What's Important in Enterprise SSD Performance

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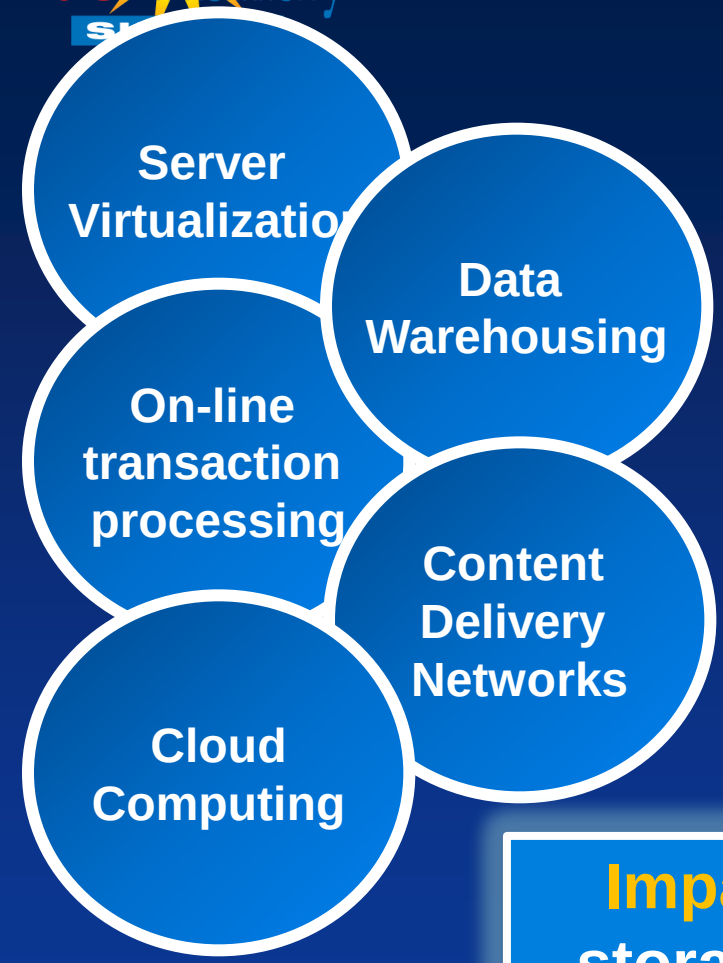
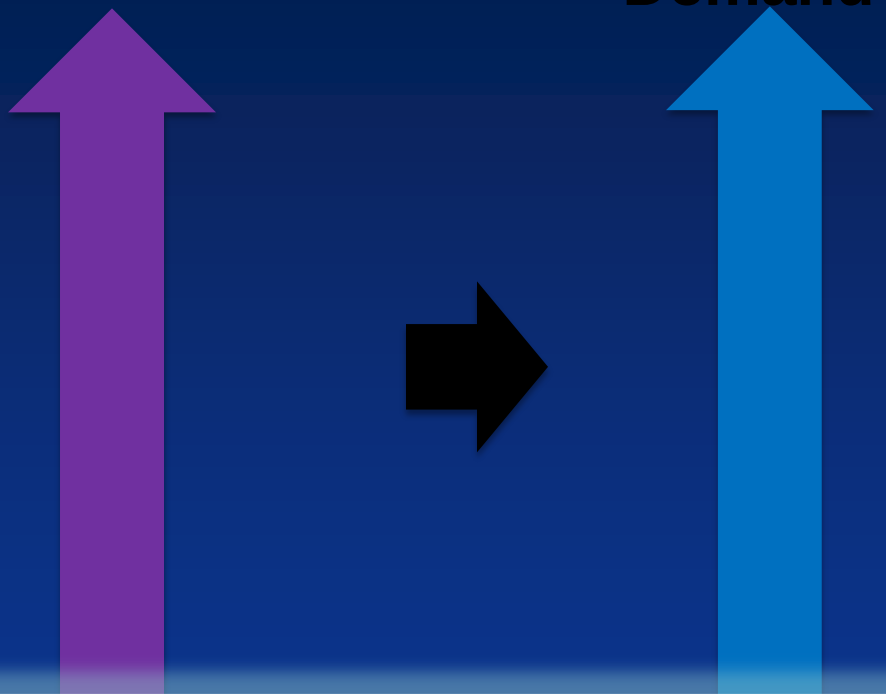
Seagate Technology

Market Trend: Data Growth is Exponential





Impact: SSDs increase the demand for storage – which is good for the industry. SSDs, SSHDs and HDDs will coexist.

What is the Future of Storage?

The Answer is:

