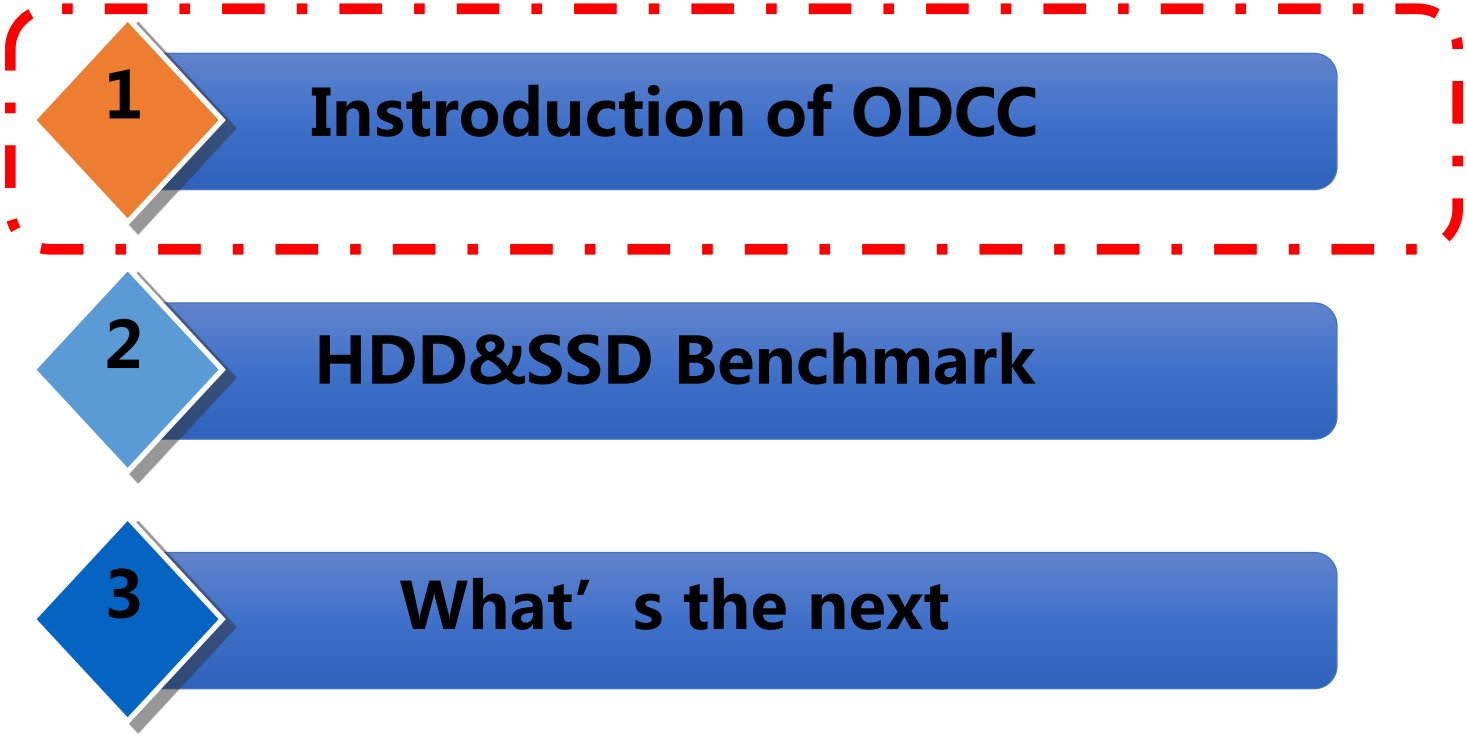
SPEC 2016亚洲峰会
SPEC 2016 ASIA SUMMIT

HDD&SSD Benchmark in China

Guo Liang

Test&Certify Working Group，ODCC



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ODCC:Open DataCenter Committee

Purpose

- **To promote the standard of server, data centers and other industries unified specification**
- **To create an active, efficient and international competitiveness of the ecological circle and open platform**
- **To promote industrial cooperation, innovation and new technology applications**

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Organization Structure

Secretariat | **BOARD** | **Consultant**

Server WG

- Scorpio Rack server 2.0
- Scorpio Rack Server 3.0
- Scorpio Multi-node server

Datacenter WG

- Module Data Center
- Power module of IDC
- Monitoring module of IDC
- Site selection white paper
- Model of operation and maintenance maturity

Network WG

- AOC cable
- Data center optical module
- TOR 25G switch
- Network operation and monitoring system
- Virtual switch
- SDN controller

Test&Certify WG

- Scorpio rack server
- Module data center
- Scorpio multi node server
- **Enterprise Disk Benchmark**
- AOC

