An NDMP Backup Sever for Distributed File Systems

Final year B. E. Project
By

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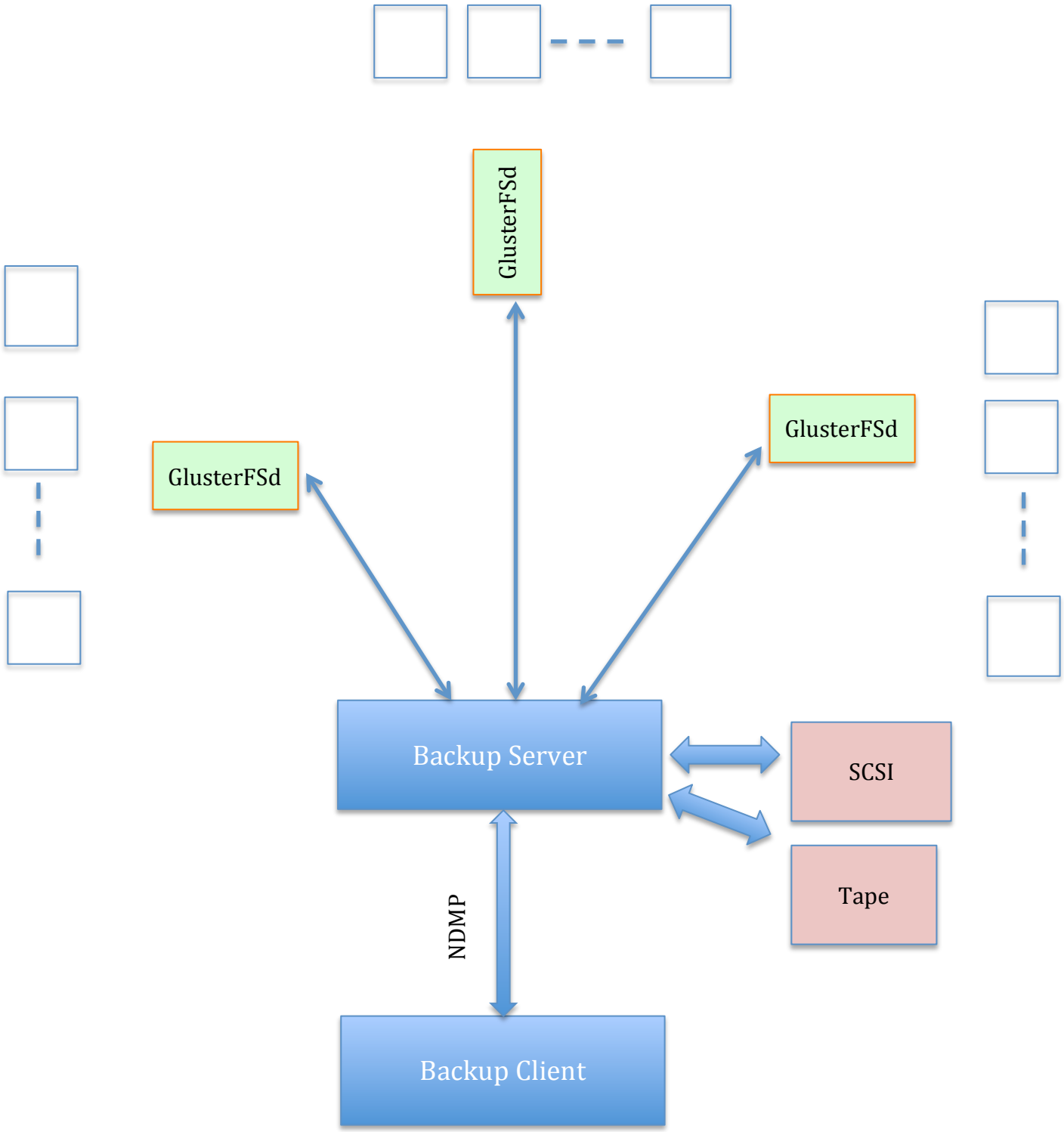
SYNOPSIS

GlusterFS is a distributed clustered file system, offered by Red Hat Inc. GlusterFS is built using File system in User Space (FUSE) concepts creating a user space stackable file system. GlusterFS uses various building-block storage servers running on commodity hardware in a network to create a distributed file system operating in user space. This approach allows users to build high performance and scalable file systems using GlusterFS. GlusterFS has a large customer base and has been used in content delivery networks, cloud computing and for many media streaming applications.

In this project we will build the capability for backup of GlusterFS file systems. Backup solutions in distributed and network environments are government by Network Data Management Protocol (NDMP). NDMP uses a client-server model to build backup solutions. The NDMP protocol eliminates unnecessary data transfer between the backup server and client to dramatically improve performance. Building a NDMP compliant backup solution for GlusterFS enables users to use any of the many commodity and third-party NDMP based backup clients to manage the actual backup process.

NDMP protocol specifies the interactions between the NDMP backup clients and the NDMP servers. The messaging has broadly two capabilities: connection management and data management. The messages themselves between the client and server are defined using External Data Representation (XDR) for purposes of interoperability between different clients and servers.

We show a schematic diagram of the possible and likely implementation of a backup server solution in a GlusterFS environment.



We assume that customers would setup multiple instances of GlusterFS and have data that spans different instances. Consequently the backup server has to be able to backup data from different GlusterFS instances as shown in the figure above. The Backup Server has to determine which GlusterFS instances to fetch the data from. GlusterFS has a mechanism to determine which brick contains a data element based on mapping between path names of files to a hash code to a brick.

Methodology

The Backup Server solution has to be compliant with the NDMP standard. We will comply with NDMP V3 as per requirement of Red Hat Inc. We anticipate that the basic communication management functionality can be used from the NDMP SDK that is available. The data services that will be responsible for the actual backup, is to be constructed in the project. The data services will use the GlusterFS API to fetch data from different GlusterFS instances.

We will use the C programming language for coding the backup solution. The code will comply with Red Hat Inc.'s coding standards. The development methodology will comply with Red Hat Inc.'s development process.

BIBLIOGRAPHY

1. GlusterFS documentation, http://www.gluster.org/community/documentation/index.php/Main_Page
2. NDMP Standard Specification, http://www.ndmp.org/