SSDs

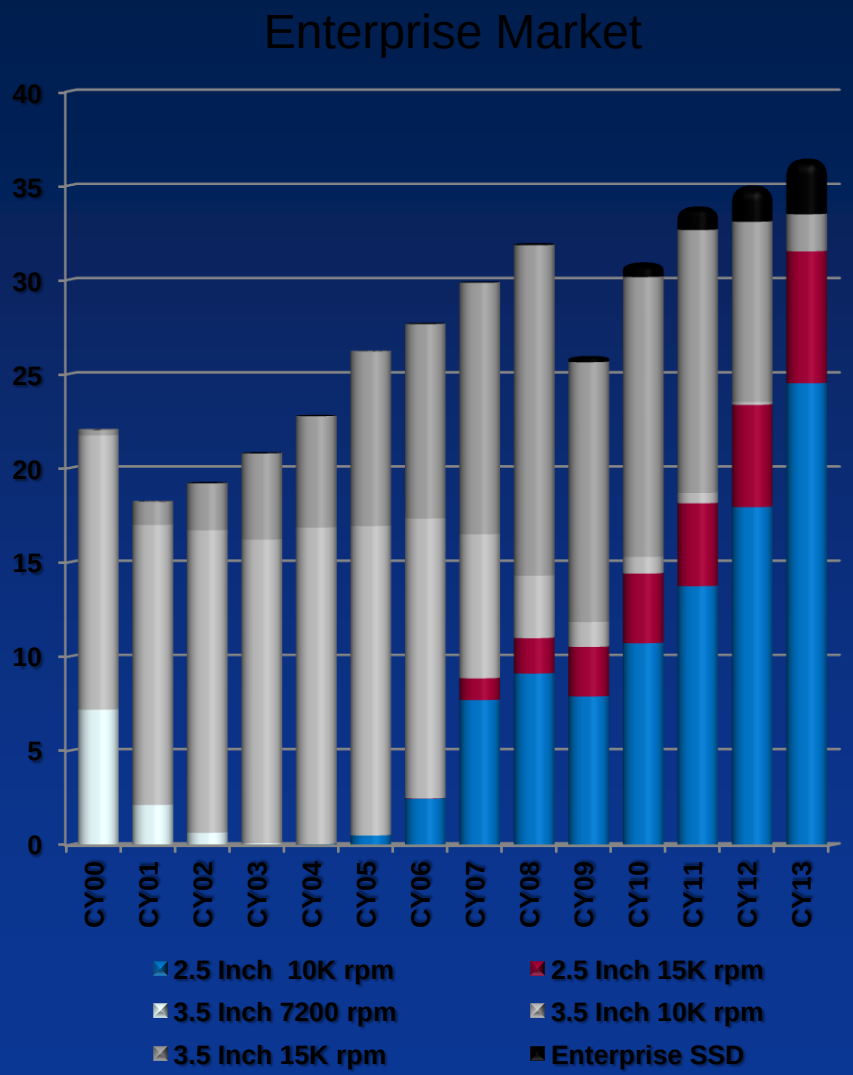
- When high performance is number one. Cost and capacity are distant seconds.

SSHDs

- When you need SSD-performance & HDD capacity at a reasonable price

HDDs

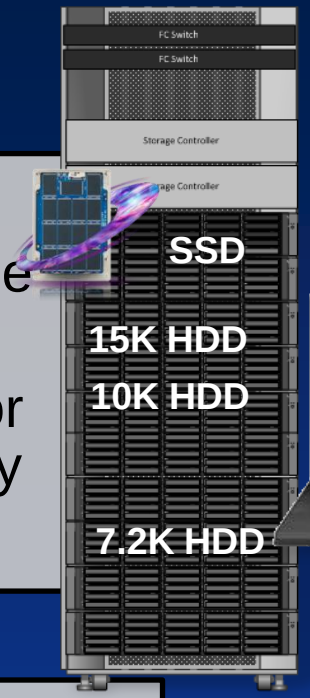
When you need the maximum storage capacity at the lowest cost



Use Cases

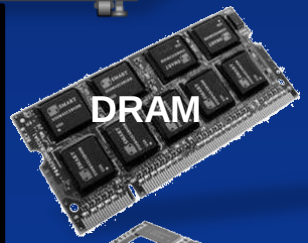
1. Persistent Storage

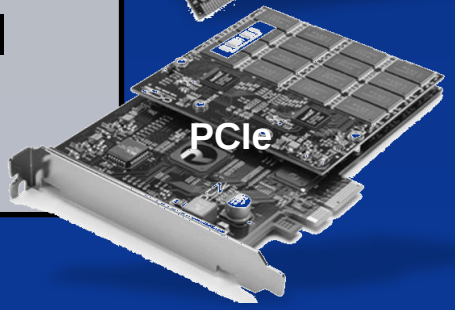
- High performance, low latency tier of storage
- Local disk
- **Primary** copy of data stored on SSD LUN or hybrid (Virtual LUN), traditional data integrity and disaster recovery techniques employed



2. Cache Extension

- L3 cache – Flash cache reduces DRAM requirements
- L3 cache – Flash is aggressively filled with all missed READ cache hits. Data on flash always has original **copy** on HDD





What's Available for Performance Tests Today

- Classic IOPS testing at various transfer sizes
  - SNIA PTS
  - IOMETER
  - Etc
- Application like tests
  - Database
  - Office
- Storage Performance Council
  - SPC-1C

How Useful are These Tests

- Classic IOPS Tests – Limited
  - Difficult to relate tested results to actual workloads that a drive may experience
  - Odd behaviors exist when switching transfer sized and W/R mixes, with wide variations between manufacturers.
- Application like tests – A little better
  - Multiple application streams not accounted for
- Storage Performance Council – Better
  - Used by many OEMs as a gauge for comparison