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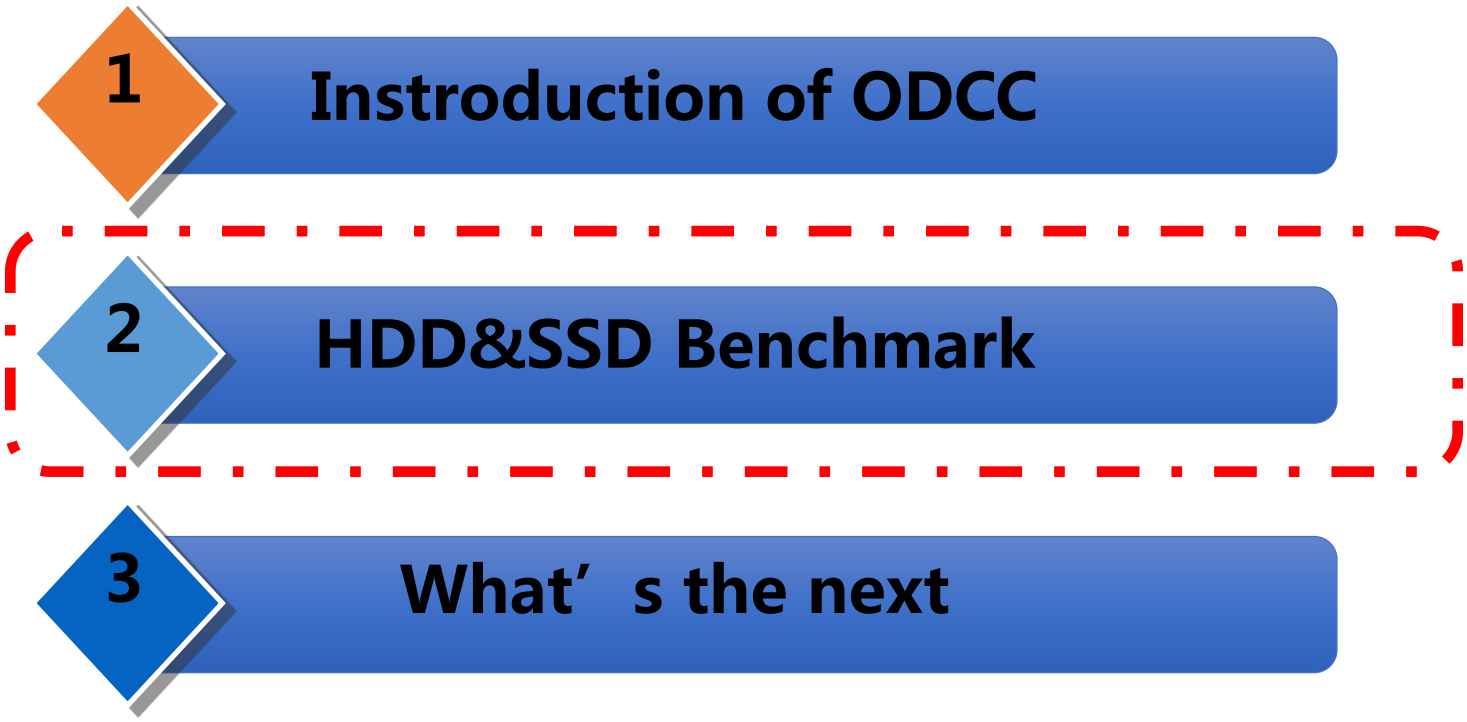
ODCC 2016 Summit

人民邮电报	机房360	通信世界网	众视网	IT168
CNII中国信息产业网	集微网-老查吧	网易新闻	TechTarget中国	Watchstor
C114中国通信网	金融界	物联中国	D电科技	天极
新华网	贸讯网	移动信息化	至顶网	太平洋
Pchome	企业网	现代数据中心网	51CTO	比特网
DOIT	泰尔网	CIO时代	CSDN	中国信息化周报
慧聪网	通信产业网	中国信息主管网	电脑商情网	中国计算机报



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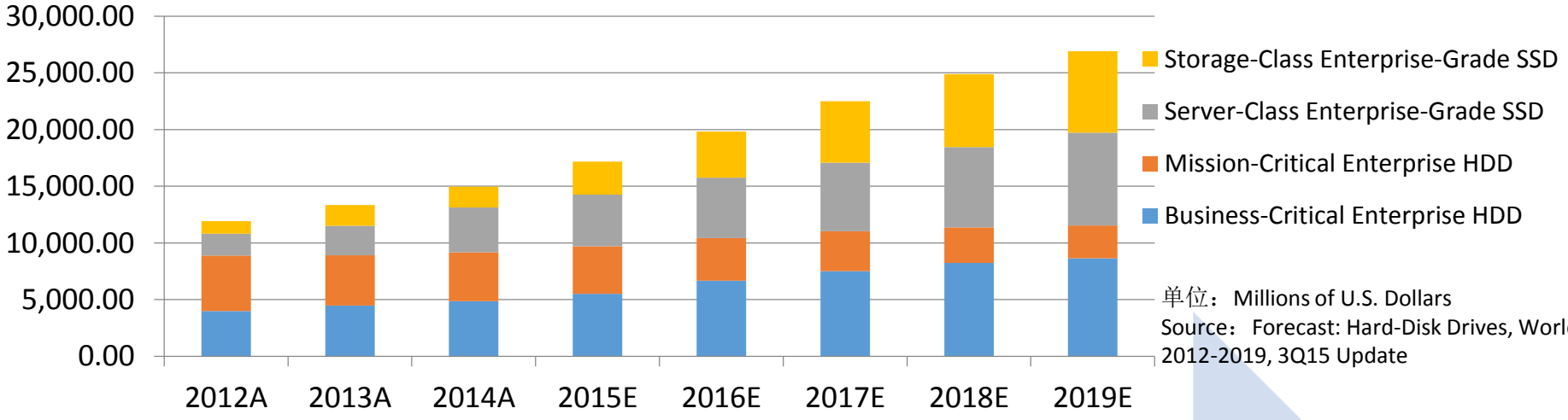
Benchmark Schedule



单位：Millions of U.S. Dollars

Source：Forecast: Hard-Disk Drives, Worldwide, 2012-2019, 3Q15 Update

2016 Feb , Launched

March , 2nd/3rd

April , 4th/5th

May , 6th /7th

June-Augest , Implement

Sep 27th , Release on ODCC summit

Participating Units ：

Alibaba Tencent Baidu China-Telecom China-Mobile China-Unicom CAICT Intel Samsung Seagate Toshiba Lite-On WD Lenovo Inspur IBM Huawei ZTE H3C Sugon

