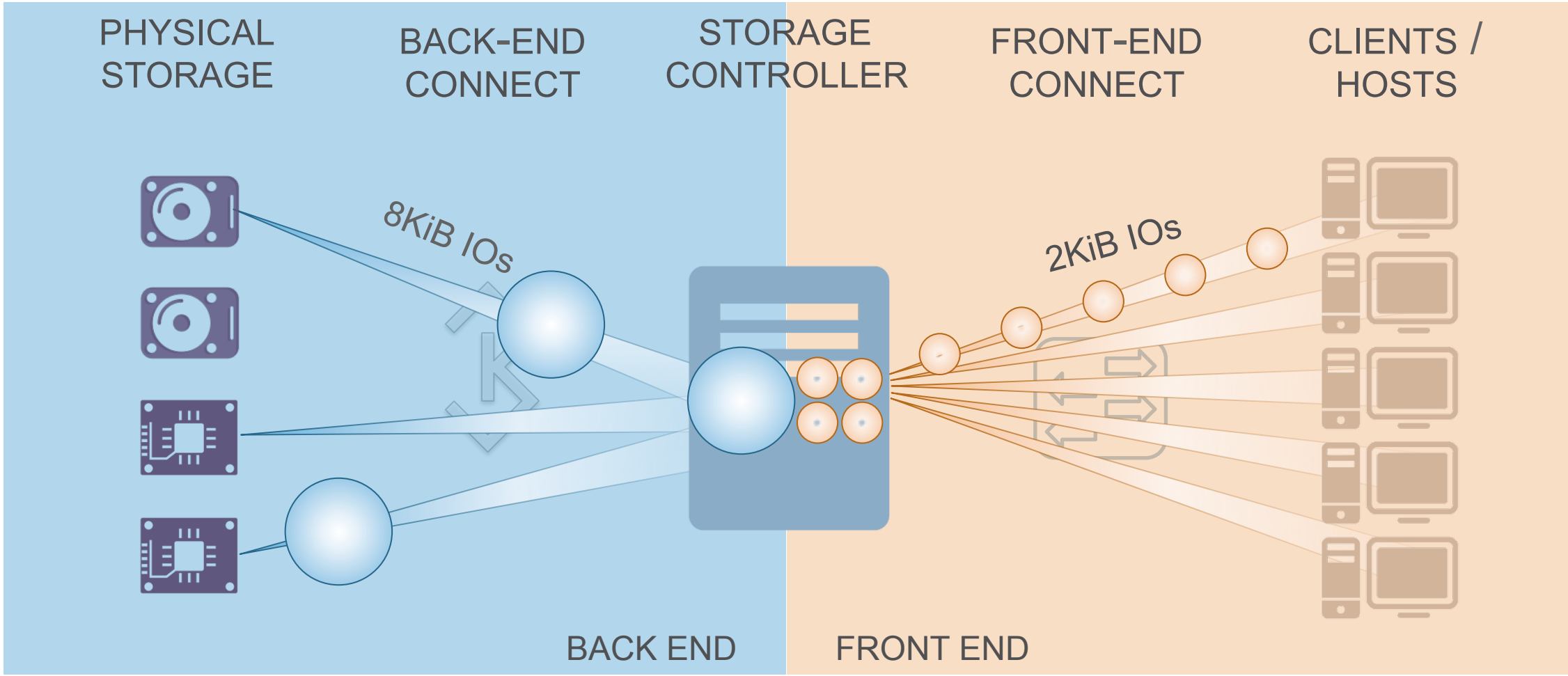
What is a Solution Under Test (SUT)?



SUT Layers

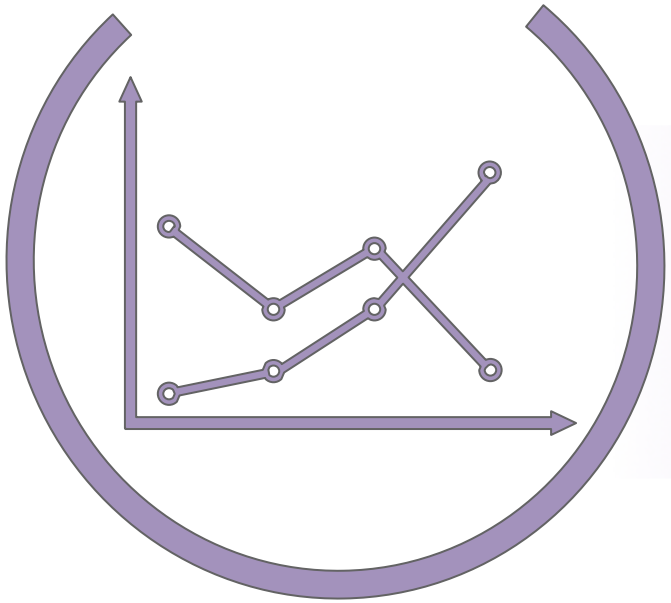


Front- and Back-End Basic Difference



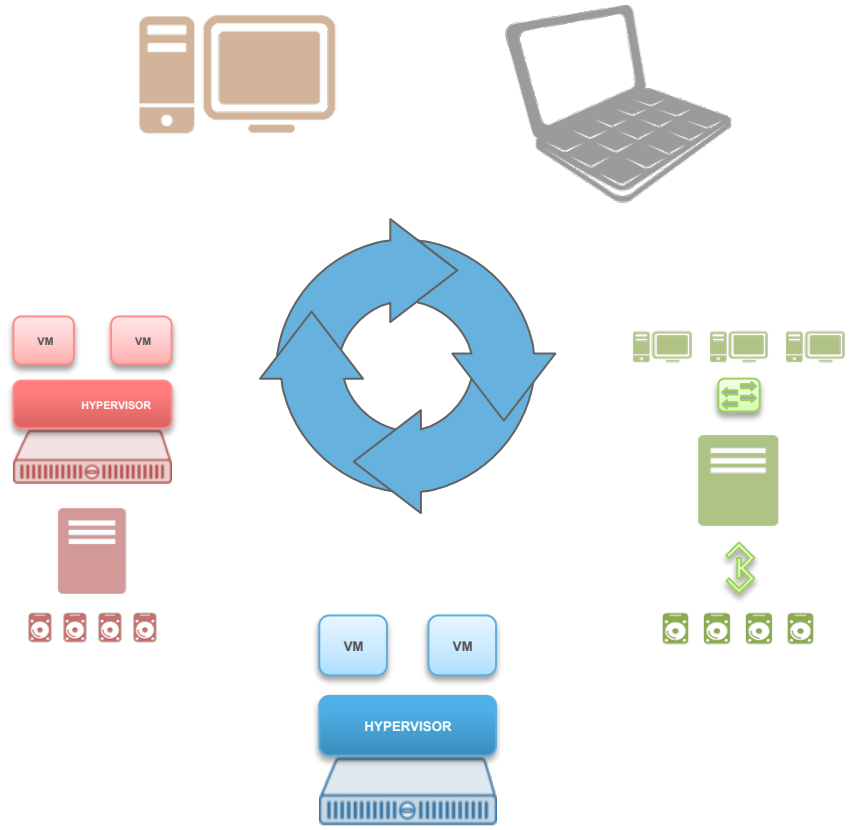
Is a Workload / Application a Part of the SUT?

