ST230c-EN Performance Administration 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 trainings
„**ST200c ONTAP 9.x Admin Basics**" or "**ST221c ONTAP 9.x Data Protection & High Availability**" before.
Also we recommend to have at least 6 months experience with ONTAP administration.

Sonstiges:

Dauer: 5 Tage

Preis: 4700 Euro plus Mwst.

Ziele:

The course **ST230c-EN Performance Administration on Clustered Data ONTAP** teaches the basics of performance analysis with NetApp systems and ONTAP. It covers NetApp hardware and software as well as data analysis tools.

Participants will learn how to interpret the data and use the analysis results for performance-related requirements such as capacity planning, tuning or monitoring.

Inhalte/Agenda:

- The content is based on the current version of the official NetApp course documentation for the 'ONTAP Performance Administration' course and is supplemented by practical exercises as well as additional commands and even more in-depth interpretations and checklists.

- ♦ **Structure of a NetApp cluster**
  - ♦ ◊ Layers of the operating system
  - ◊ Data flow in the cluster
  - ◊ Troubleshooting configuration errors (hardware and software)

- ♦ **Presentation of the challenges**
  - ♦ ◊ Physical limits and additional effort for error prevention and correction: run and response times, fragmentation, misalignment, small IOs, reconstructs, silent data corruption
  - ◊ Fairness brakes in the NAS and SAN protocols and the ONTAP management layers: TCP windowsize, buffer credits, quality of service, CMD queue limits
  - ◊ How can we recognise them?
  - ◊ How big are their impacts?

- ♦ **Presentation of countermeasures by NetApp**
  - ♦ ◊ Lost write protection, DIF/DIX=PI, WAFL Write Optimation, RAID-DP/TEC, Free Space Reallocate, Read Reallocate, Read Ahead, Dedupe, Compression, Compaction, VAAI, ODX, Thin Provisioning, Quality of Service, Volume Move, FlexGroups, InodePath

- ♦ **The mathematical foundations**
  - ♦ ◊ Queuing theory and its concrete application in storage and network performance analysis
  - ◊ Recognising open and closed load / single threaded and parallel workloads
  - ◊ Criteria for identifying and differentiating between bullies and victims

- ♦ **Presentation of the commands for identifying the**
  - ♦ ◊ highest latencies
  - ◊ highest IO loads
  - ◊ highest data throughputs
  - ◊ largest queues

- ♦ **Performance-Tuning**
  - ♦ ◊ HDD + PAM = Flash Cache
  - ◊ HDD + SSD = Flash Pool (Hybrid Aggregate)
  - ◊ All Flash FAS (AFF)
  - ◊ FlexGroup
  - ◊ Optimizations: Which ones are compatible? Which ones cancel each other out?

- ♦ **Sizing** ◊
  - ♦ ◊ Adequate consideration of client IO workloads
  - ◊ Estimation of the additional housekeeping and metadata IOs
  - ◊ Size of the metadata and the working set

- ♦ **Overview of other external monitoring tools**
  - ♦ ◊ System Manager
  - ◊ Active IQ Unified Manager
  - ◊ Harvest, Graphite, Grafana, NABox

- ♦ **All topics of the official NetApp training "ONTAP Performance Administration" are covered and deepened:**
  - ♦ ◊ Describe how to use NetApp tools for performance measurement
  - ◊ Explain the benefits of using Active IQ for performance analysis
  - ◊ Use Active IQ Unified Manager to monitor the performance of cluster objects
  - ◊ Describe the layers of ONTAP software architecture
  - ◊ Diagram the flow of read and write requests through the ONTAP network and protocol layers
  - ◊ Use performance analysis tools to identify WAFL-related performance bottlenecks
  - ◊ Discuss how storage quality of service (QoS) operates in an ONTAP environment
  - ◊ Explain how to monitor and manage workload performance
  - ◊ Use performance analysis tools to identify NAS performance bottlenecks
  - ◊ Identify the actions that you can take to resolve SAN performance issues

  - ♦ ◊