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Benchmark Primary Coverage

No.	content	purpose
1	Performance test	➢IOPS ➢Throughput ➢Long time write （SSD only） ➢Cross Long time write （SSD only ）
2	Stability test	➢48hours ➢Copy and Compare ➢Temperature test ➢Air pressure environment
3	Compatibility test	➢Windows Compatibility ➢Linux Compatibility
4	Power test	➢Power on test（HDD only） ➢Power test under load ➢Energy efficiency test

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Practice of HDD Benchmark

lenovo联想

No.	Content	Test bed
1	Server name	ThinkServer RD450X
2	Os	Redhat Enterprise Linux Server release 7.0 (Maipo)
3	Software	Fio-2.2.12
4	CPU	Intel(R) Xeon(R) CPU E5-2690 v4 @ 2.60GHz 55核
5	Memory	32G
6	Mainboard	R450X MB(Rev 1.3)
7	Other software	Hdparm/Smartctl
8	BIOS version	R450X206
9	Network card	Intel Corporation I350 Gigabit Network Connection(rev 01)

TOSHIBA SEAGATE

No.	Content	6T	8T	10T
1	Vendor	Toshiba	Seagate	Seagate
2	Model	MG04ACA600E	ST8000NM0055	ST10000NM0086
3	Capacity	6000GB	8000GB	10TB
4	Interface and rate	SATA 3.1/ 6.0Gbps	SATA 3.1/ 6.0Gbps	SATA 3.1/ 6.0Gbps

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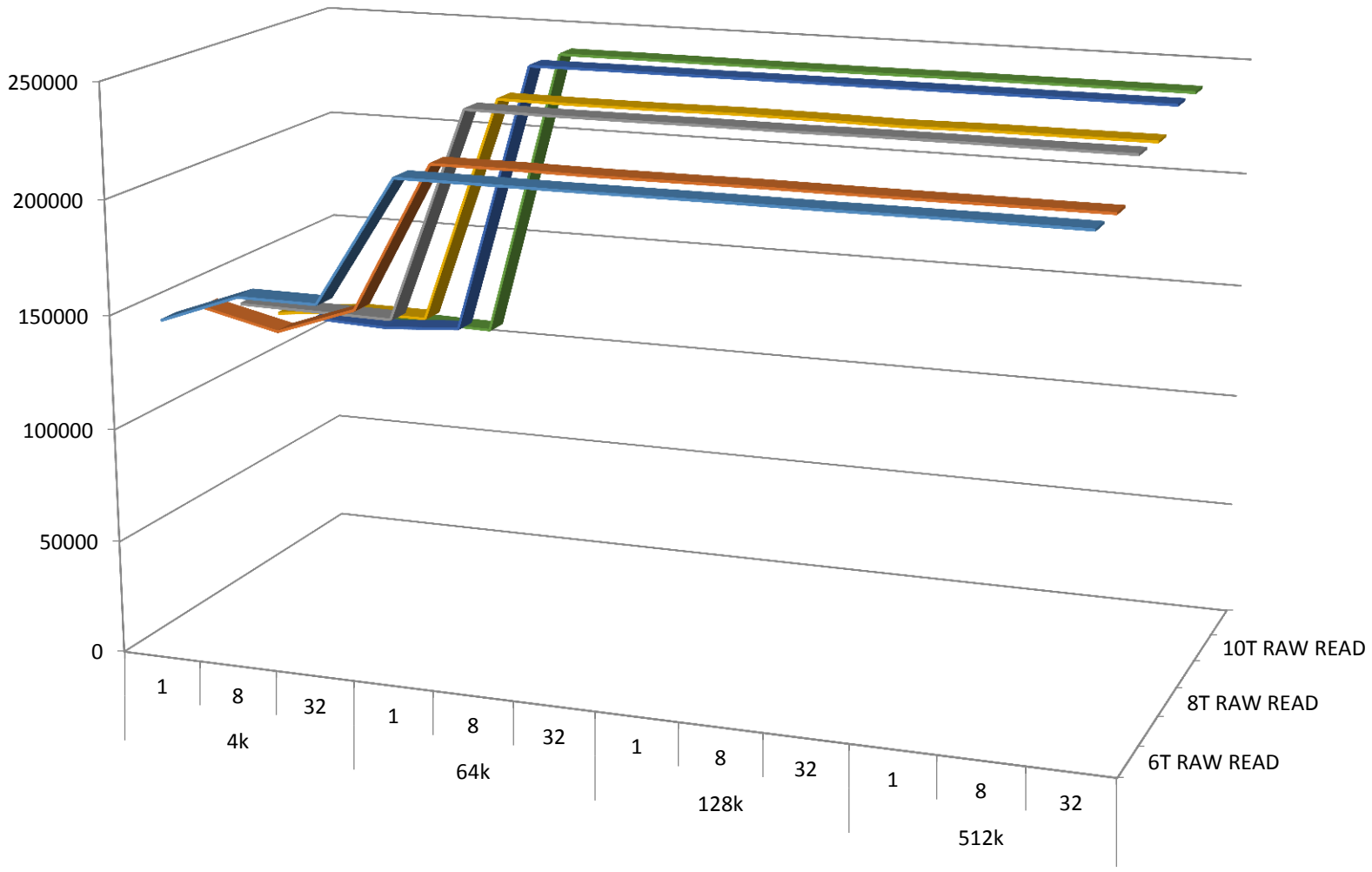
Throughput of HDD