WORKLOADS



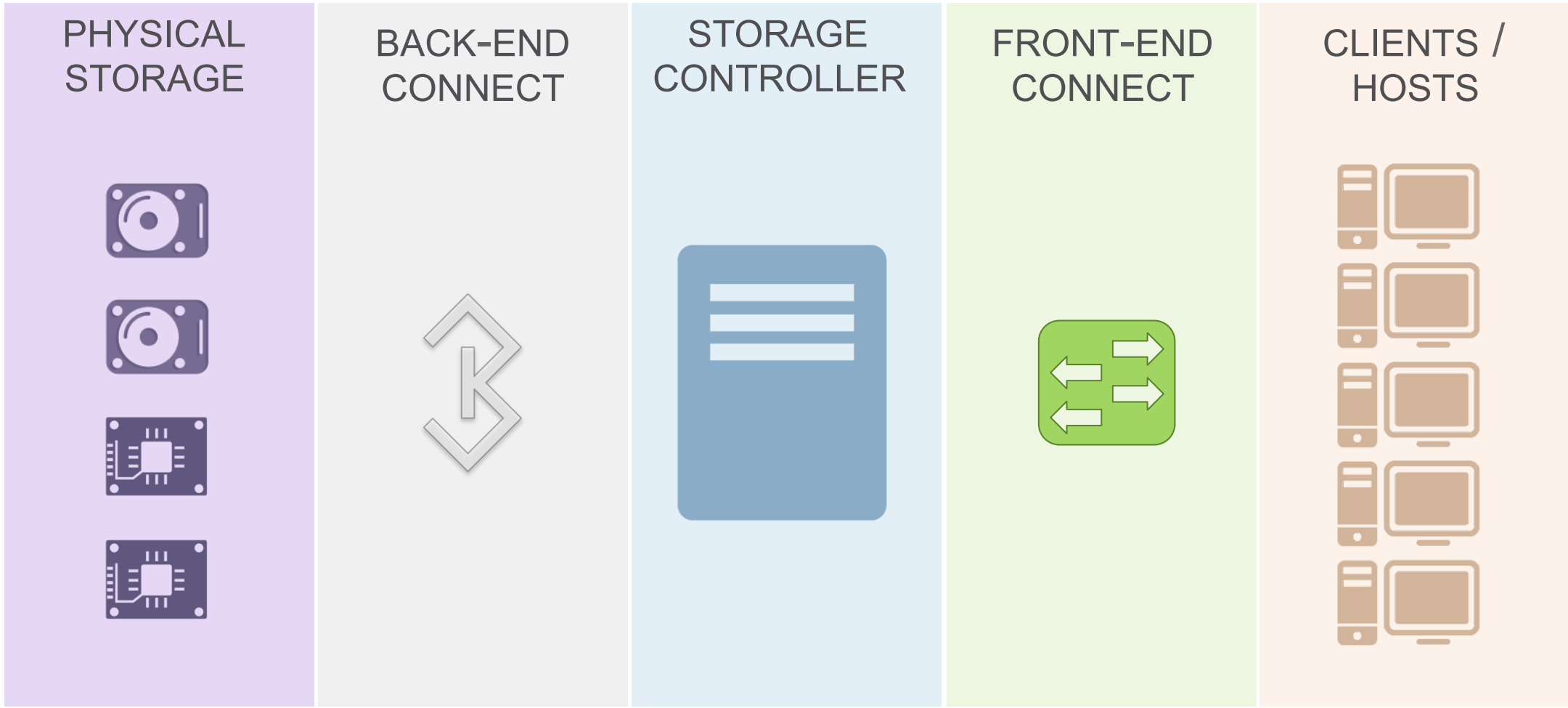
RUN ON

SOLUTIONS UNDER TEST

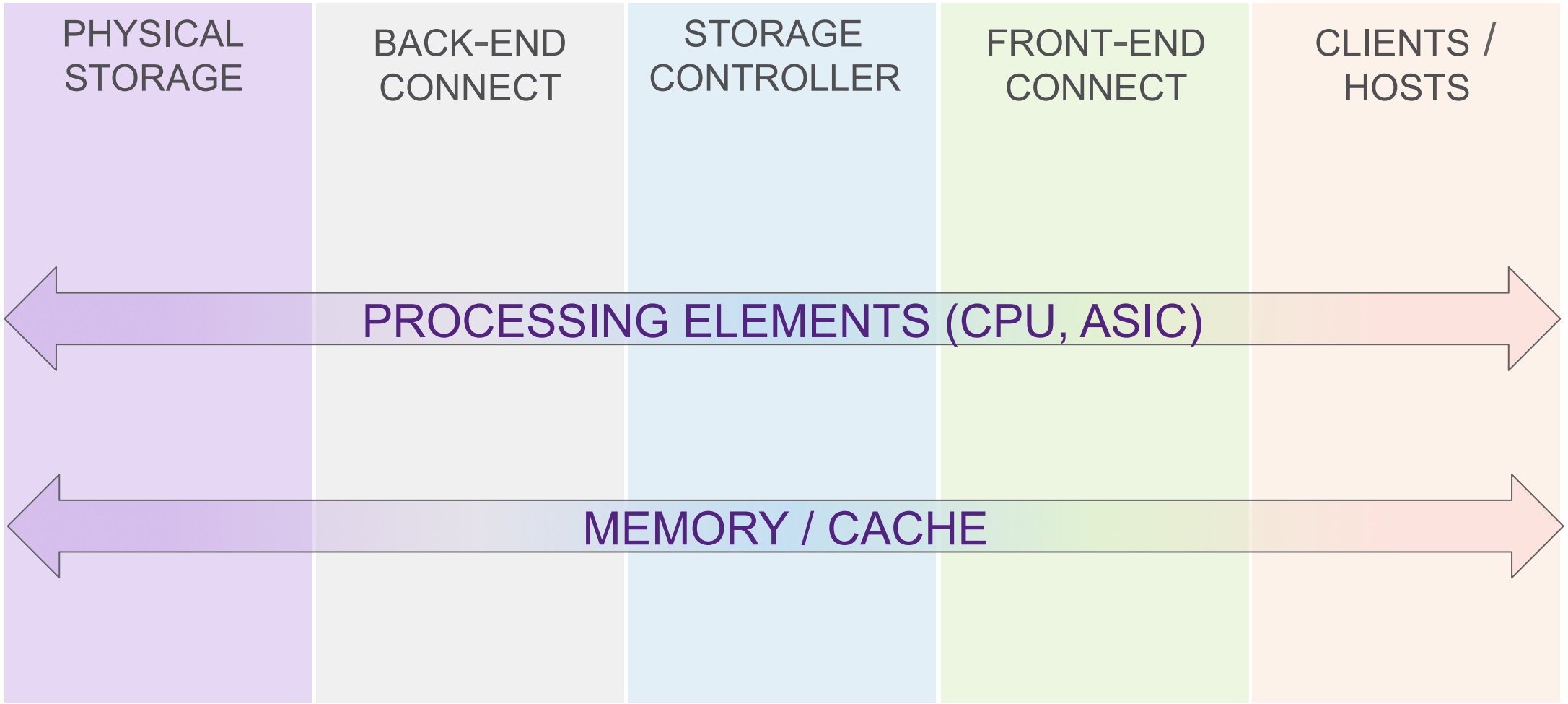



INTRO
SUT
CACHE
MOLE
HERO
MiB/S
END

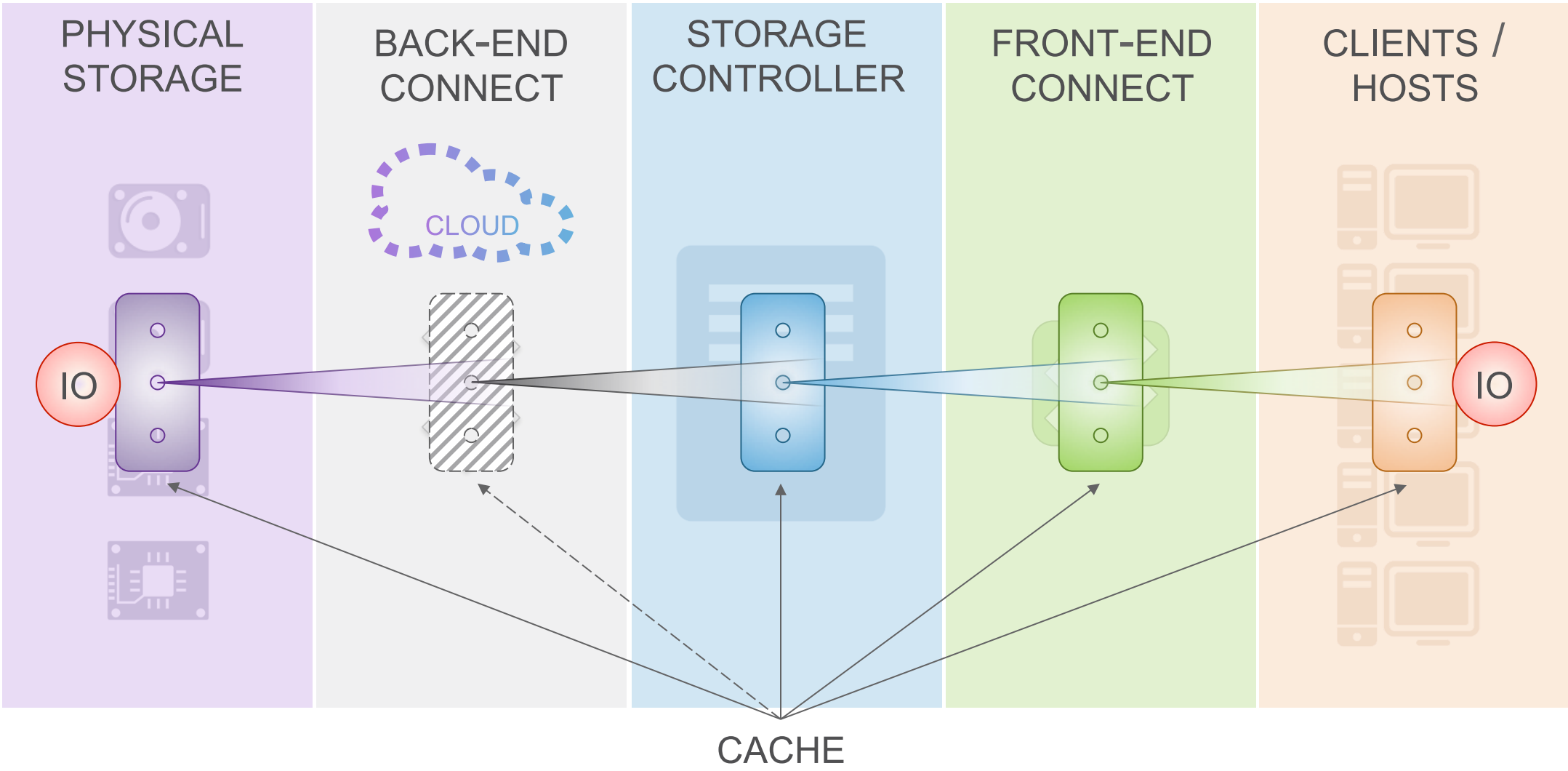
Which Elements in the SUT Affect Performance?



What is Common Between All Of The Components?



