

# Symmetrix VMAX Performance Workshop



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## Welcome to the Symmetrix VMAX Performance Workshop.

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## Course Overview

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|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Description</b>   | This course introduces participants to the methodology for analyzing performance of Symmetrix arrays. Participants will learn to analyze Symmetrix VMAX performance using ControlCenter Performance Manager and Symmetrix Performance Analyzer tools. Metrics that are relevant for analysis of each of the components in a Symmetrix array are presented. Participants will learn to identify bottlenecks for performance and provide recommendations to remedy the problem. Hands-on lab exercises using performance archives reinforce the concepts and methodology presented in the lecture. |
| <b>Audience</b>      | This course is intended for anyone responsible for operating, maintaining, and optimizing the performance of a Symmetrix VMAX storage environment.                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Prerequisites</b> | Prior to attending this course, you should have attended the following course(s): <ul style="list-style-type: none"><li>• Symmetrix Fundamentals</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                       |



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## Course Objectives

Upon completion of this course, you should be able to:

- Relate knowledge of the Symmetrix architecture and I/O handling processes to their performance benefits
- Identify the performance impact different types of workloads have on Symmetrix architectural components
- Use key metrics to identify performance bottlenecks and components over utilization
- Make performance-oriented recommendations when allocating new storage or migrating applications



Upon completion of this course, you should be able to analyze the performance of a Symmetrix array using the methodology, metrics, and tools described herein.

# Agenda

## Modules/Lessons

## Labs

|       |                                                                                                                                                                                                                                                         |                                                                                                                      |
|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| Day 1 | <b>Module 1: Performance Management Overview</b>                                                                                                                                                                                                        | <ul style="list-style-type: none"><li>Lab Exercise 1: Tools</li></ul>                                                |
|       | <b>Module 2: Tools for Analyzing Performance</b> <ul style="list-style-type: none"><li>Lesson 1: Unisphere for VMAX Performance Overview</li><li>Lesson 2: Loading Data in Performance Viewer</li><li>Lesson 3: Navigating Performance Viewer</li></ul> |                                                                                                                      |
| Day 2 | <b>Module 3: Performance Analysis</b> <ul style="list-style-type: none"><li>Lesson 1: Workload Profiles and Characterization</li><li>Lesson 2: Performance Analysis Roadmap</li><li>Lesson 3: Little's Law and its Impact on Response Time</li></ul>    | <ul style="list-style-type: none"><li>Lab Exercise 2: Analysis</li><li>Lab Exercise 3: Symmetrix Front-end</li></ul> |
|       | <b>Module 4: Analyzing Performance of the Symmetrix Front-end Adapters</b>                                                                                                                                                                              |                                                                                                                      |



# Agenda

## Modules/Lessons

## Labs

|       |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                   |
|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Day 3 | <b>Module 5: Analyzing Symmetrix Cache Performance</b> <ul style="list-style-type: none"><li>• Lesson 1: Symmetrix Cache Architecture</li><li>• Lesson 2: Cache Hit and Miss I/O Operations</li><li>• Lesson 3: System and Device Write Pending Limits</li><li>• Lesson 4: Dynamic Cache Partitions</li><li>• Lesson 5: Alignment of I/Os with Cache Slots</li><li>• Lesson 6: XtremSW Cache</li><li>• Lesson 7: Roadmap and Analysis</li></ul> | <ul style="list-style-type: none"><li>• Lab Exercise 4: Symmetrix Cache</li></ul> |
|       | <b>Module 6: Analyzing Performance of Symmetrix VMAX Backend Adapters</b> <ul style="list-style-type: none"><li>• Lesson 1: Symmetrix Backend Architecture</li><li>• Lesson 2: Analyzing Symmetrix Backend Utilization</li><li>• Lesson 3: Analyzing I/O imbalance</li></ul>                                                                                                                                                                    |                                                                                   |



# Agenda

## Modules/Lessons

## Labs

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|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Day 4 | <b>Module 6: Analyzing Performance of Symmetrix VMAX Backend Adapters</b> <ul style="list-style-type: none"><li>• Lesson 4: Symmetrix Backend Optimization Algorithms</li><li>• Lesson 5: Impact of RAID Protection on Backend Performance</li></ul> | <ul style="list-style-type: none"><li>• Lab Exercise 5: Symmetrix Backend</li><li>• Lab Exercise 6: Business Continuity</li></ul> |
|       | <b>Module 7: Performance Considerations for Business Continuity Operations</b> <ul style="list-style-type: none"><li>• Lesson 1: TimeFinder Performance Considerations</li><li>• Lesson 2: SRDF Performance Considerations</li></ul>                 |                                                                                                                                   |

