

## ***ST230c-EN Performance Analysis on Clustered Data ONTAP***

### **Kurzbeschreibung:**

ONTAP 9 Performance Analyse including case studies and solutions

### **Zielgruppe:**

Experienced NetApp storage administrators and architects

### **Voraussetzungen:**

We suggest to visit the training "ST200c ONTAP 9.x Admin Basics" or "ST221c ONTAP 9.x Data Protection & High Availability" before. Also we recommend to have at least 9 to 12 months experience with ONTAP administration.

### **Sonstiges:**

**Dauer:** 5 Tage

**Preis:** 4500 Euro plus Mwst.

### **Ziele:**

This training provides basics about the performance analysis on Netapp systems and ONTAP. This includes the NetApp hardware, software and tools for the data analysis.

## Inhalte/Agenda:

- Introducing the following topics:
  - ◆ Physical and logical errors: e.g. fragmentation, misalignment, small IOs, reconstructs, silent data corruption
  - ◆ Further anti-bully, fairness limitations like TCP-Window size, buffer credits, quality of service and CMD queue limits for storage
  - ◆ What are the effects?
  - ◆ How can we recognize them?
  - ◆ Countermeasures from NetApp: lost write protection, free space reallocate, read reallocate, dedupe, compression, compaction, VAAI, ODX, thin provisioning
- The mathematical basics:
  - ◆ Queueing theory and the correct use of filer performance analysis
  - ◆ Detect Open and closed loads, single threaded & parallel loads at clients
- ONTAP commands to identify
  - ◆ Highest latencies
  - ◆ Highest IO loads
  - ◆ Highest data throughputs
  - ◆ Biggest queues
- Performance tuning:
  - ◆ HDD + PAM = Flash Cache
  - ◆ HDD + SSD = Flash Pool (Hybrid Aggregate)
  - ◆ SSD only = All Flash FAS (AFF)
  - ◆ Flexgroup
  - ◆ Presentation: which optimizations are possible and rational in each case?
- Sizing:
  - ◆ Adequate consideration of the client IOs
  - ◆ Estimation of the additional housekeeping IOs from a filer
  - ◆ Size of the metadata and the working set
- Overview of external monitoring tools:
  - ◆ System Manager
  - ◆ OnCommand Unified Manager with OnCommand Performance Manager
  - ◆ Harvest, Graphite, Grafana
- Troubleshooting configuration errors (HW / SW)