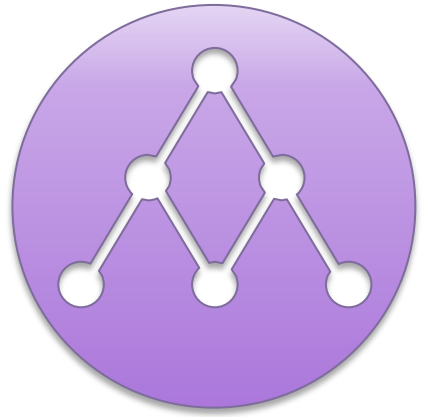
Answer To Ken's Interview Question



3 Principles To Improve Performance

DO WORK FASTER

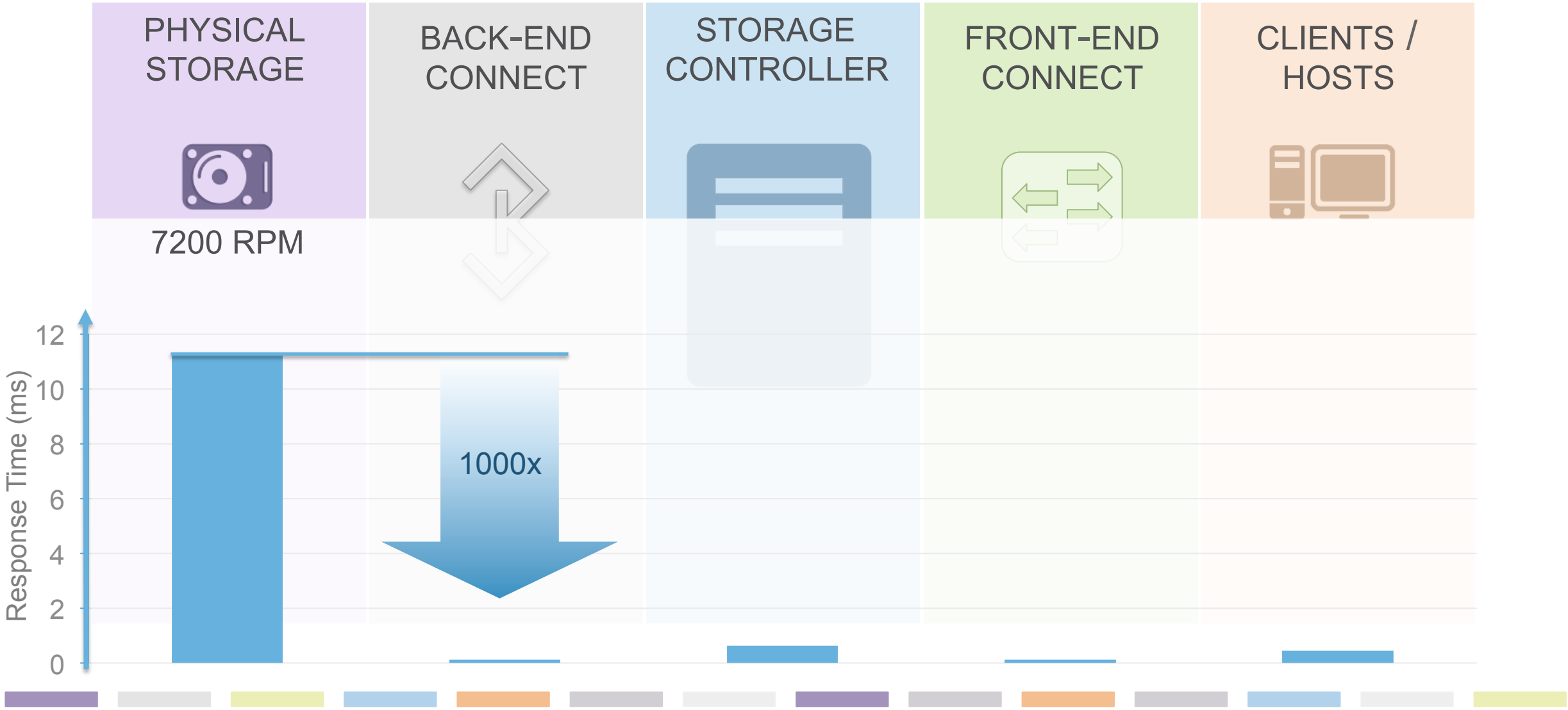
DO LESS WORK



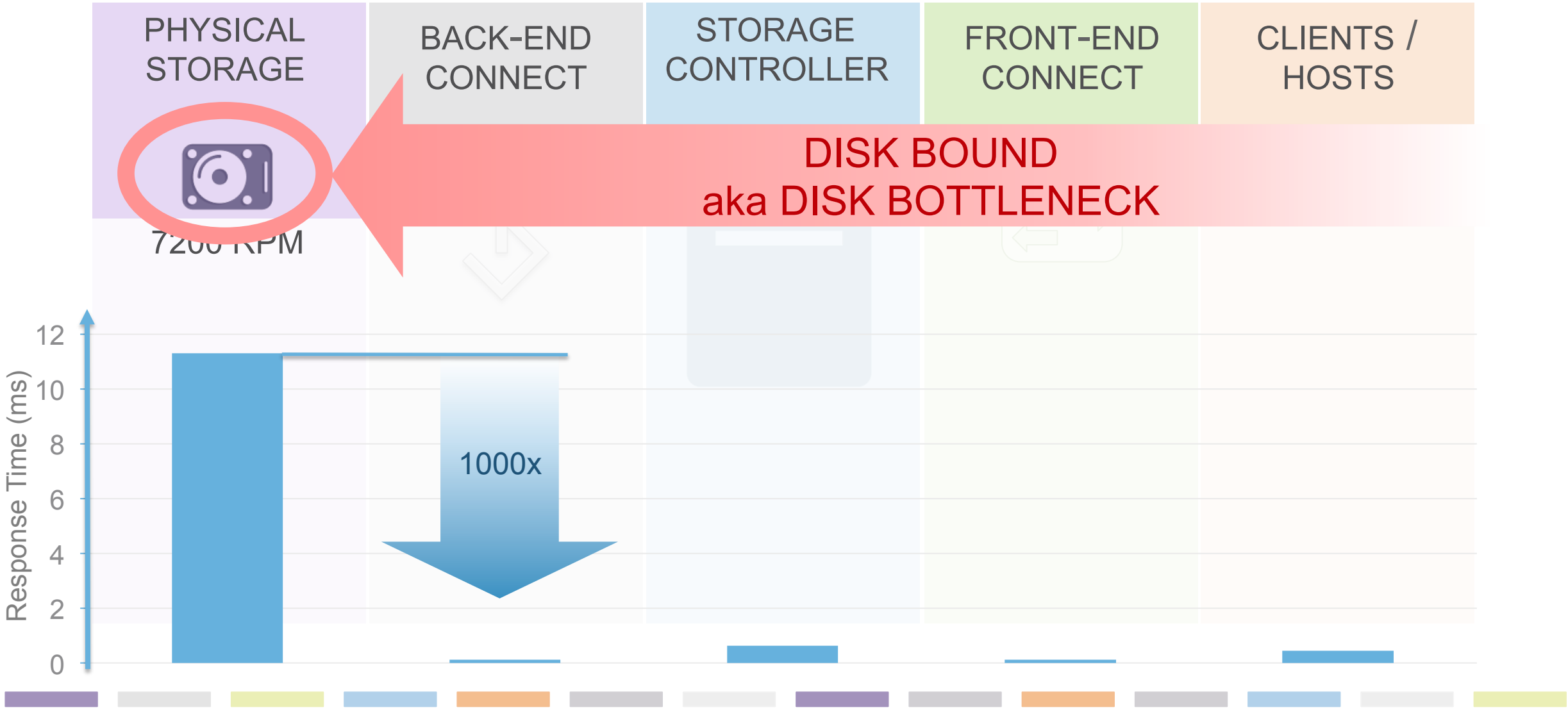
INCREASE PARALLELISM


INTRO
SUT
CACHE
MOLE
HERO
MiB/S
END

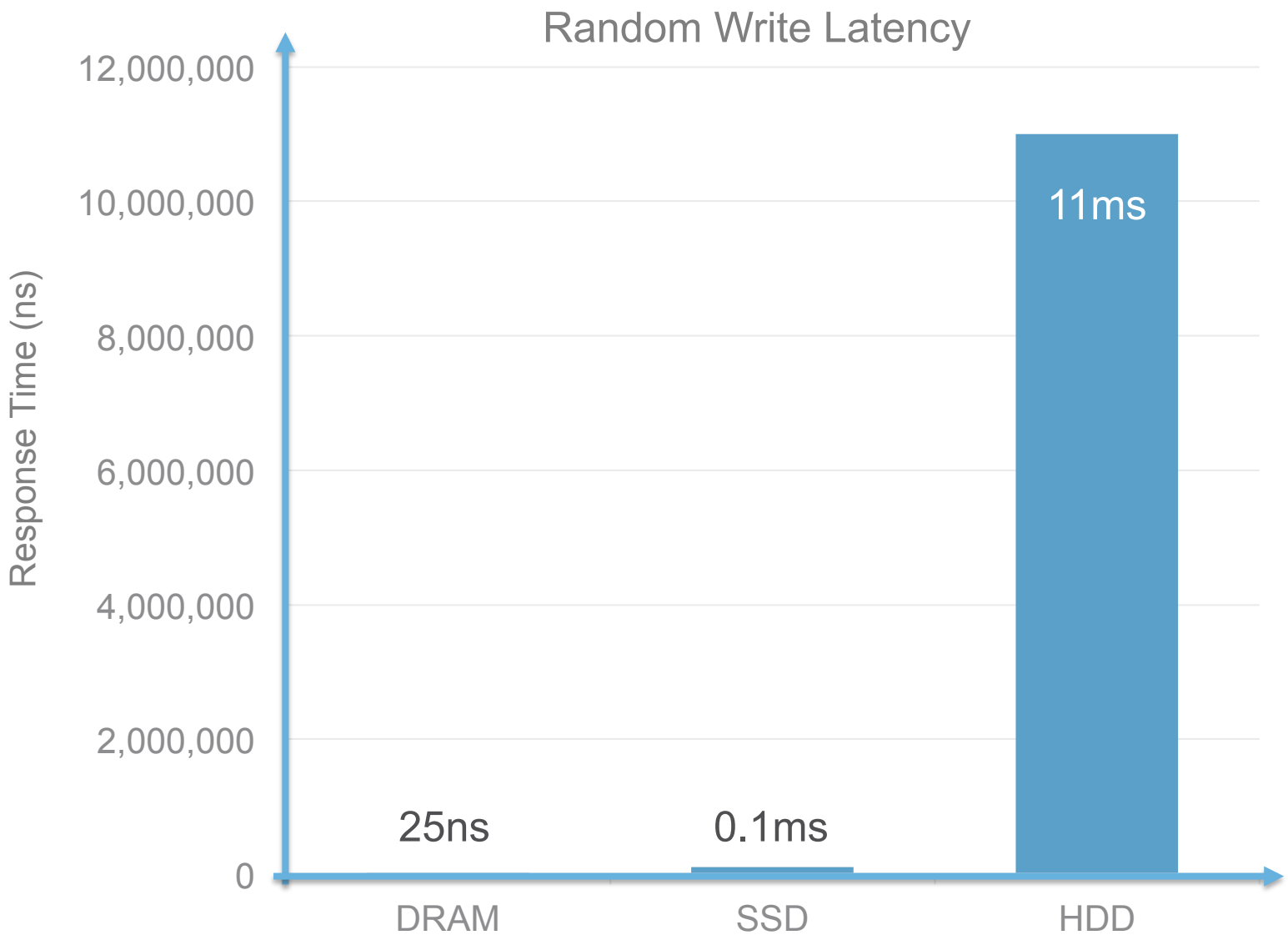
Latency Or “Whack A Mole Game”



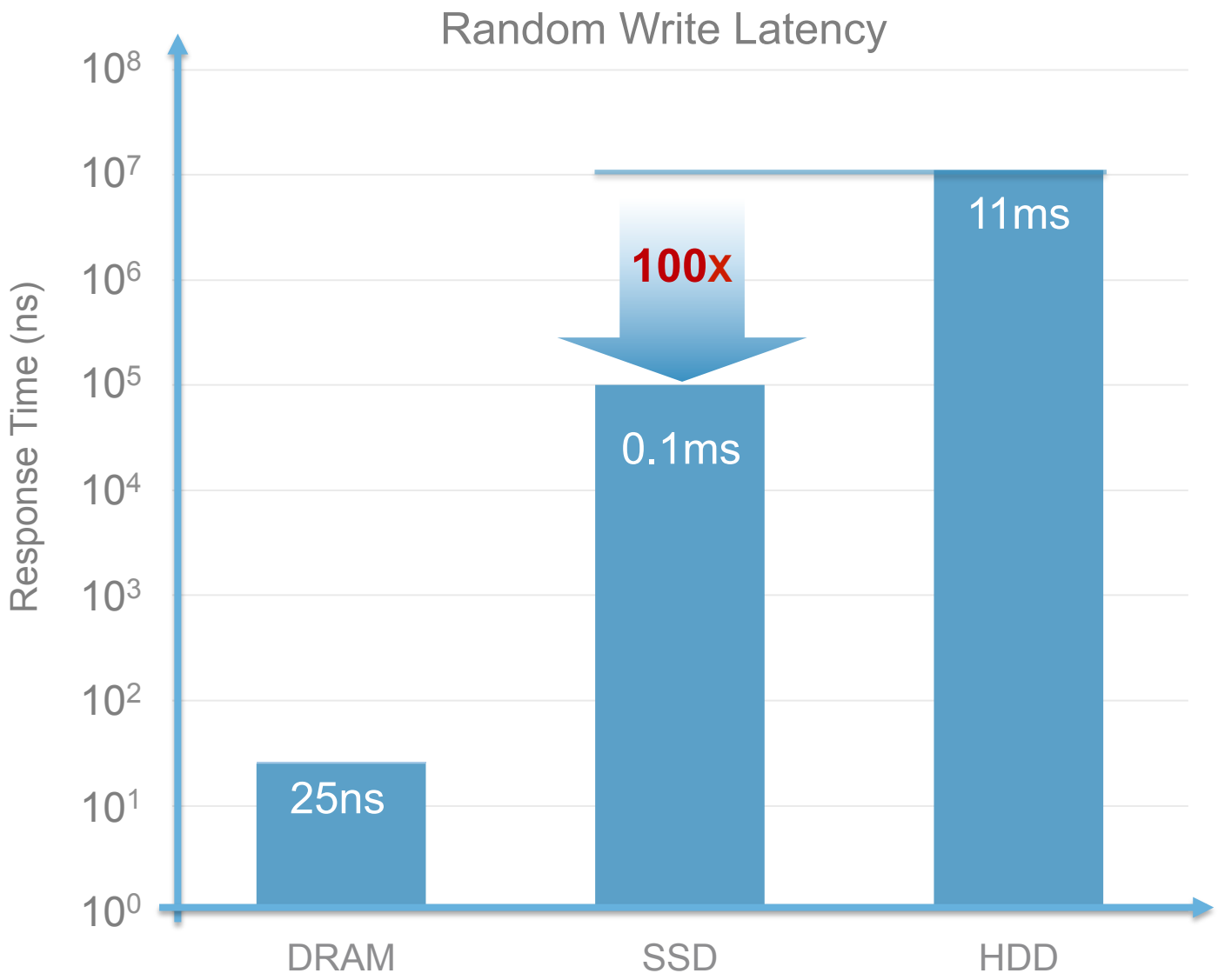
Disk Bottleneck



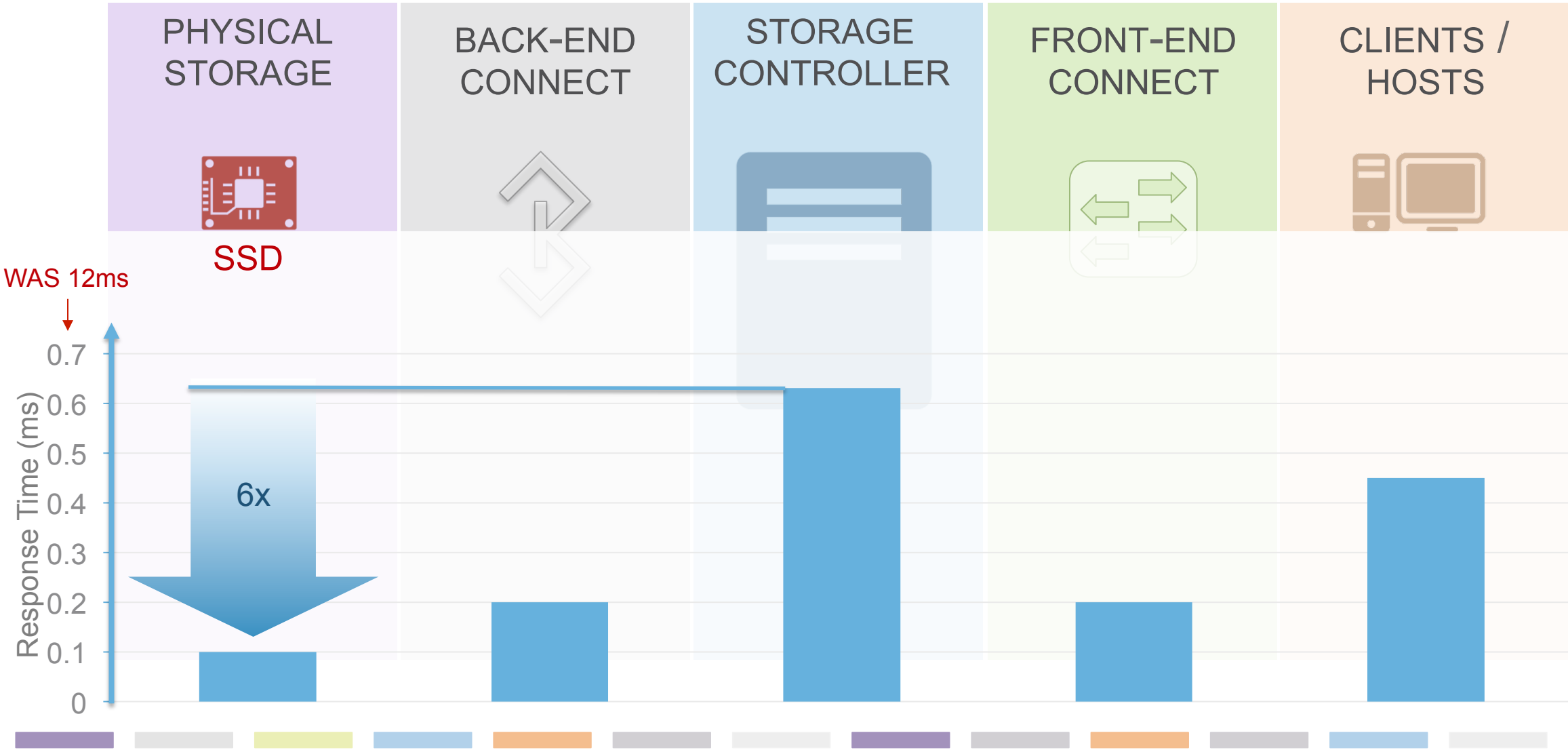
Why Are SSDs So Compelling?



