Dashboard - Feature #50980

Feature # 47072 (New): mgr/dashboard: Usability Improvements

Cleanup # 47073 (In Progress): mgr/dashboard: landing page

mgr/dashboard: advanced cluster visualization

05/26/2021 03:03 PM - Ernesto Puerta

Status:	New	% Done:	0%
Priority:	Normal		
Assignee:			
Category:	Component - Landing Page		
Target version:	v17.0.0		
Source:	Development	Reviewed:	
Tags:		Affected Versions:	
Backport:		Pull request ID:	

Description

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The goal of this feature would be to provide a visual representation of the cluster status covering the following aspects:

- **Data integrity**:
  - Goal: Highlight damaged or compromised sections of the cluster. It should help relate how a failure in one cluster item (PG, OSD, host, etc) relates to degraded status in other items (e.g.: a failure in one OSD causes its PGs to become degraded and hence peer PGs in other OSDs will become affected).
  - What: The suitable entity/es for this could be hosts, OSDs, or PGs (data placement items).
  - How: A representation that could fit this goal for this would be ring-like (e.g.: Cassandra OpsCenter) or it could also be a multi-level ring/pie aka Sunburst chart (inner ring for hosts, middle ring for OSDs belonging to that host, and outer ring for PGs belonging to that OSD).
  - Sample scenario: "a given OSD 123 goes down (due to an I/O disk error), then: the OSD 123 stripe in the OSD ring turns red, the inner ring (host) turns orange (warning), and the outer ring (PGs) turn orange (warning). Additionally, the PG replicas in other OSDs would also turn orange (since they are degraded: a replica for each PG is lost).
  - The position of adjacent hosts/OSDs/PGs in the ring may follow some topological criteria (even allowing for more inner rings: hosts belonging to same rack, chassis, row, ... datacenter, etc.)
- **Data movement**:
  - Goal: visualize how data moves within the cluster and identify hot-spots and bottlenecks (replica writes, erasure-code chunks read/writes). Client traffic (inbound-outbound) could be optionally left out (client traffic will mostly trigger cluster traffic).
  - What: it's not realistic to display every byte/request traversing the cluster network, so a threshold should be applied
  - How: A representation suitable for this could be the Chord diagram which allows to map flows among segments/stripes in a ring (also in multi-level one). In Chord diagrams the color and width of the segments can be used to describe
- **Data placement**:
  - Goal: detect hot-stops and imbalances in data distribution.
  - Is this really an issue after PG balancer module?

References

Sage suggested using advanced visualization tools for displaying the cluster-OSD recovery I/O:

- Hierarchical edge bundling (and Hierarchical Edge Bundles: Visualization of Adjacency Relations in Hierarchical Data paper)
- chord dependency

More references or examples of cluster visualization:

- Example of a ring view in Cassandra OpsCenter.
- Presentation
- Netflix's Vizceral
- https://github.com/A-Dechorgnat/inkscope-lite
- https://github.com/call518/sonar4ceph
- https://github.com/inkscope/inkscope
- https://github.com/Crapworks/ceph-dash

- https://ceph.io/en/news/blog/2014/ceph-calamari-the-survival-guide-2/

History

#1 - 05/26/2021 03:04 PM - Ernesto Puerta

- Description updated

#2 - 05/26/2021 03:06 PM - Ernesto Puerta

- Description updated

#3 - 06/17/2021 01:08 PM - Ernesto Puerta

- Category changed from UI to Component - Landing Page

- Status changed from New to Triaged

#4 - 01/31/2022 05:08 PM - Ernesto Puerta

- Tracker changed from Bug to Feature

- Description updated

- Status changed from Triaged to New

- Assignee deleted (Nizamudeen A)

#5 - 01/31/2022 05:11 PM - Ernesto Puerta

- Description updated

#6 - 01/31/2022 05:14 PM - Ernesto Puerta

- Description updated

#7 - 02/03/2022 07:05 PM - Ernesto Puerta

- Tags set to GSoC22

- Tags set to g

#8 - 02/17/2022 08:57 PM - Ernesto Puerta

- Description updated

- Tags deleted (g)