FUJITSU

White Paper
RAID: End of an Era?

Ceph-based FUJITSU Storage ETERNUS CD10000: an improvement over
traditional RAID-based storage systems in OpenStack cloud environments

Introduction

RAID technology has been the fundamental building block for storage systems for many years. It has proven successful for almost every kind of data that has been generated in the last three decades, and the various RAID levels have provided sufficient flexibility for balancing usable capacity, performance, and redundancy up to now.

However, over the course of the last years cloud infrastructures have gained a strong momentum and are imposing new requirements on storage and challenging traditional RAID-based storage systems (in the remaining text we will refer to these systems simply as "RAID systems").

This white paper explains
- current trends in application development and how this challenges IT operations to become faster and more agile including the impact on storage system design.
- the essential ideas about a new open source storage architecture called Ceph and its implementation in an E2E software/hardware solution called ETERNUS CD10000 in order to address the previously mentioned need for speed and agility.
- how Ceph/ETERNUS CD10000 adds new value to OpenStack-based cloud environments in contrast to traditional RAID systems by
  - automating the efforts of storage scaling, i.e. adding new storage, retiring old ones with automatic data migration, on the fly with zero downtime.
  - offering practically unlimited storage scalability in a single system, thereby removing the need for multiple individual RAID systems.
  - overcoming the issue of long disk recovery times and degraded performance in RAID systems
  - offering disaster resilience as part of the basic product instead of using complex layers on top of RAID systems
  - reducing unnecessary copy operations in the process of spawning OpenStack VMs
  - improving capacity utilization by managing all storage needed for recovery, headroom, and growth in a single pool on a data center level.
  - introducing the concept of an "immortal system"

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