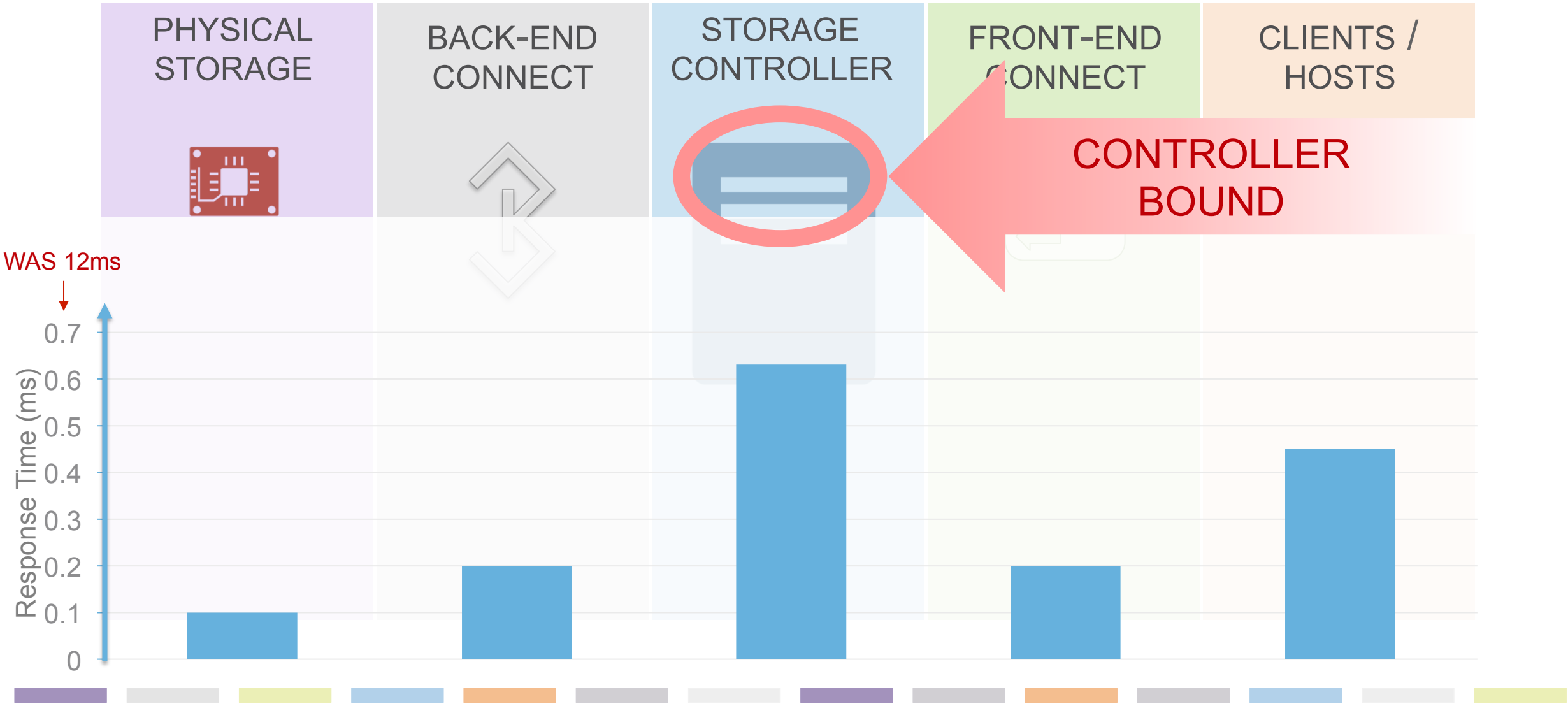
Why Are SSDs So Compelling?