Speed is Great, but Consistency is Essential

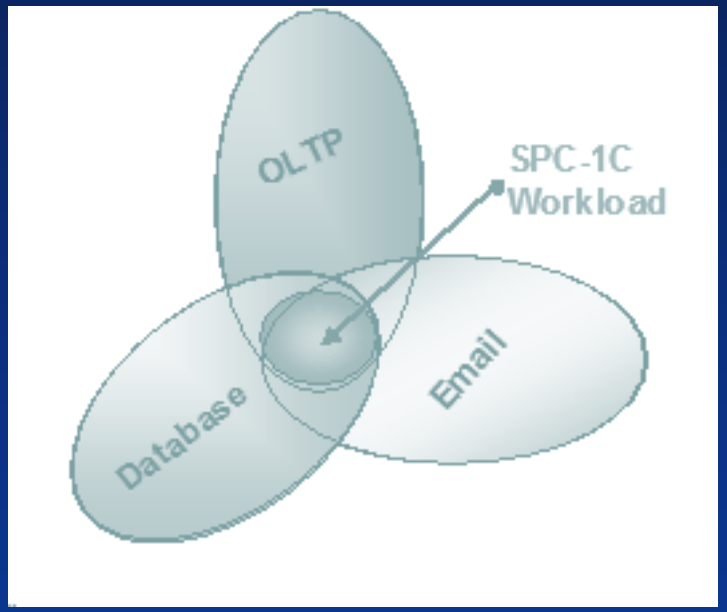
Flash Memory SUMMIT

Storage Performance Council

- **Storage Industry De-facto Performance Benchmark**

  - Proven
  - Sustainable
  - Repeatable
  - Reproducible

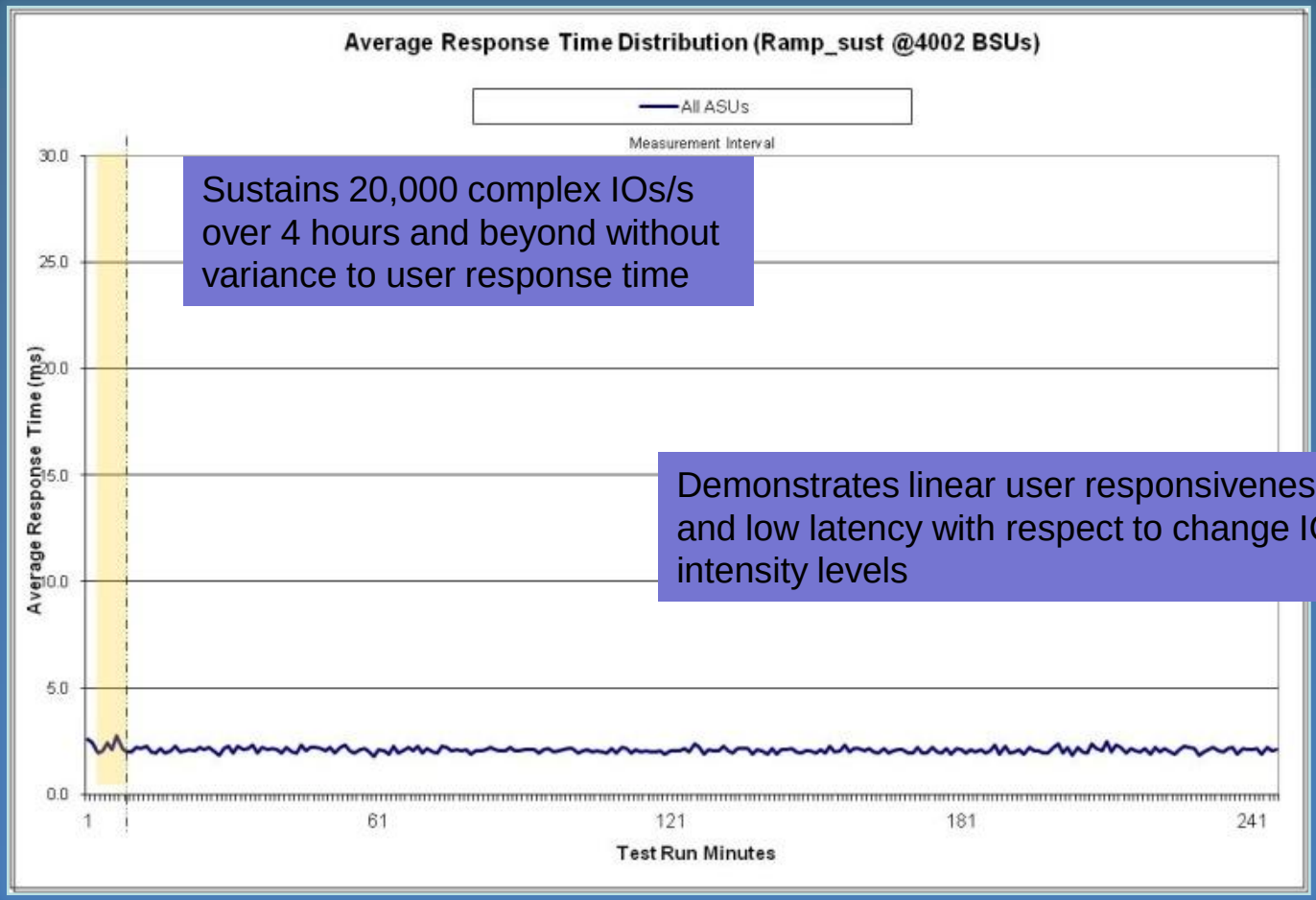
  - Must be audited to publish results for a product