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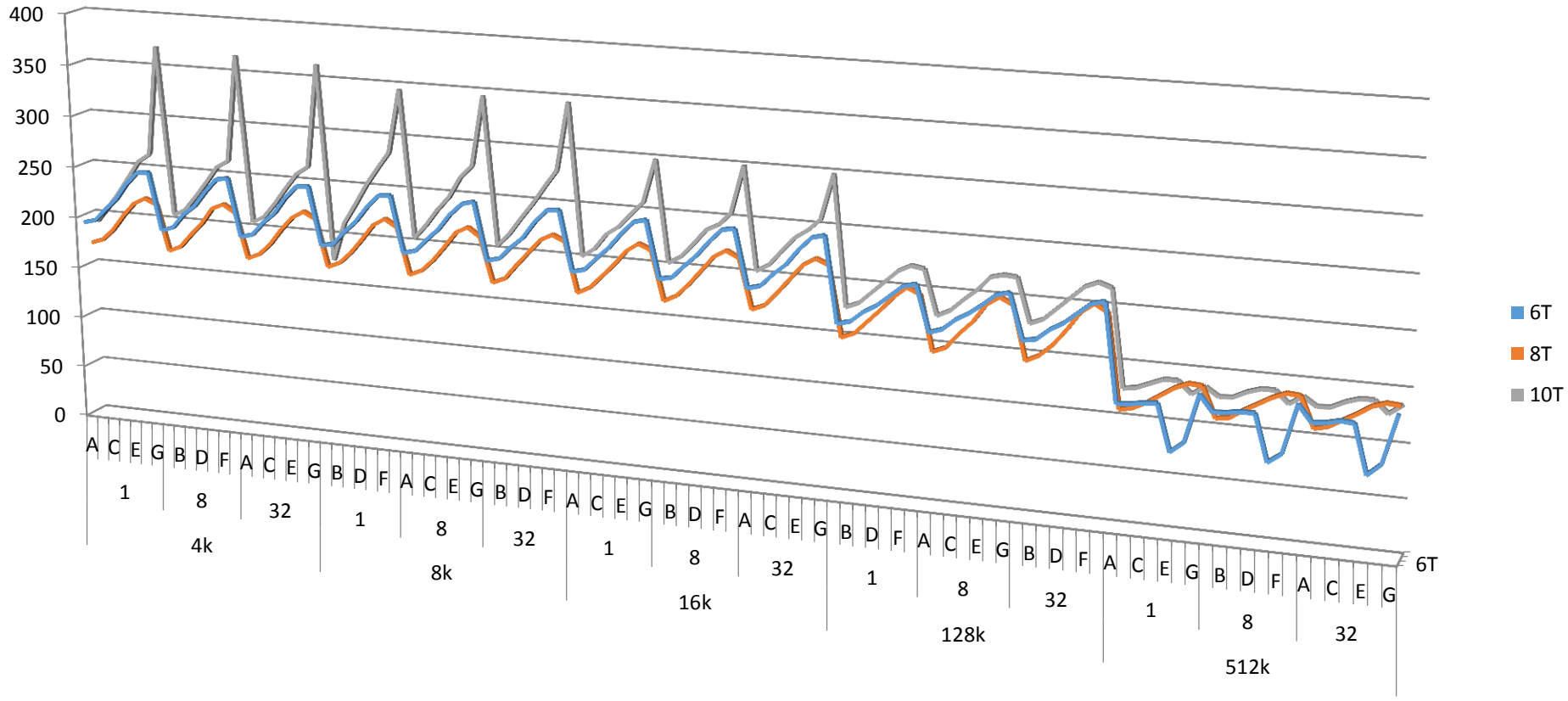
IOPS of HDD



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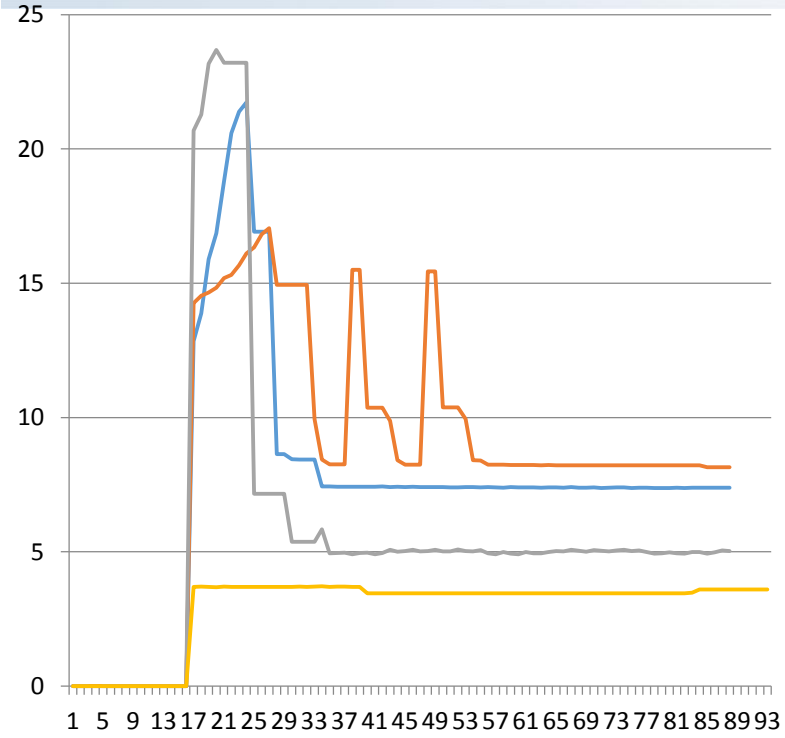
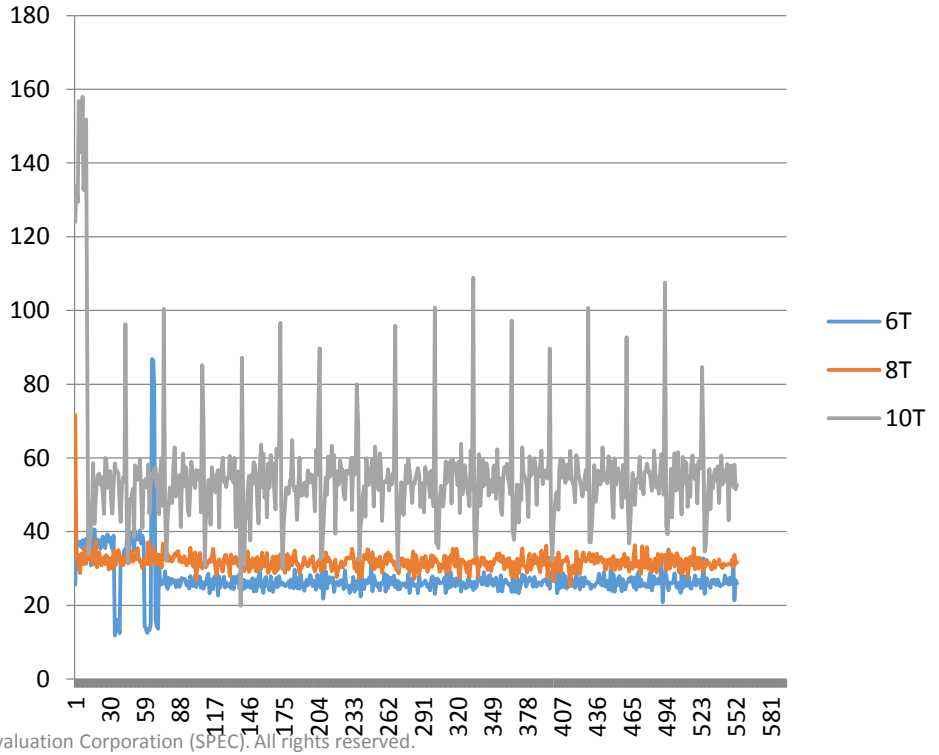
Power of HDD



