



Welcome and Overview SNIA Emerald V3.0 Training

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SNIA GSI Chair

SNIA Emerald™ Training

*SNIA Emerald™ Power Efficiency
Measurement Specification*

Version 3.0

February-March 2018



Greetings from the SNIA!

- ◆ The Storage Networking Industry Association welcomes you.
- ◆ Several SNIA groups have worked together to the SNIA Emerald™ Training:
 - ◆ SNIA Green Storage Initiative and Green Technical Working Group
 - ◆ EPA
 - ◆ SPEC
 - ◆ SNIA Staff

Welcome

- ◆ Training format – Webex ; 6 days, 4 hours each session
- ◆ Sessions audio recorded; posted 2-3 weeks later
- ◆ Attendance tracked
- ◆ Slides posted at <https://www.snia.org/emerald/education/vendor-training>
- ◆ Agenda may have time for per session Q&A ; will have time at end of each day Q&A
- ◆ Questions can be emailed to emerald-training@snia.org
- ◆ Audio controls
 - ◆ With your PC , find the microphone icon and click to mute/unmute
 - ◆ If calling in on a landline/cellphone, use the phone device options to mute/unmute

Moderator may mute all lines

Webex Details Change Each Day

SNIA Emerald V3.0 Webex Details Per Day				
Date	URL	Webex Password	Phone	Dialin Passcode
Feb 20th	https://snia2.webex.com	none	+1-415-655-0002	666 077 228
Feb 21st	https://snia2.webex.com	none	+1-415-655-0002	663 657 901
Feb 22nd	https://snia.webex.com/meet/sniahost	none	+1-415-655-0002	800 388 486
Mar 6th	https://snia2.webex.com	none	+1-415-655-0002	660 005 378
Mar 7th	https://snia2.webex.com	none	+1-415-655-0002	665 640 182
Mar 8th	https://snia2.webex.com	none	+1-415-655-0002	666 449 876

Training Objectives

- Understand the purpose of the SNIA Emerald Program and the EPA ENERGYSTAR Program for Data Center Storage
 - ◆ Timing of the EPA V1.1 Program that references SNIA Emerald V3.0
- Understand the key components for a storage system under test, understand the storage industry taxonomy for the system under test, identify the key workload tests run by Vdbench/SPEC SFS for system under, understand the raw and summarized data being collected from a system under test, and how the summarized data correlates to reported key metrics
- Install and configure SPEC SFS and S-Flow for File IO and a power measurement meter for a product under test.
- Understand how system configurations and system features can effect energy usage for a system under test
- Understand the steps to enroll and submit test results to EPA ENERGYSTAR Program
- Understand available industry resources for support and answers; and where to obtain specification, tools, and resources

Intended Audience

➤ Independent Test Labs

- ◆ Test engineers
- ◆ Program Managers

➤ Vendors/Service Providers with in-house Test Labs

- ◆ Test engineers
- ◆ Compliance Officers
- ◆ Product Managers

➤ National Bodies Leveraging the Program

- ◆ Labs affiliated with that National Body program
- ◆ Certifying Bodies affiliated with that National Body

➤ Interested Stakeholders

- ◆ IT Professionals that perform in-house assessments
- ◆ Industry Associations and Consortia

Schedule at a Glance

Overview of the 6 Sessions

SNIA Emerald V3.0 Training Schedule					
Month	Date	Day	Pacific Time	Format	Theme
February	20th	Tuesday	10am-2pm	webinar	Storage Primer
February	21st	Wednesday	10am-2pm	webinar	SNIA and EPA Program Overview
February	22nd	Thursday	10am-12N	webinar	SNIA Emerald Programs TWG, GSI, RTP
March	6th	Tuesday	10am-2pm	webinar	Emerald 3.0 Specification and Tool Deep Dive
March	7th	Wednesday	10am-2pm	webinar	Generating Emerald Test Data
March	8th	Thursday	10am-2pm	webinar	Analyze and Report Emerald Metrics

- Feb 20 - Feb 22: Focus – “What it is”
- Mar 6 - Mar 8: Focus – “How to do it (File IO)”
 - *Block IO, refer to V2.0.2/V2.1 training materials
 - <https://www.snia.org/emerald/training/July2015>
 - <https://www.snia.org/emerald/training/July2014>