http://www.storageperformance.org

Pulsar XT.2 400GB: SPC-1C Results

Pulsar is designed for complex, mixed, enterprise workloads



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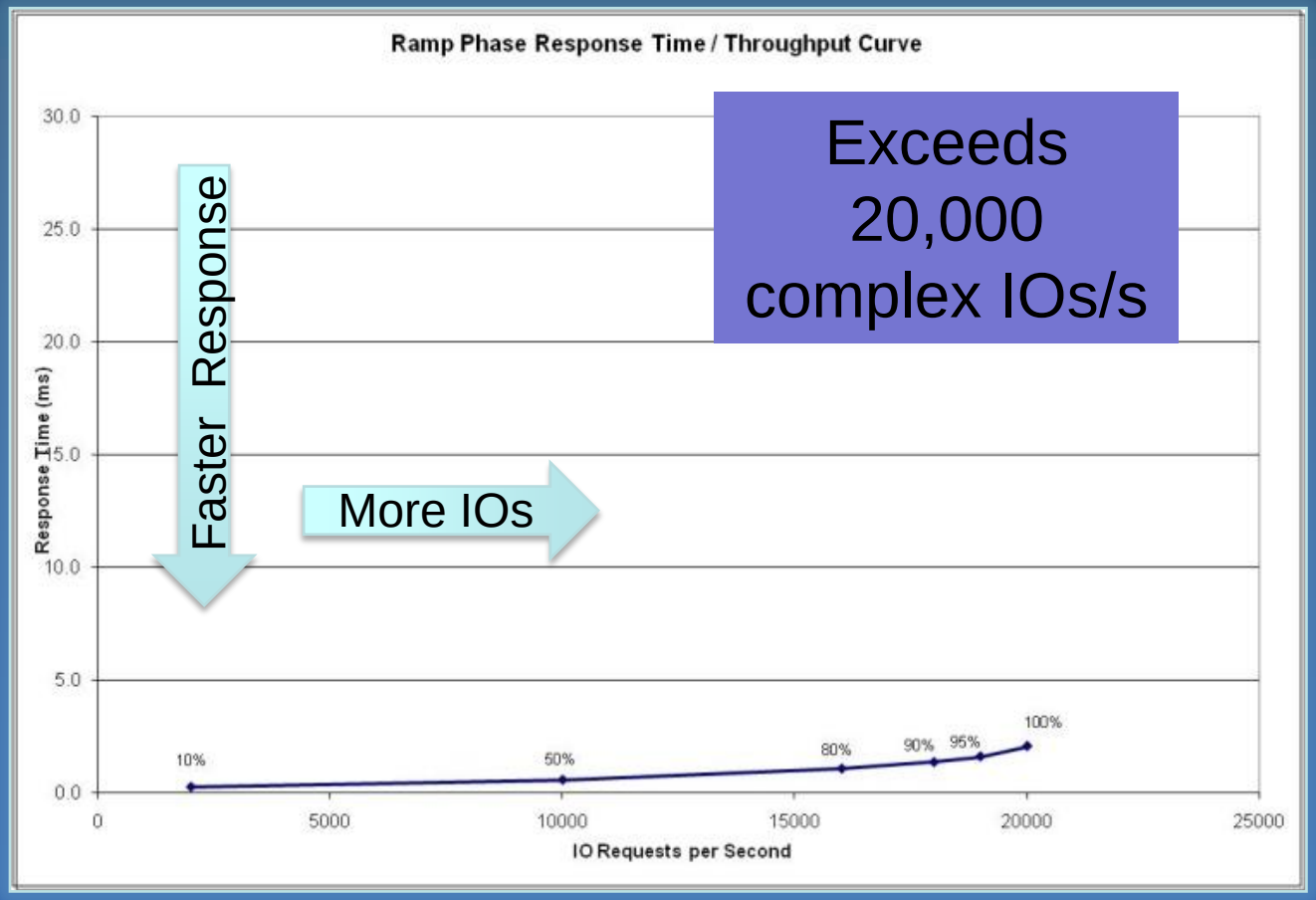