- HDD boot power ranging from 17-23w;
- SSD no power on burst



- 10T average power consumption 5.85w; 8T average power consumption 9.23w; 6T average power consumption 9.97w
- 10T energy efficiency is larger

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Practice of SSD Benchmark

SAMSUNG TOSHIBA LITEON

No.	Content	Product Information					
1	Verdor	Samsung	Samsung	Samsung	Samsung	Toshiba	Liteon
2	Model	PM863a	PM1633	PM1725	PM963	THNSN81Q92CSE	EP2-KP960
3	Size	2.5	2.5	2.5	2.5	2.5	M.2
4	Capacity	3.84TB	1.6TB	1.6TB	1.92TB	1.92TB	960GB
5	Interface and rate	SATA 3.1/ 6.0Gbps	SAS 12Gbps	PCIE3.0 x4 32Gbps	PCIE3.0 x4 32Gbps	SATA 3.1/ 6.0Gbps	M.2 PCIE3.0 x4 32Gbps
6	NAND type	3D V3 TLC	3D V3 TLC	3D V2 TLC	3D V3 TLC	15nm MLC	15 nm MLC

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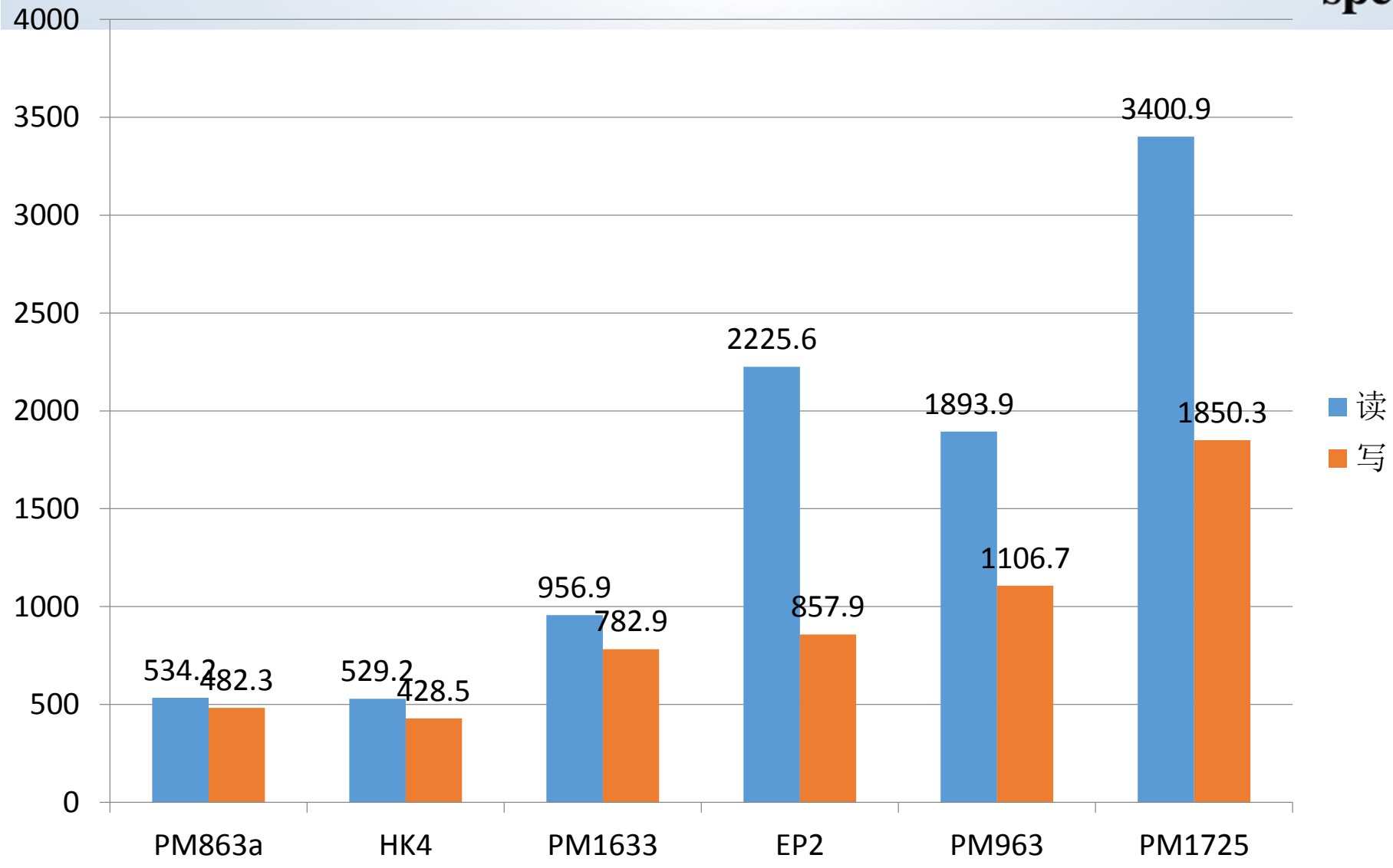
SSD throughput：512k sequence