*** Mar 13-15 is possibility instead of Mar 6-8 , will announce on Feb 28th the Plan

Overview of February 20th – 22nd

Feb 20th, Tuesday, 10-2		Enterprise Storage and IO Primer
10 mins		Training overview and objectives
220 mins		Part 1 Components of Enterprise Storage; How Does HDD work, SSS work, How do the pieceparts make an array, block, file, object, network
inc above		Part 2 Enterprise Storage (consolidate 2013 PI and PII into one module)
inc above		Part 3 Storage Performance and IO Load Basics
inc above		Part 4 Capacity Optimization Techniques
10 mins		Q&A
Feb 21st, Wednesday 10-2		Overview of Energy Efficiency, SNIA Emerald Storage Testing, EPA E* Program for Data Center Storage
10 mins		Training Overview of 3 days and Overview objectives for Day 1
75 mins		EnergyStar Overview and relation to SNIA Emerald
inc above		Overview of E* Specification and E* Data Center Program, plus 2+ year outlook
inc above		Fill out E* Form; submit, post, and review on website
45 mins		Overview of SNIA Emerald Specification P1) Block ; P2) File
30 mins		Contrast differences of testing and reporting for Emerald and E*
45 mins		Overview- what is being tested and why P1) Block ; P2) File
15 mins		SNIA Emerald Taxonomy
10 mins		Power supply efficiency and testing
20 mins		Q&A
Feb 22nd, Thurs, 10-12		Overview of SNIA Green Efforts, Programs, Committees Membership
75 mins		SNIA Emerald Program and SNIA GSI ; SNIA Emerald Newsletter and Website
30 mins		SNIA Emerald Recognized Tester Program
2 mins		Overview and Reminder Mar 6th-8th
10 mins		Q&A

February 20th

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inc above	Part 4 Capacity Optimization Techniques
10 mins	Q&A

We have presenter out ill today, so the plan is as follows

10:10am-12:30PM Pacific Time --You watch these two You Tube Videos

12:30PM, rejoin webex and

we'll do Q&A and a few technology updates and resume 12:30-2:15PM PT w/ P3&4

Part 1

- <https://www.snia.org/emerald/Training/July2014/StorageBasics>
- or https://www.youtube.com/watch?time_continue=321&v=xQtAbgMBo_A

Part 2

- <https://www.snia.org/emerald/Training/July2014/CharacteristicsOfEnterpriseStorage>
- or https://www.youtube.com/watch?time_continue=1007&v=FLVkMXzno-A

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February 22nd

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10 mins	Q&A

March 6th – 8th

***could be March 13th-15th, notice by Feb 28th

Mar 6, Tuesday, 10-2		PUT Config Overview and setup for File	
10 mins		Overview of next 3 days of training	
220 mins	--- 55 mins Youtube	SFS 2014 Overview	
	45 mins Youtube - inc above	SFS 2014 SNIA Emerald	
	inc above	1. Setting up AC power.	
	15 mins - 2014 inc above	2. Setting up the power meter, and measurement system.	
	inc above	3. Setting up Sflow on the switch, and sflow collector.	
	inc above	4. Setting up the SFS2014 benchmark.	
	inc above	a. Software configuration.	
	inc above	b. Hardware configuration	
	inc above	c. Install and setup ssh automatic logins.	
	30 mins - 2014 inc above	Capacity Optimization testing and types (applies to both file and block)	
10 mins		Q&A,	
Mar 7th, Wednesday, 10-2		Part 1 Run the SNIA Emerald Tests and Generate Data; Analyze Data	
10 mins		Overview of today agenda	
220 mins		Continue - 4. Setting up the SFS2014 benchmark.	
	inc above	d. Finding the peak throughput, for each workload type.	
	inc above	e. Finding the optimal throughput versus power for each workload type	
	inc above	5. When things go wrong.	
	est 15 mins 2014 inc above	Run COM Test	
10 mins		Q&A	
Mar 8th, Thursday, 10-2		Part 2 Run the SNIA Emerald Tests and Generate Data; Analyze Data	
10 mins		Overview of today agenda	
210 mins		Continue - 4. Setting up the SFS2014 benchmark.	
	inc above	f. Merging the power meter results with Sflow results.	
	inc above	g. data reduction, validation, and metric calculation	
	inc above	Mistakes to avoid, lessons learned - tests and - data analysis	
	30 mins 2014 inc above	SNIA Test Data Report elements	
10 mins		Q&A	
10 mins		Support, Help, Resources	