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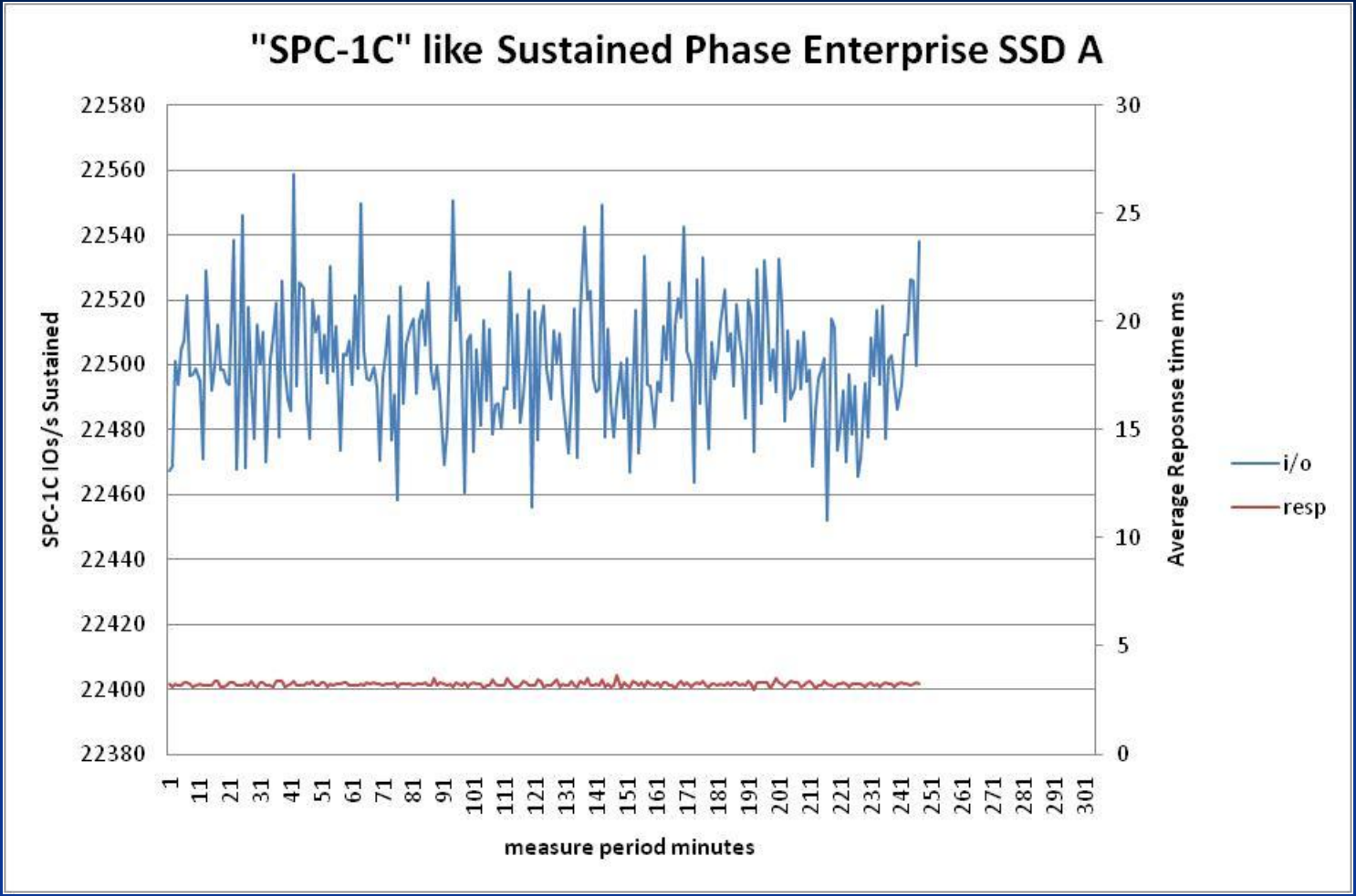
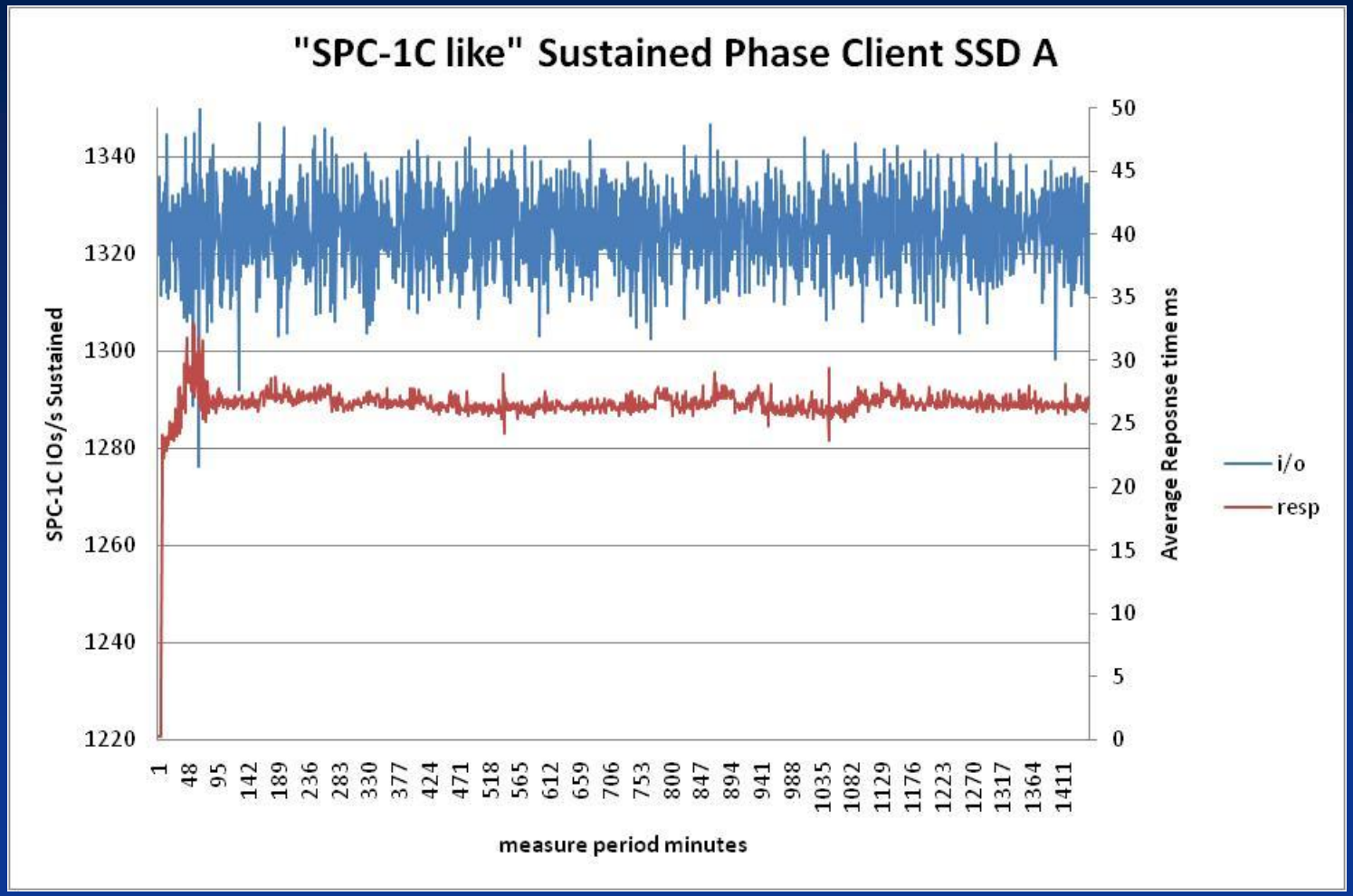
Enterprise Drive A