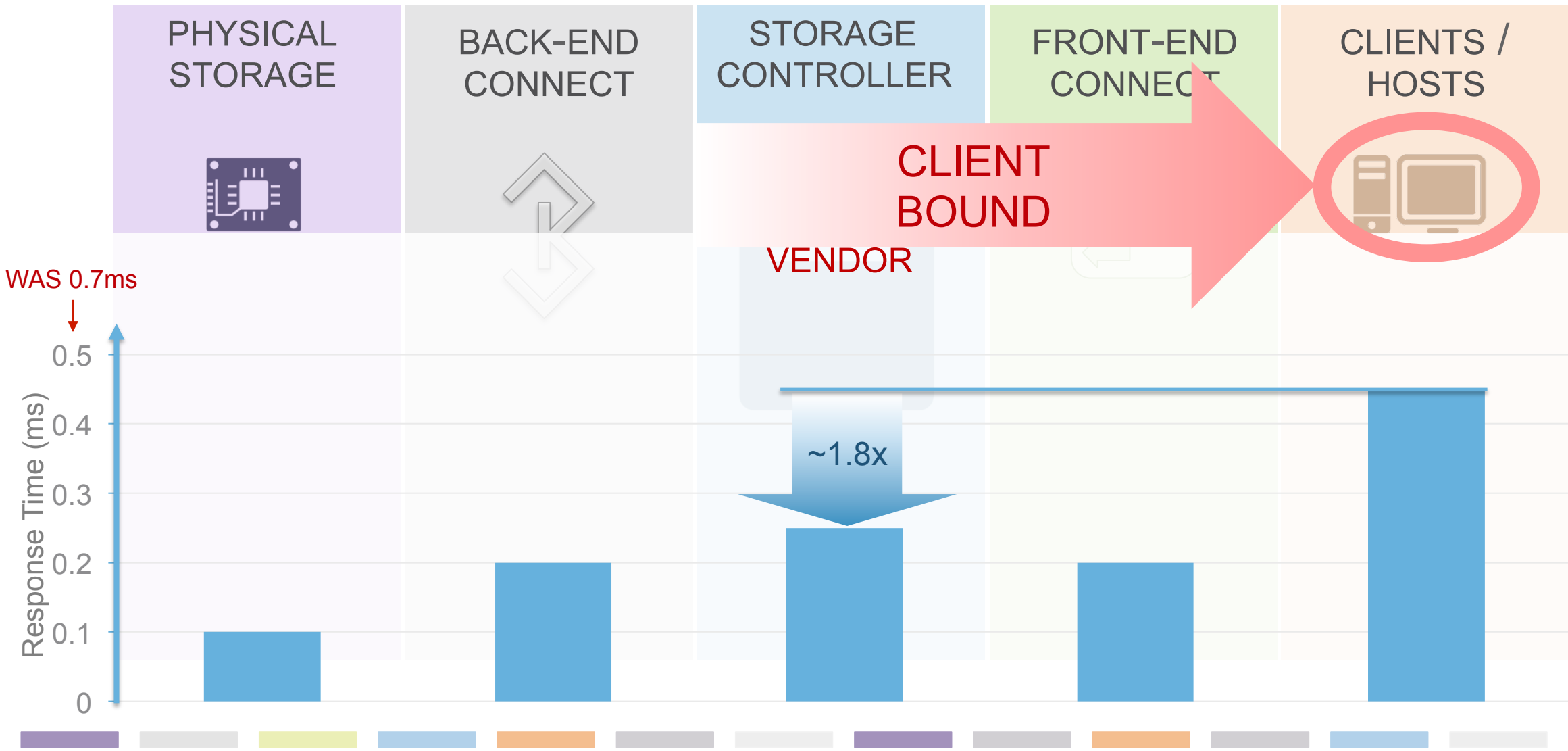
Change SUT: Upgrade With SSDs



Change SUT: Upgrade With SSDs



Controller Bottleneck



Bottlenecks Always Exist

DO WORK FASTER

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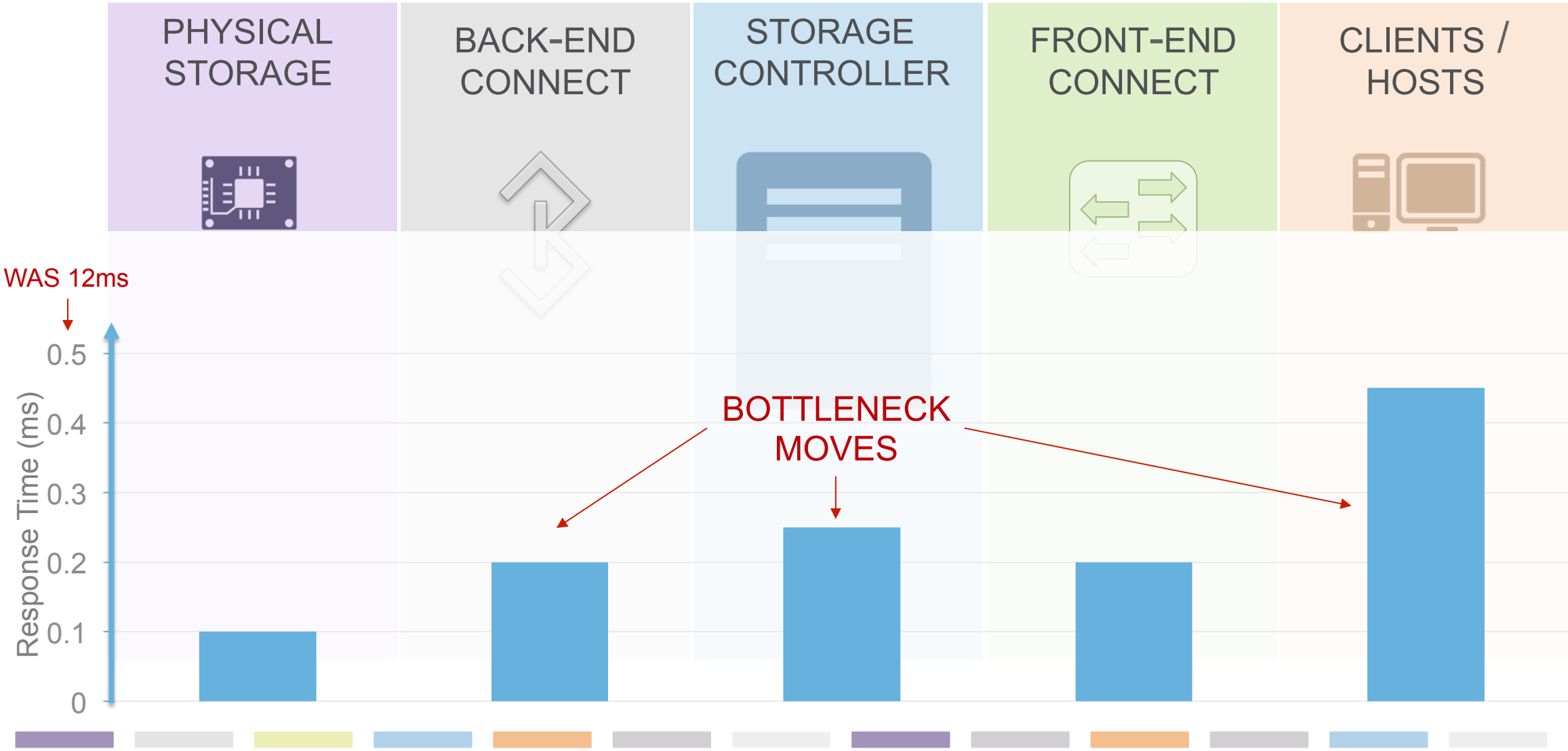
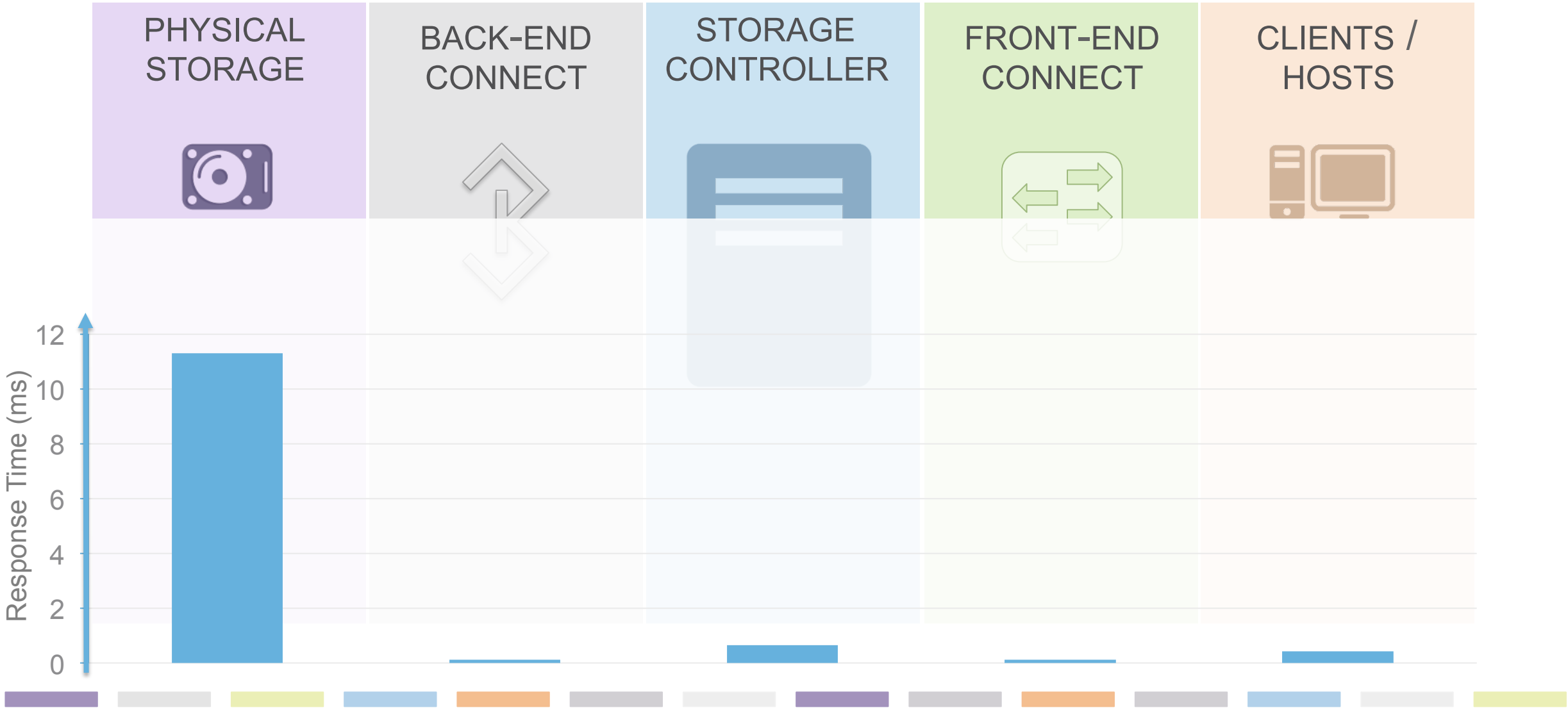


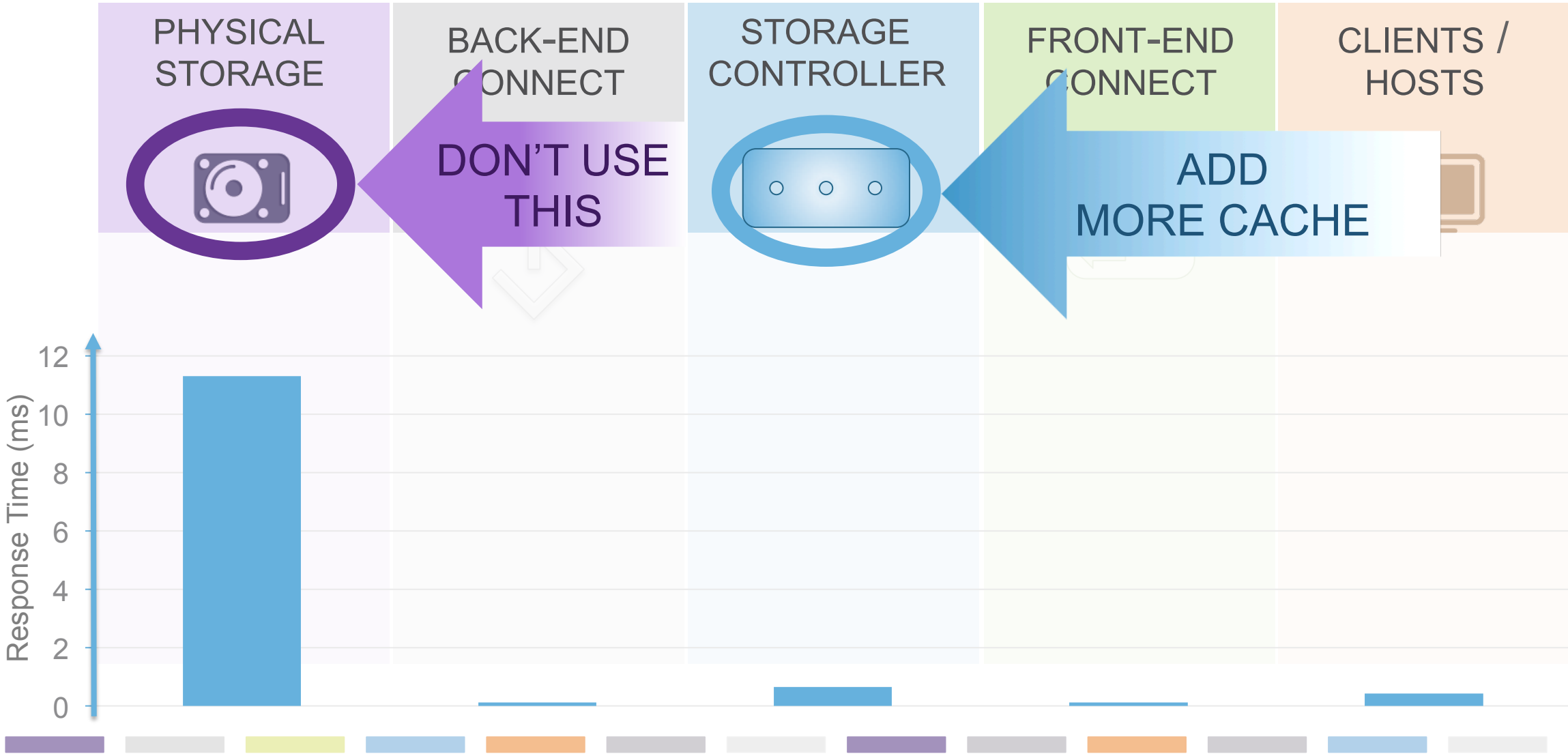

INTRO
SUT
CACHE
MOLE
HERO
MiB/S
END

Back to the Original Problem …

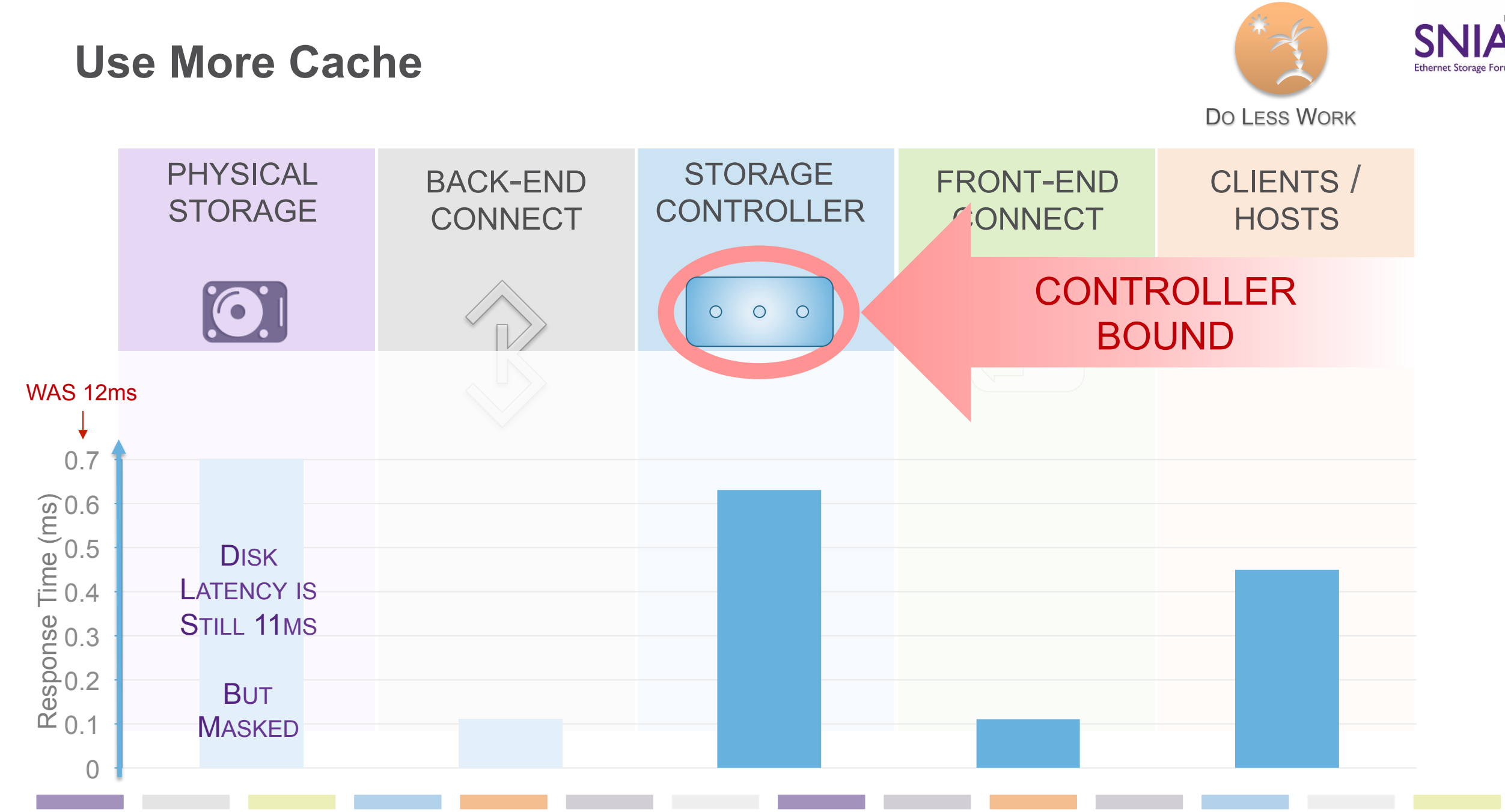


Avoid Slow Parts And Generate “Hero Numbers”

