Geographically Distributed Software Defined Storage (proposa)

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Storage
- All types of storage are distributed, depends on the scale of distribution:
  - among disk drives, servers in Data Center, or among Data Centers (large 1000+ to 5+ terabytes).
- Several storage systems for science are proposed and many running.
- Commercial companies suggest distributed data storage solutions: Google (Kaos Distributed, Large Scale Data Reduction), Dropbox, Amazon, Microsoft, Google, Azure, Amazon, DSN Storage.
- Which is appropriate solutions for globally distributed data storage in scientific research and education?
  - Obviously we need for software-defined solutions.

Main features of SDS
- Software Defined Storage should include:
  - Automation - Simplified management that reduces the cost of maintaining the storage infrastructure.
  - Standard Interfaces - APIs for the management, provisioning and maintenance of storage devices and services.
  - Unrestricted Data Path - Block, File and Object interfaces that support applications written to these interfaces.
  - Scalability - Seamless ability to scale the storage infrastructure without disruption or availability or performance.

National Grid Storage Development Solutions (NGBDS)

Some details
- It is supposed that command create Storage Instance might be issued by the user from the GDSDS portal. It is not often required operation.
  - In result the user has to receive all information about operation completion code and information how to use created Storage instance.
  - It is planned for each operation create to create new instance of storage cluster. Separate instances are completely independent each other.

Examples for SLA
- Specific type of Data Encryption.
- Specific type of Data Compression.
- On one specific Data Center (DC) or on many DCs with specific types of Data Links.
- Type of bandwidth: 10GB, 100GB, EDS, etc.

Development process consideration
- During implementation GDSDS the project working repository is strongly required. Any update and/or installation must be done only with this working repository.
- Updating the working repository is separate specific activity.
- Several existing SSD systems might be considered as backend: SWIFT, EDS, commercial instances as well.
  - CEPH is under testing now as backend for the proposal.
- Teach implementation with cluster (under intensive testing now).

Who are developers
- We (volunteers from PNNL and ITMO) are proposing the project as open source development.
- It is supposed that any person with interest to such the topic could take participation:
  - Researchers, students.
  - Yes, we are looking for support.

References
- "Why so Slick? Ceph backed storage at the RAL, Talk 1" - (http://datastorage.org/…/ACAT_2014.pdf)
- "Xstore" - a fault-tolerant distributed file system for storage needs. (http://www.xstore.org/)
- "Software Defined Storage Layer2X is a distributed, scalable, fault-tolerant and highly available file system. - https://www.xstore.org/