Client Drive A



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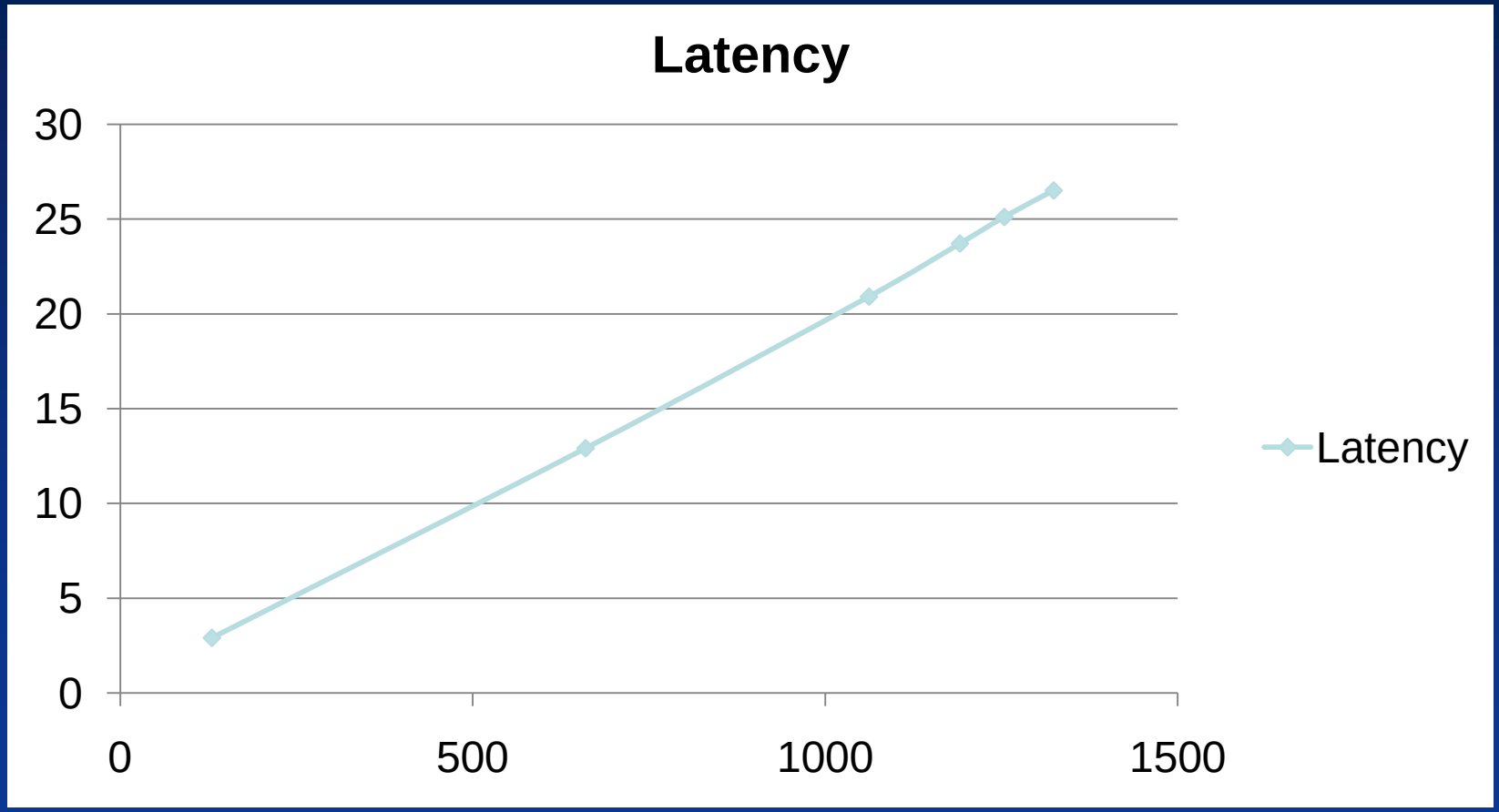
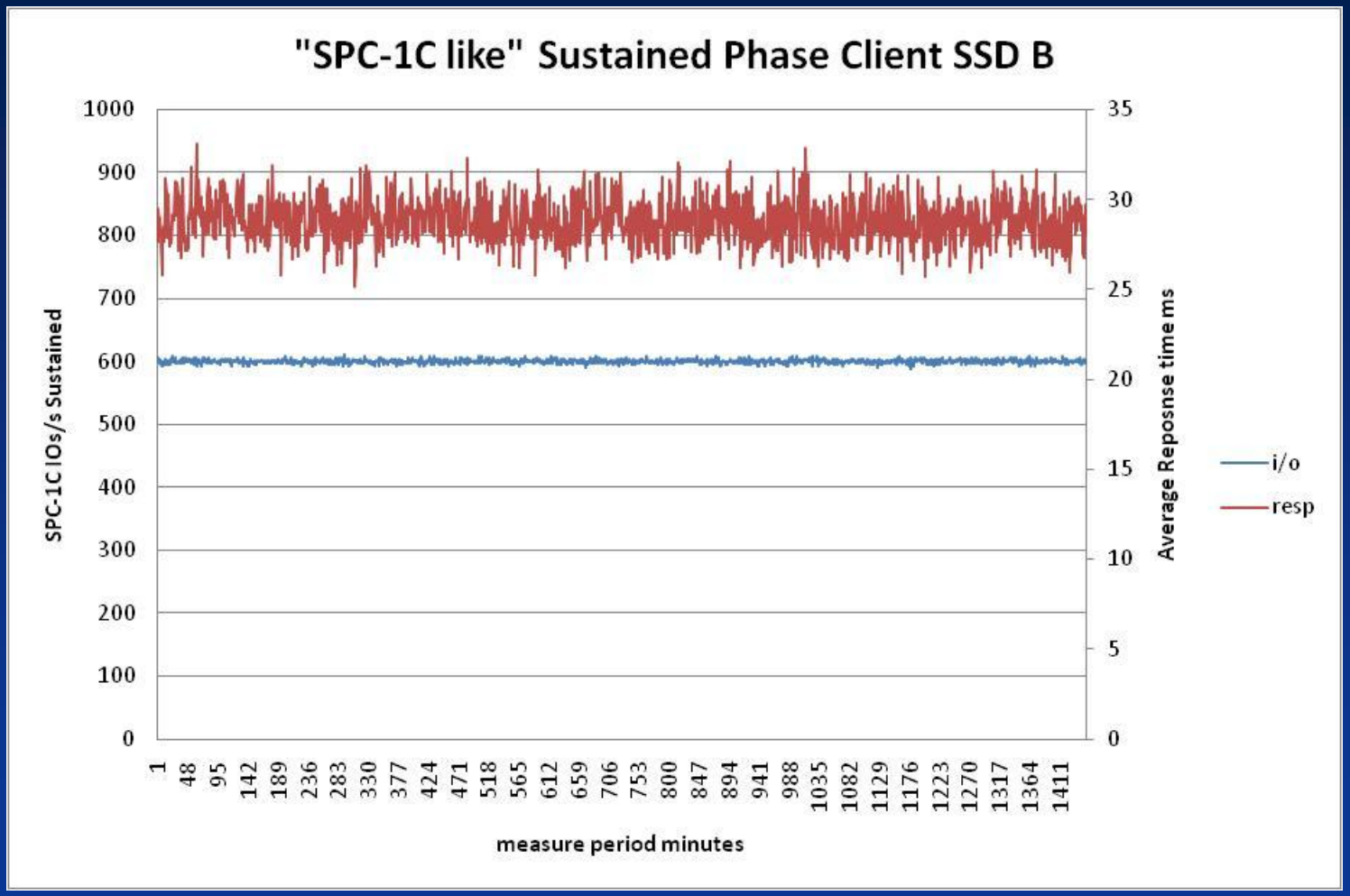