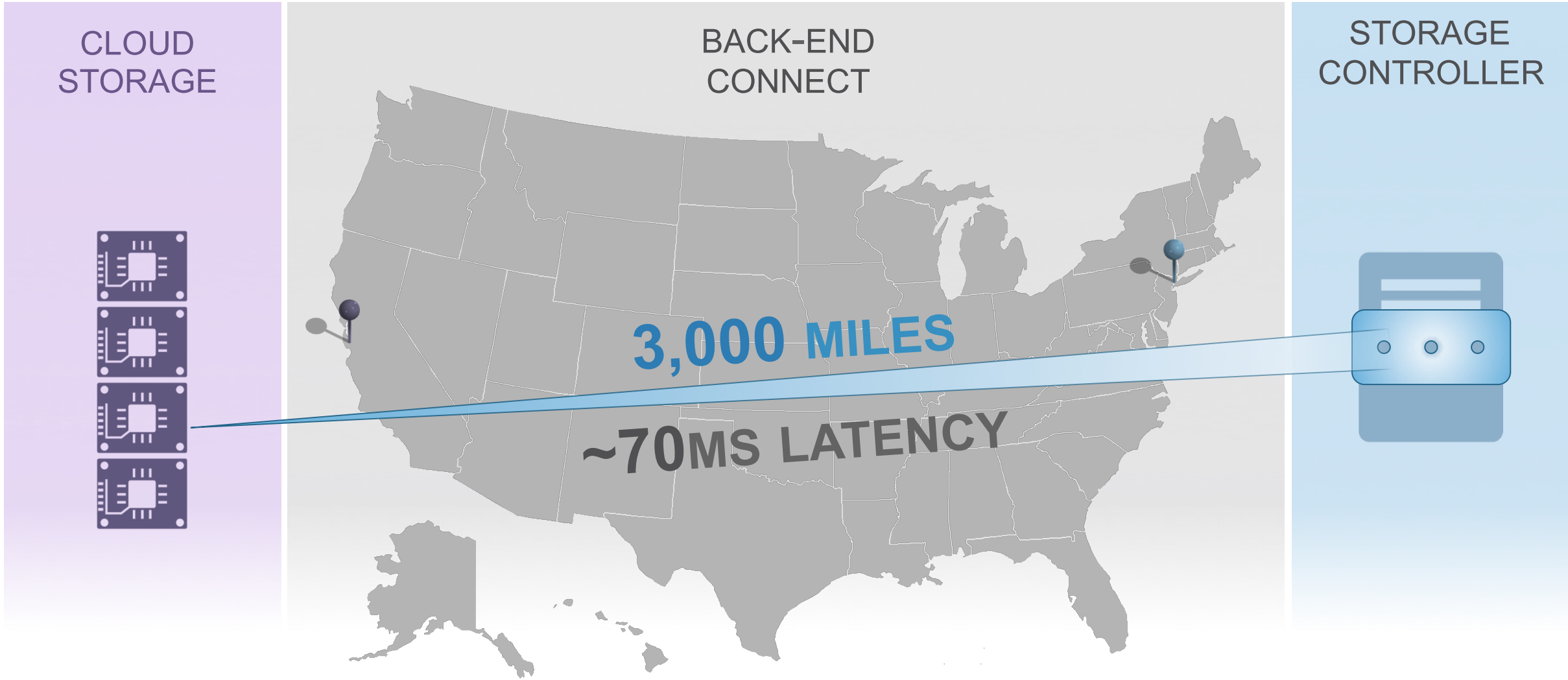
DO LESS WORK



Use More Cache



Caching Isn't Just For Slow Drives



DO LESS WORK

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INTRO
SUT
CACHE
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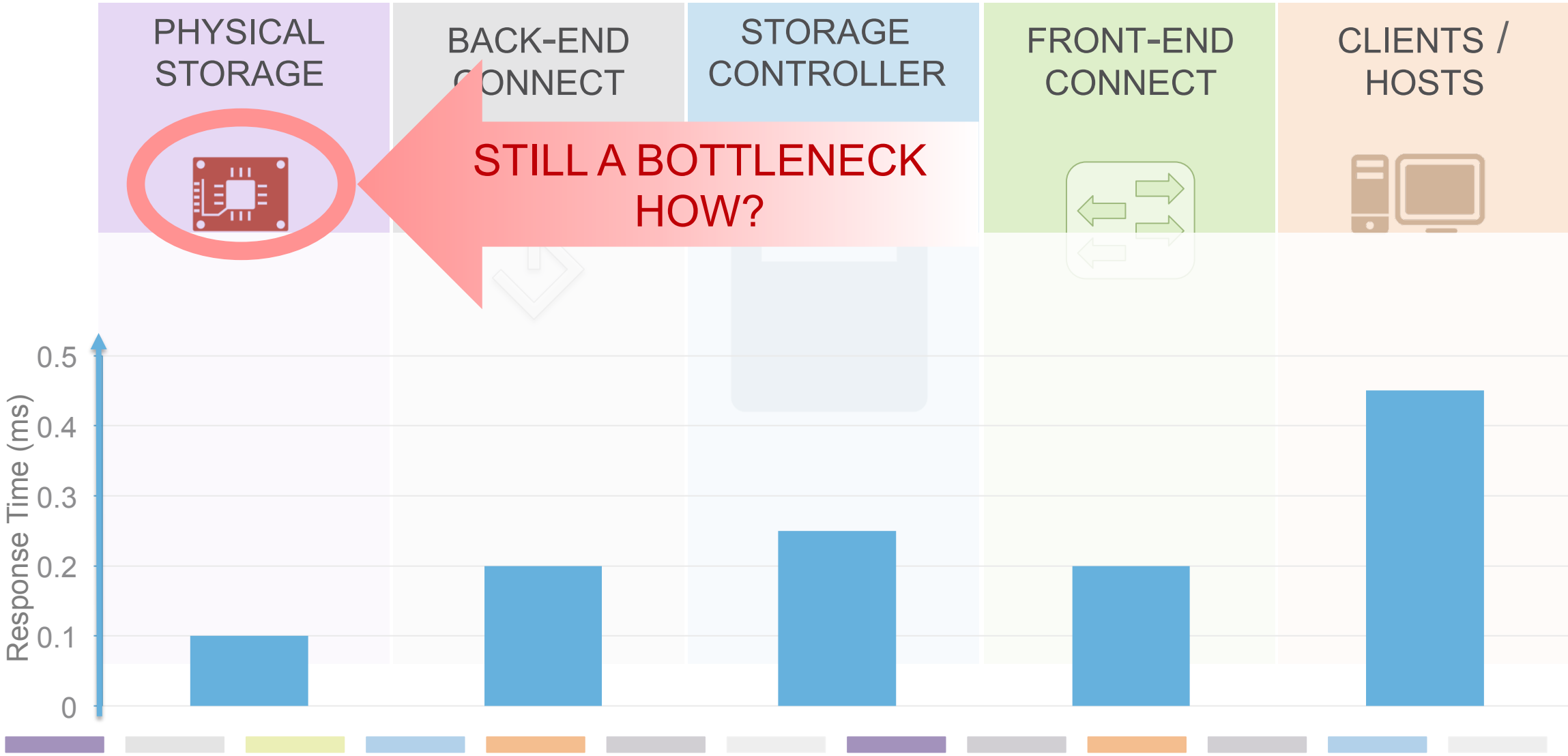
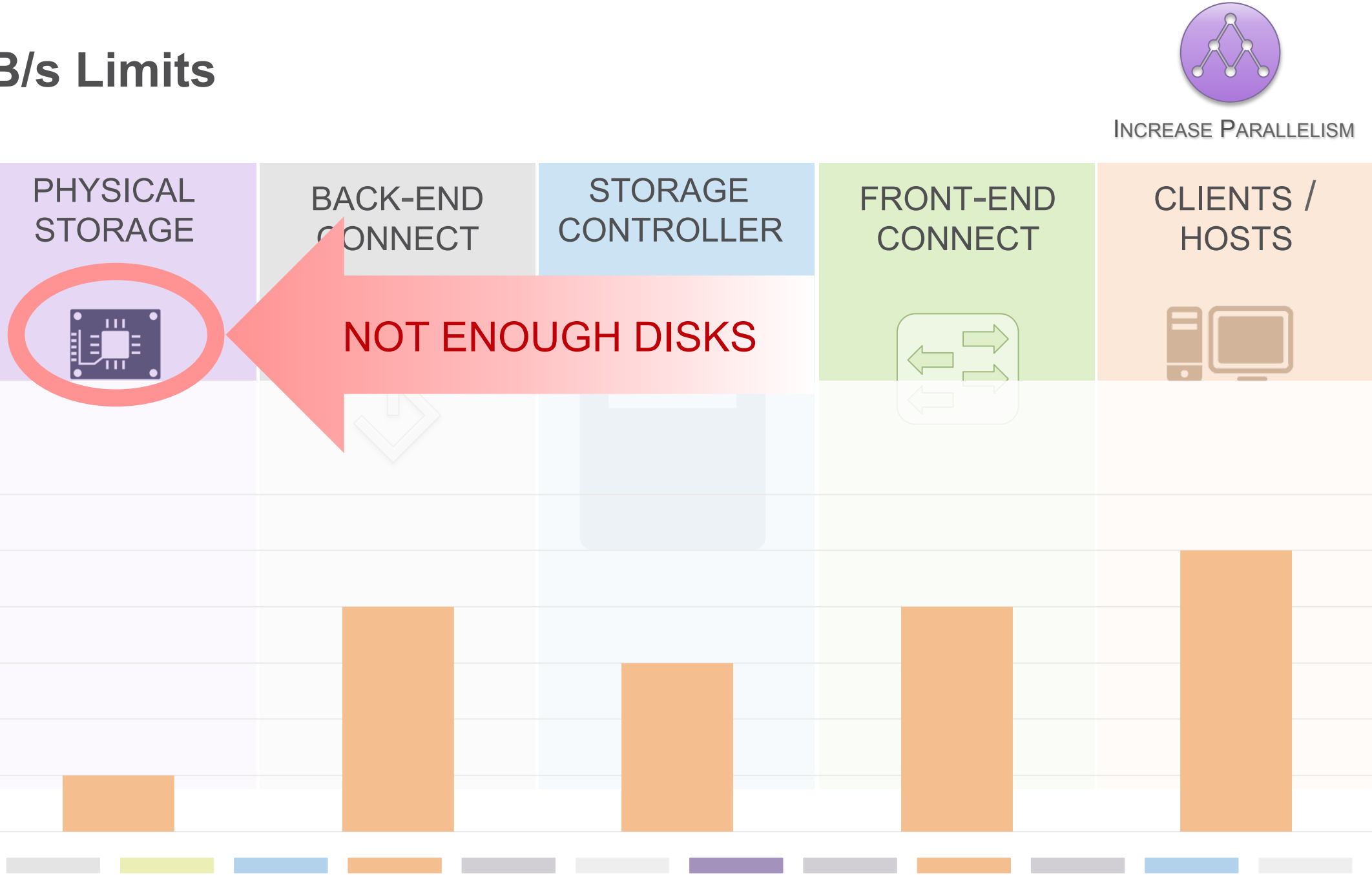
MiB/S
END