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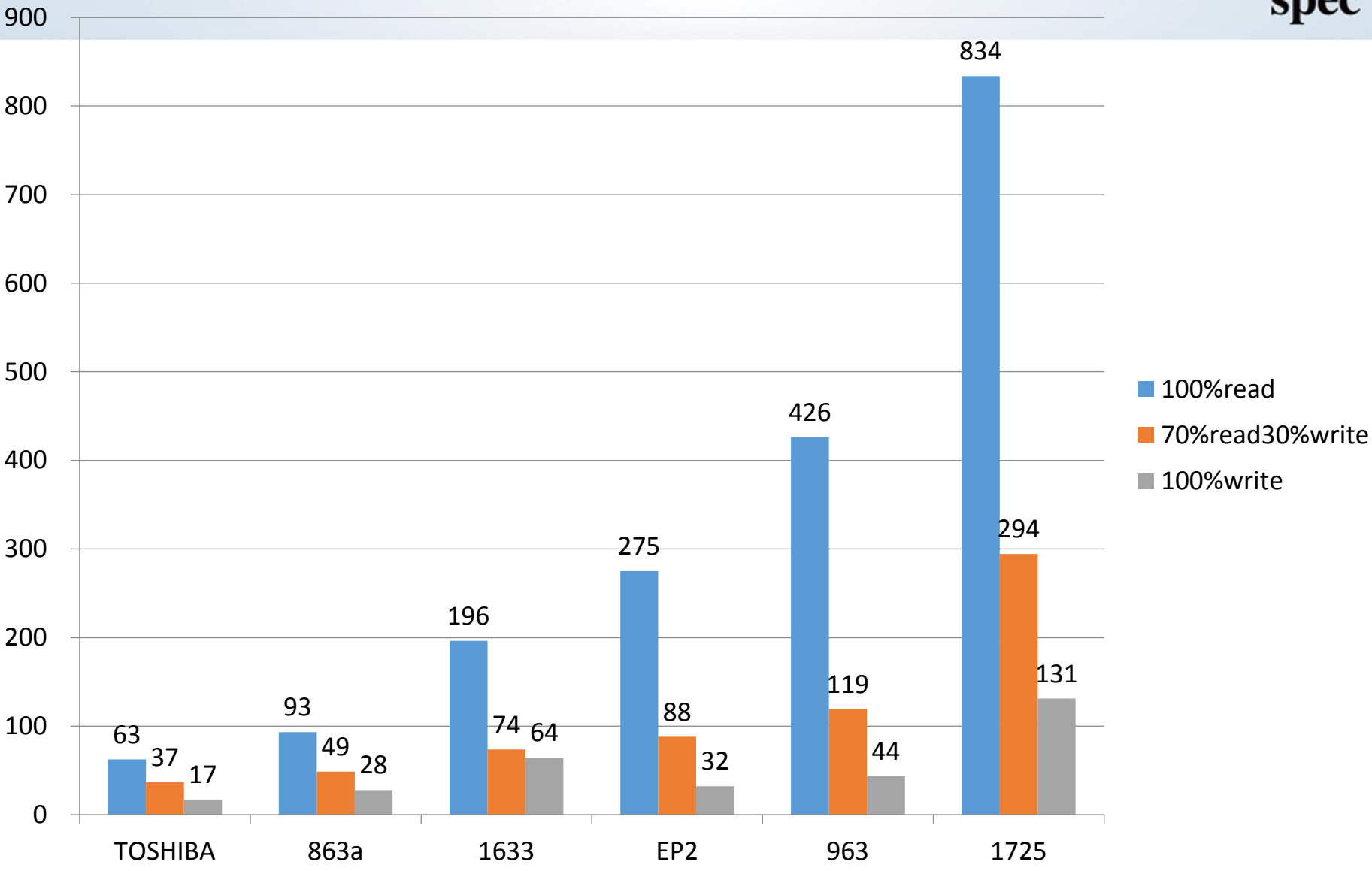
SSD IOPS：4k random