Client Drive B



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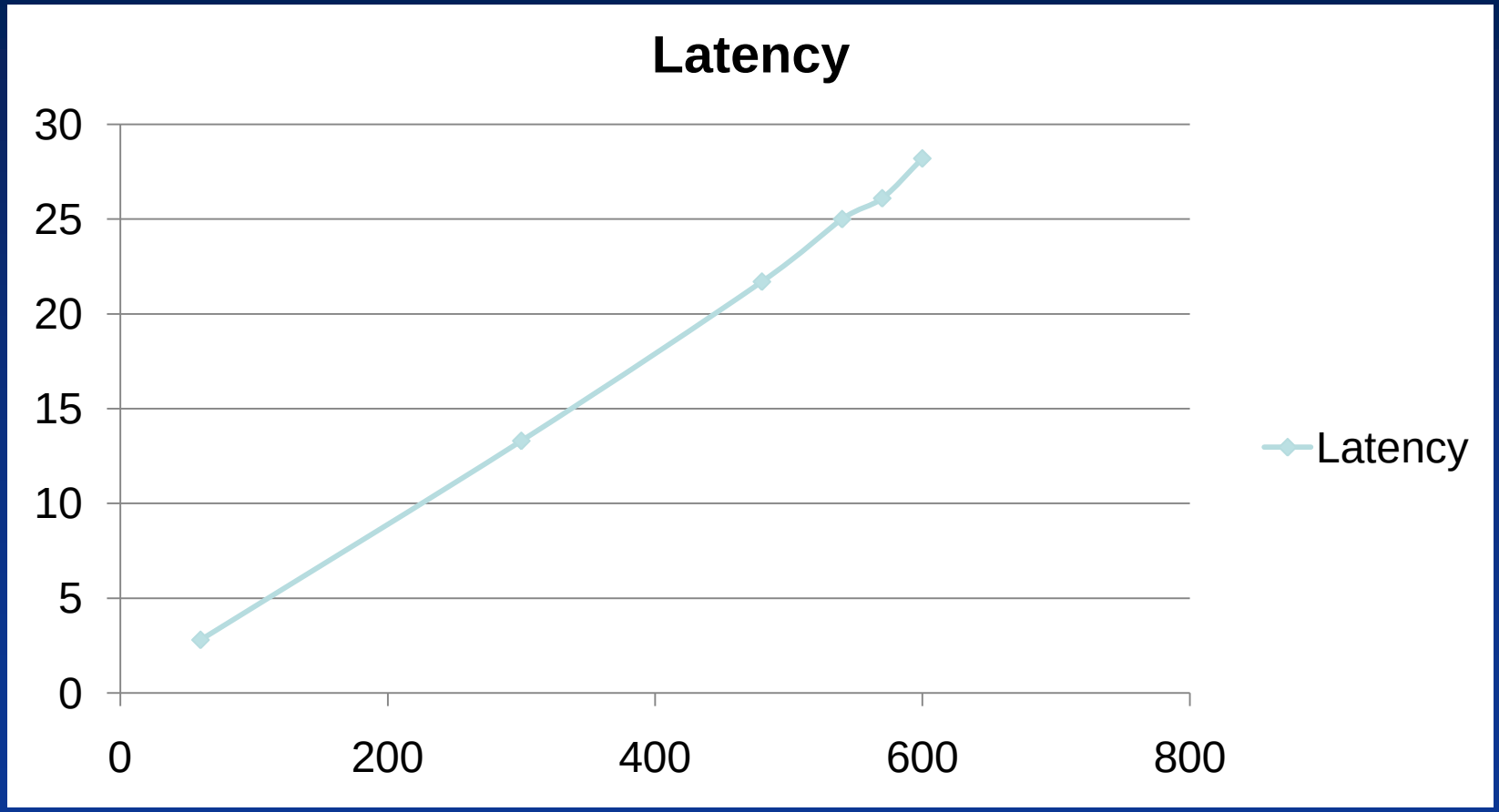
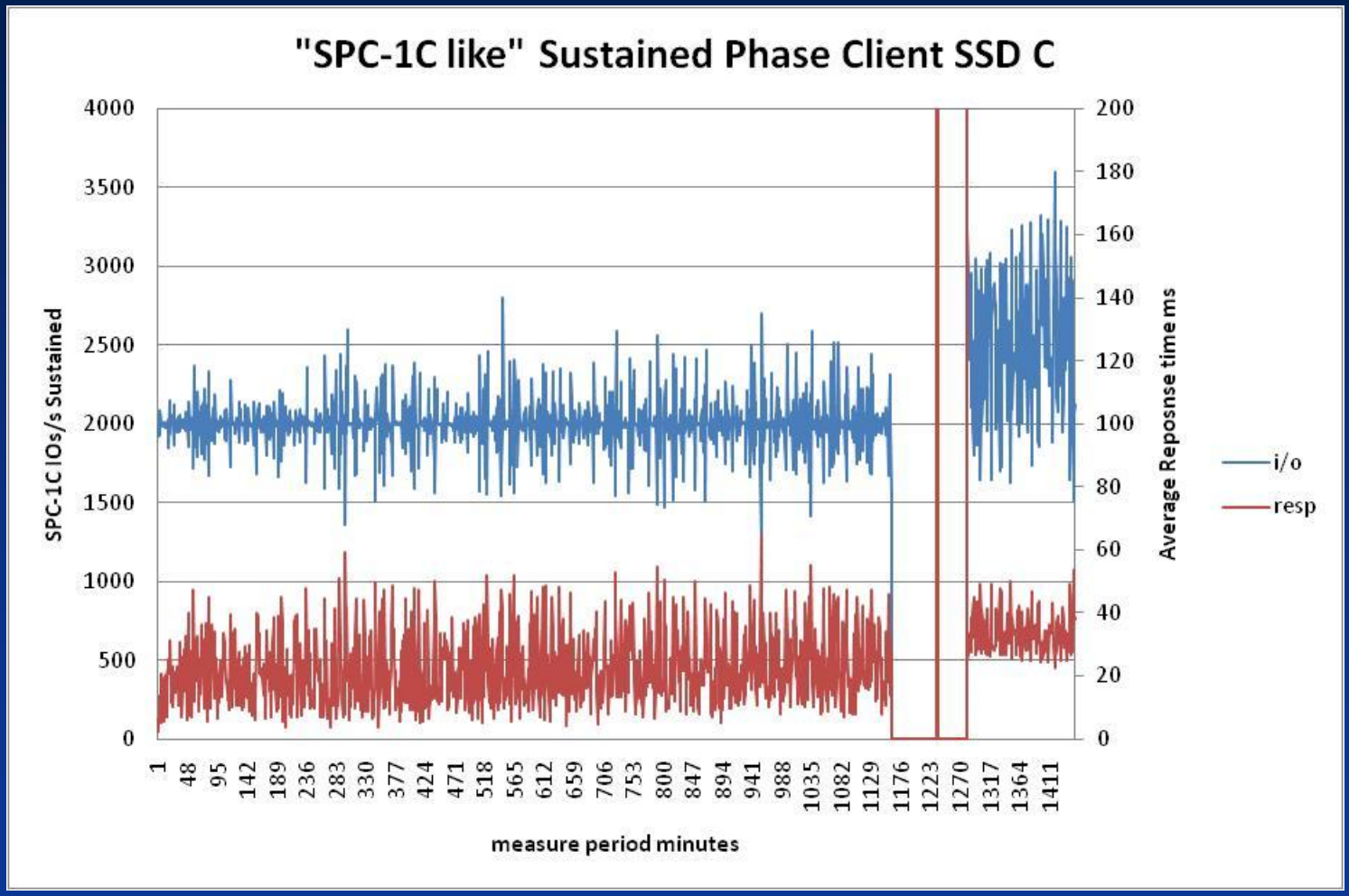
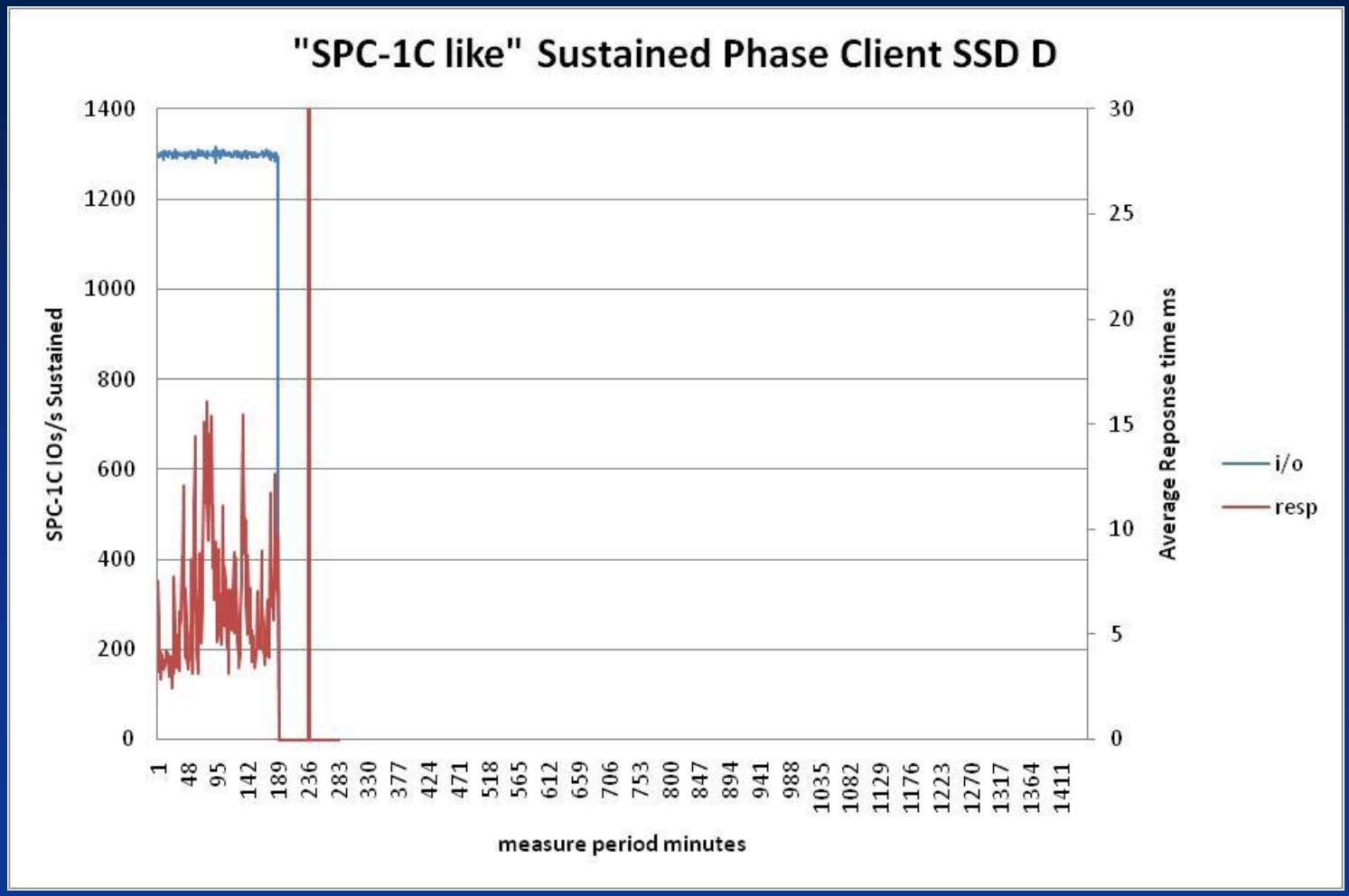


Client Drive C



Client Drive D



Conclusion

- There is no prefect performance test for predicting real world behaviors
- Consistent, predictable levels of performance are a major criteria for the enterprise
- Tests need to be run over extended times
- SPC-1C has gained acceptance as a benchmark for comparing performance for enterprise application