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Block IO testing with Vdbench not covered

Refer to V2.0.2/V2.1 Training Materials

SNIA Emerald V3.0 Block IO same V2.1

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March 7th

Mar 7th, Wednesday, 10-2		Part 1 Run the SNIA Emerald Tests and Generate Data; Analyze Data			
10 mins		Overview of today agenda			
220 mins		Continue - 4. Setting up the SFS2014 benchmark.			
	inc above	d. Finding the peak throughput, for each workload type.			
	inc above	e. Finding the optimal throughput versus power for each workload type			
	inc above	5. When things go wrong.			
	est 15 mins 2014 inc above	Run COM Test			
10 mins		Q&A			

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SNIA Emerald V3.0 Block IO same V2.1

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<https://www.snia.org/emerald/training/July2015>

March 8th

Mar 8th, Thursday, 10-2		Part 2 Run the SNIA Emerald Tests and Generate Data; Analyze Data			
10 mins		Overview of today agenda			
210 mins		Continue - 4. Setting up the SFS2014 benchmark.			
	inc above	f. Merging the power meter results with Sflow results.			
		g. data reduction, validation, and metric calculation			
	inc above	Mistakes to avoid, lessons learned - tests and - data analysis			
	30 mins 2014 inc above	SNIA Test Data Report elements			
10 mins		Q&A			
10 mins		Support, Help, Resources			

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SNIA Emerald V3.0 Block IO same V2.1

<https://www.snia.org/emerald/training/July2014>

<https://www.snia.org/emerald/training/July2015>

Training Materials

- SNIA Emerald URL for download,
 - ◆ www.snia.org/emerald/training/downloads
 - ◆ <https://www.snia.org/emerald/education/vendor-training>
- Attendee List will be emailed for personal networking purposes. List will not be posted to the website

Questions?



SNIA Emerald™

Questions?

➤ Please watch these two Videos

Part 1 Storage Basics

- <https://www.snia.org/emerald/Training/July2014/StorageBasics>
- or https://www.youtube.com/watch?time_continue=321&v=xQtAbgMBo_A

Part 2 Characteristics of Enterprise Storage

- <https://www.snia.org/emerald/Training/July2014/CharacteristicsOfEnterpriseStorage>
- or https://www.youtube.com/watch?time_continue=1007&v=FLVkMXzno-A

- Resume Webex at 12:30 pm PT for Part 1 and Part 2 Q&A
- And continue with Part 3 and Part 4 until 2:00- 2:15PM PT

Enterprise Storage Changes From 2014 – 2018 Worth Noting

- ◆ Storage capacities continue to increase in the same device dimensional footprint
 - ◆ Today's news 2/20/18: Samsung's new SSD is industry's biggest at 30TB
 - ◆ 10/2017: world's biggest hard drive can store 14TB
 - ◆ Next gen NAND/NVM – ramping up delivering speed ; one vendor can perform reads on an MLC XPoint cell in just 30 nanoseconds - extremely fast for a nonvolatile memory
- ◆ Energy efficient supplies : silver & gold (a change from bronze and silver; always be challenged with redundant supplies)
- ◆ New architectures and technology approaches out of scope for energy programs today. E.g. SDS, Hyper-converged, hyperscale purpose built, cards vs drives devic count

Proceed with Part 3 and 4

➤ Speakers Chuck Paridon and Carlos Pratt

Backup

March 6th : 10:15-am-12:30pm Pacific Time

Webex Line will Be Silent until 12:30 PM PT

- Please watch these two Videos at this URL in this sequence
- <https://www.spec.org/sfs2014/presentations/index.html>
 - Application-Level Benchmarking with SPEC SFS 2014
 - Using SPEC SFS with the SNIA Emerald Program for EPA Energy Star Data Center Storage Program
- Resume Webex at 12:30 pm PT for SFS 2014 Q&A
- And continue with rest of Product Under Test Setup until 2:00PM PT

SNIA Emerald Program Building Block for Industry Programs