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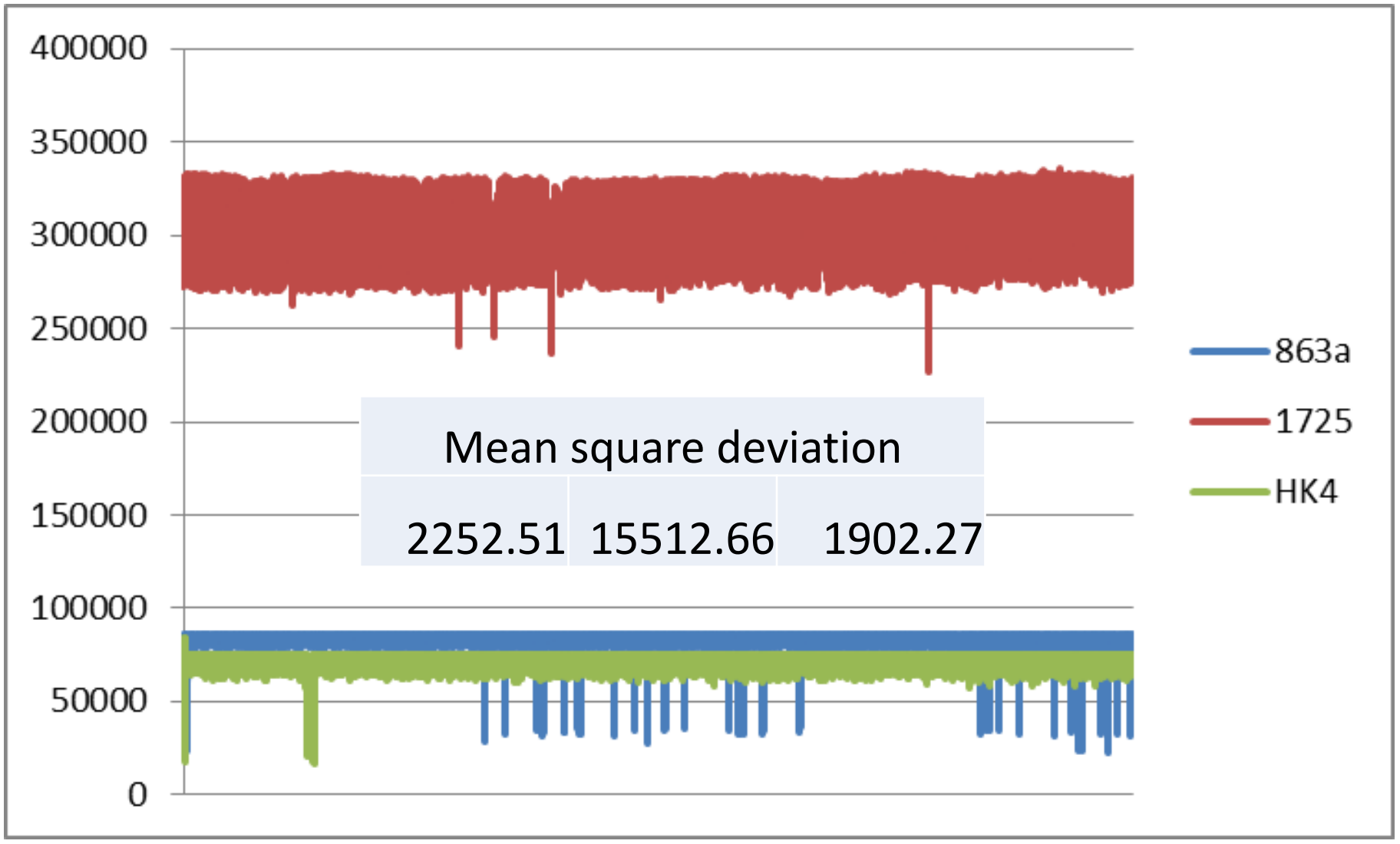
Long time write-4k random@24hours



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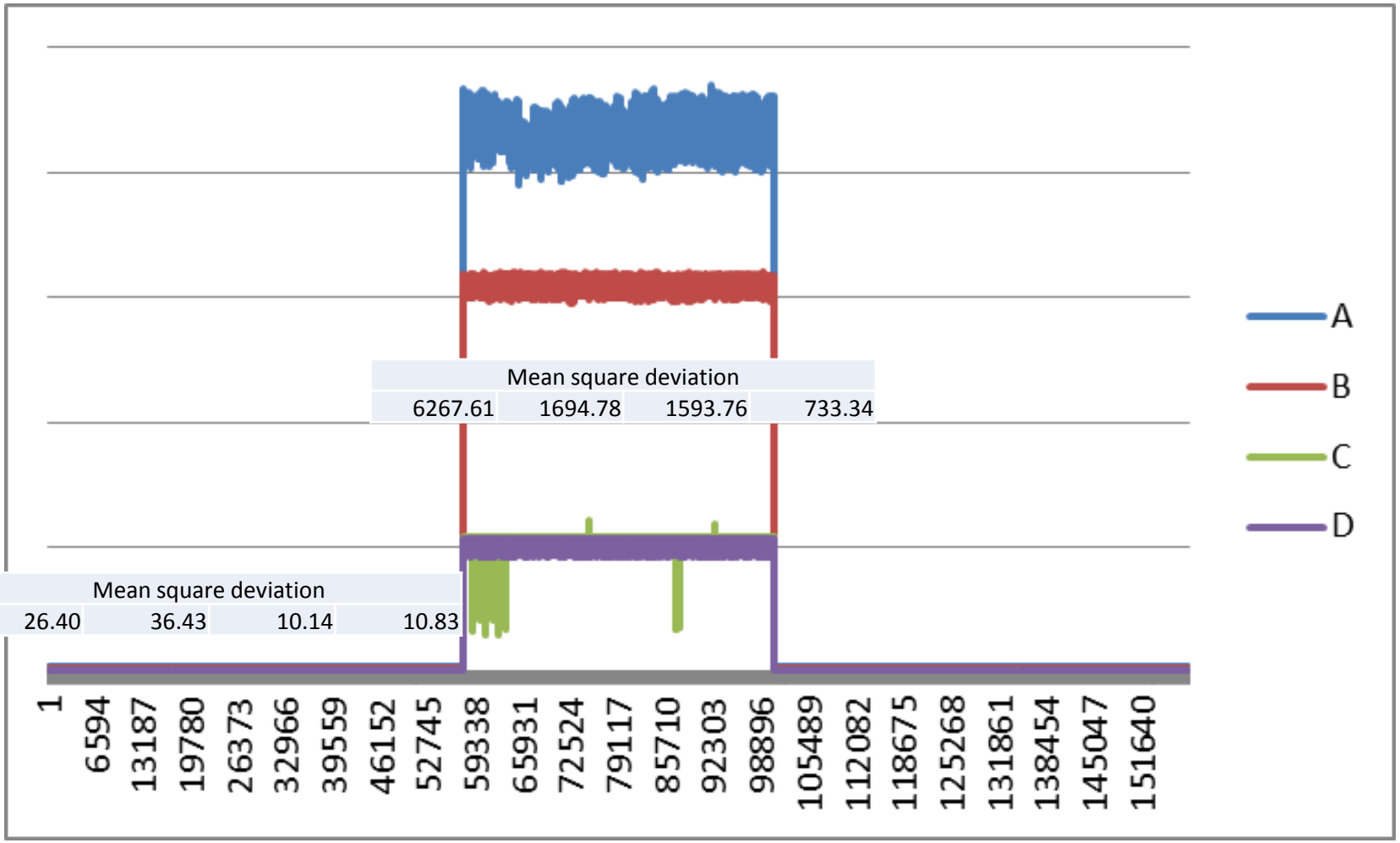
Cross long time write