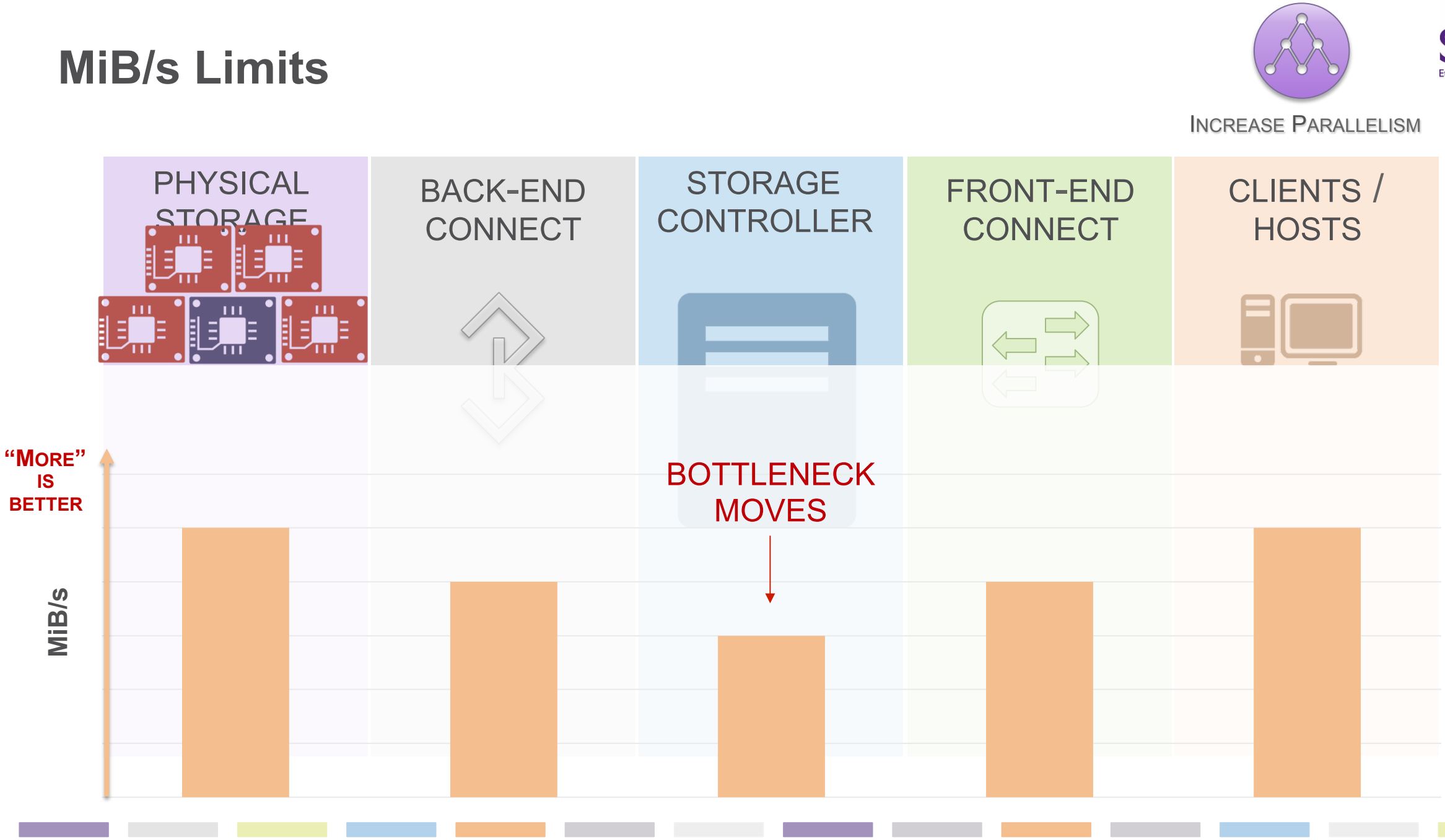
Latency Isn't Everything



MiB/s Limits

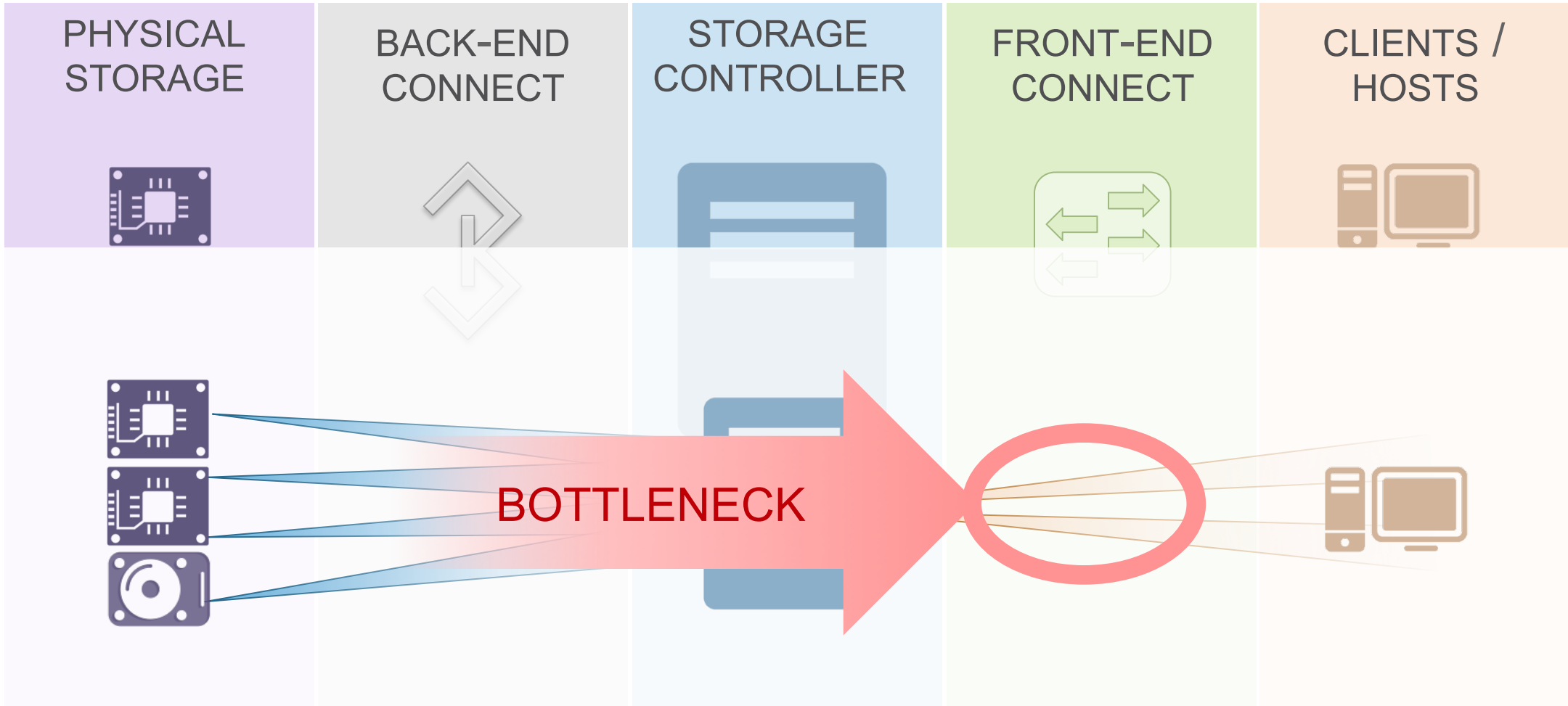


MiB/s Limits



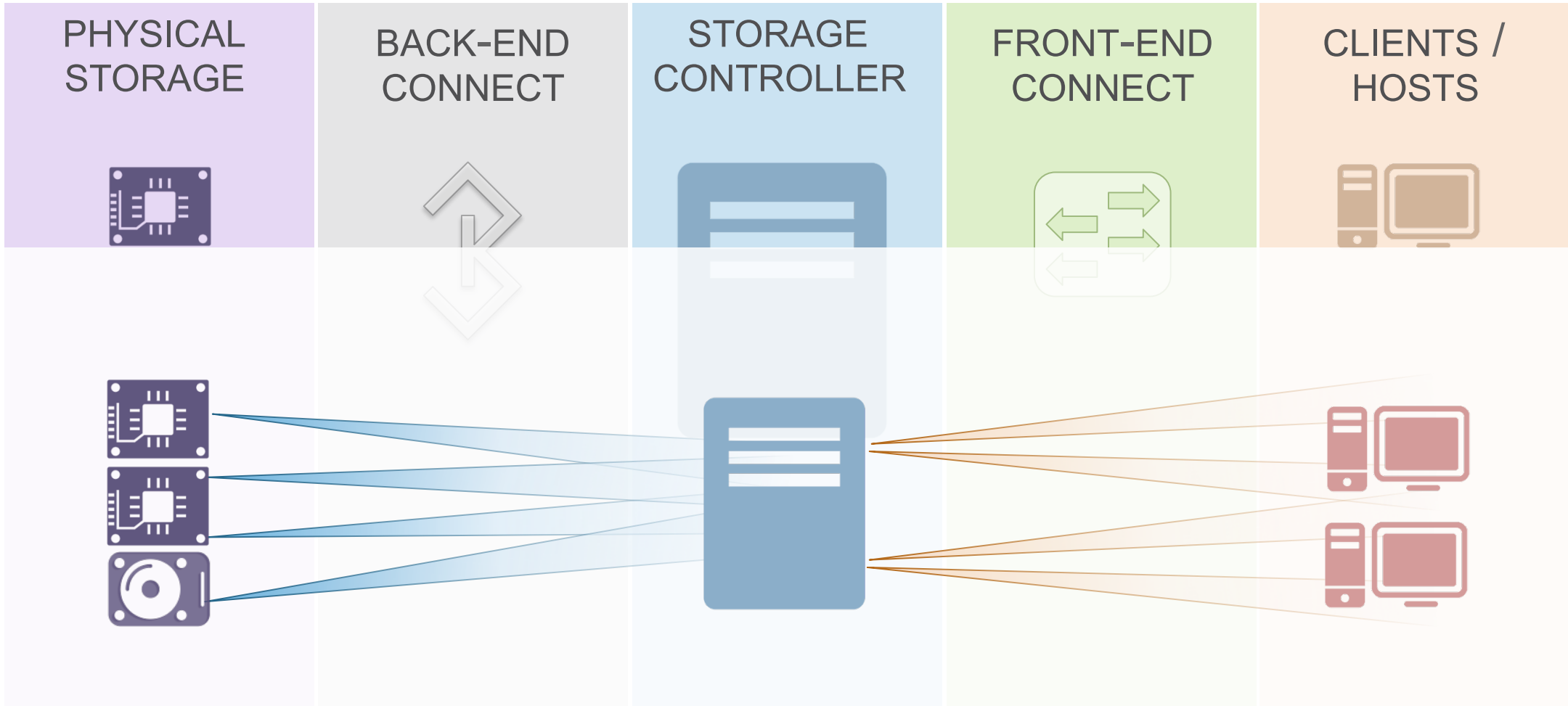
Network Bound Or Design Problem

INCREASE PARALLELISM



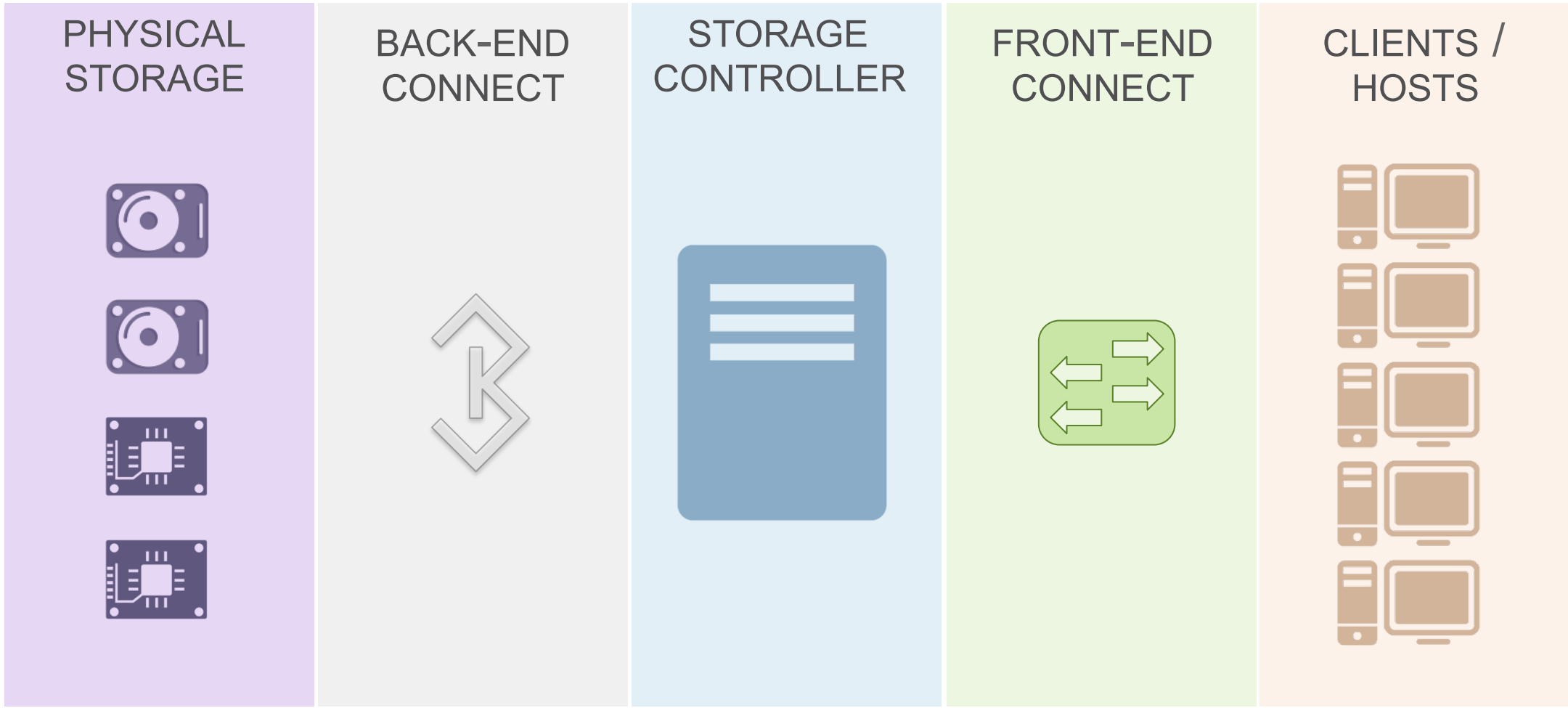
Network Bound Or Design Problem

INCREASE PARALLELISM

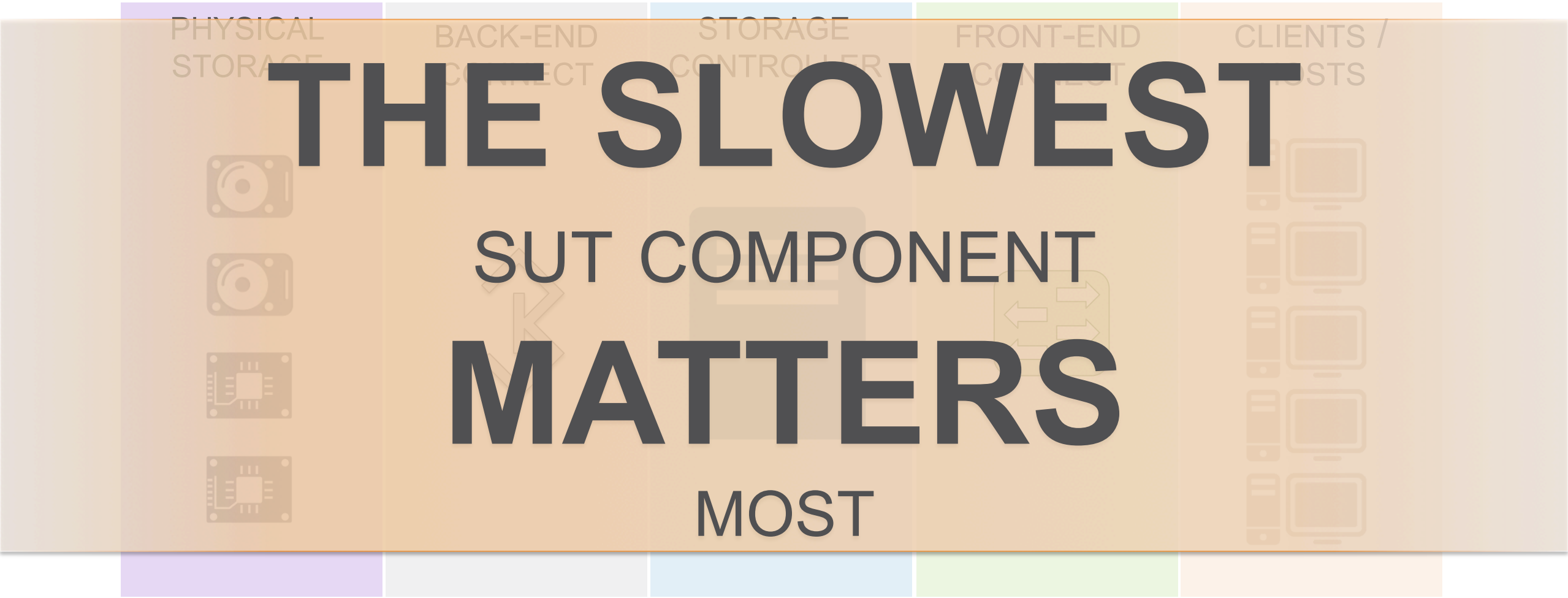



INTRO
SUT
CACHE
MOLE
HERO
MiB/S
END

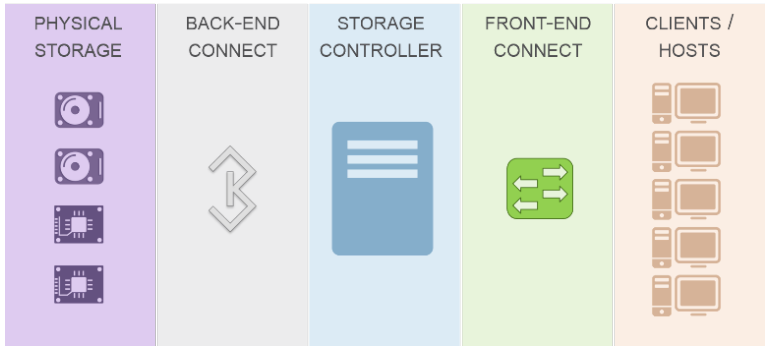
Which SUT Component Matters?



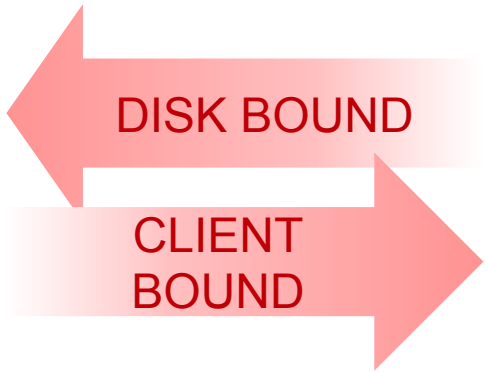
Which Component Matters?



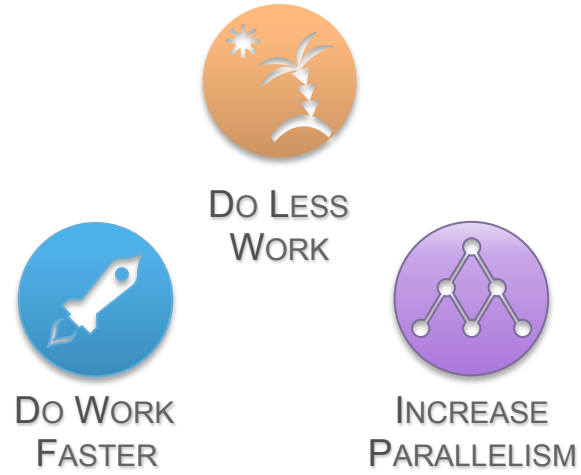
Solution Under Test Review



SLOW COMPONENT MATTERS MOST

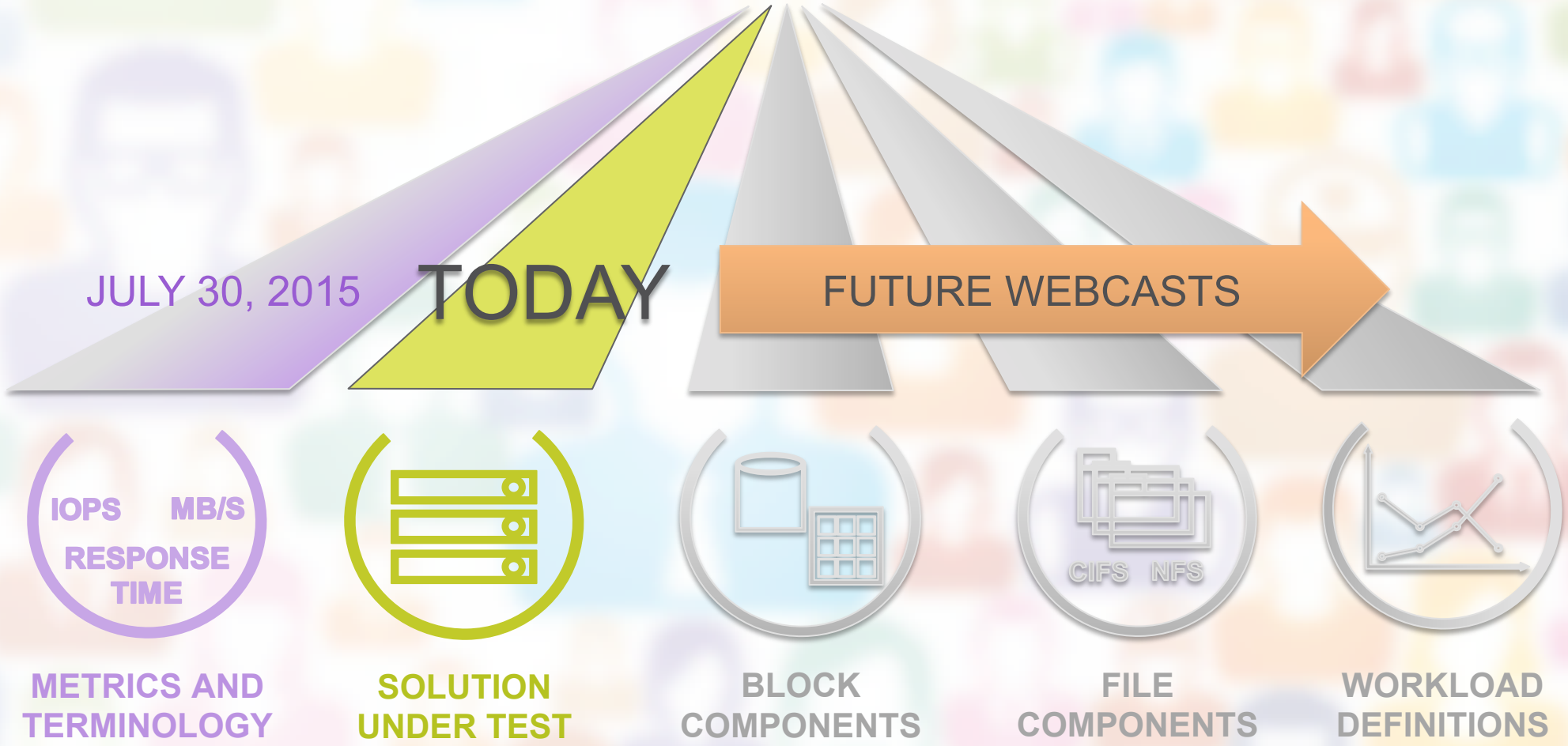


BOTTLENECKS ALWAYS EXIST



3 PERFORMANCE PRINCIPLES

Storage Performance Benchmarking



INTRO > SUT > CACHE > MOLE > HERO > MiB/S > END

After This Webcast

- A PDF and a PPT of the slides for this and all previous parts of this Webcast series will be posted to the SNIA Ethernet Storage Forum (ESF) website and available on-demand
  - PPT and PDF: http://www.snia.org/forums/esf/knowledge/webcasts
  - Storage Performance Benchmarking: Part 1 Recording: https://www.brighttalk.com/webcast/663/164323
- A full Q&A from this webcast, including answers to questions we couldn't get to today, will be posted to the SNIA-ESF blog
  - http://sniaesfblog.org/
- Follow us on Twitter @SNIAESF, @RogovMark, @KenCantrellJr, @DrJMetz
- Next Webcast – First Quarter 2016
  - "Storage Performance Benchmarking: Part 3"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QUESTIONS?

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THANK YOU!