1024K squence+8k random+1024k squence

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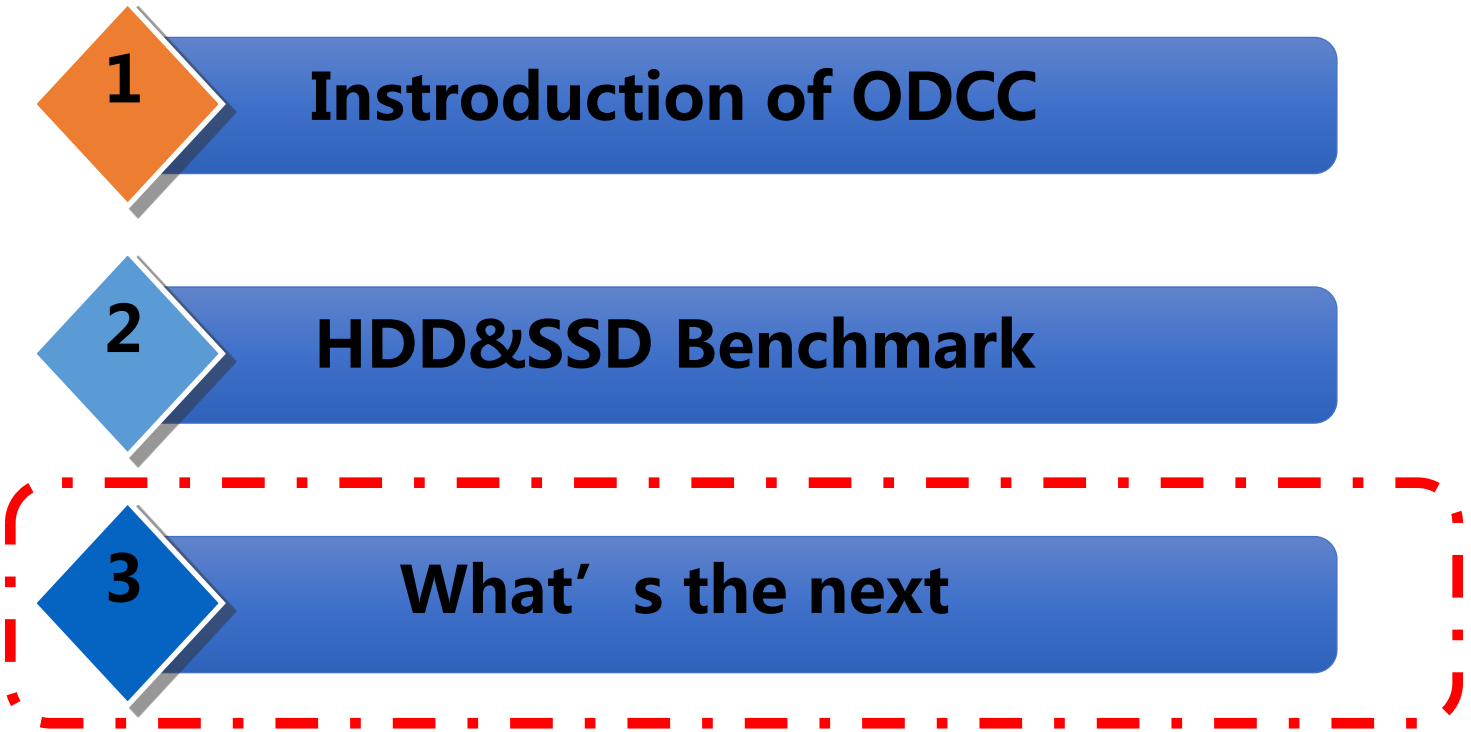

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Programs

Enterprise Disk Benchmark

Multi-node server

Rack Server

25G TOR Switch

Module Datecenter

White paper

AOC

Cold storage server

Datecenter optical module

ODCC CERTIFIED

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Members

Core member

Regular Member

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Thank you!

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