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Letterkenny Institute of Technology

Assignment 1

Lecturer:	John O'Raw
Report Title:	Assignment 2
Submit to:	Blackboard with all files as specified in the assignment, submitted as a single ZIP folder.
Date Submitted:	03 June 2021

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Programme of Study:	M.Sc. in Cloud Technology
Module:	Private Cloud Technology

Please refer to the Institute's Quality Assurance Handbook, Version 3.0, September 2018

1. Practical work, forming part of the CA of a module, will only be assessed if the student has attended the relevant practical classes.
2. CA work must be completed within the schedules and specifications (specified in the CA brief). Students who submit CA late may forfeit some or all the marks for that work.
    a. The total marks available for an assessment be reduced by 15% for work up to one week late; i.e. a grade of 50% would become (50*0.85) = 42.5%
    b. The total marks available be reduced by 30% for work up to two weeks late i.e. a grade of 60% would become (60*0.7) 42%
    c. Assessment work received more than two weeks late should receive a mark of zero.

    Work is deemed late when an unauthorized missing of a deadline has occurred.
3. CA must be the student's own work, refer to Plagiarism Policy, in section 5.7 of the QA manual.

Integration

Synology Unified Controller, UC3200 Active-Active IP SAN is rack-mountable and uses SAS (Serial Attached SCSI) type controllers. It will be integrated with a cluster of Dell R440 Servers via Ethernet switches. Since, UC3200 with iSCSI support was chosen for this project, it can be integrated over ethernet network and no separate cable, hardware or switch is required unlike Fiber Channel. However, UC3200 does support Fiber Channel too. UC3200 has two storage controllers which work in active-active mode and provide high availability of controllers. RAID 10 which uses a combination of RAID 0 and RAID 1, was used to provide disks redundancy. By default, each controller has dual gigabit and one 10GBase-T ports available and spare PCI-E slots present which can be used to insert 10GbE or 25GbE adapter cards from Synology, Marvel,Intel are present. Two ethernet switches will be used for redundancy and there will be connections from each UC 3200 controller to them. Each controller has an inbuilt 10G port and two extra adapter cards with one 10G port has been ordered for the controllers. Five Dell Servers which are part of a cluster will be connected to the two ethernet switches as well with connections going to both the switches for redundancy. Storage Manager in DSM can be used to create RAID10 pools, which are managed using primary controller. An MPIO link will be created between both the controllers, however, an MPIO link using both the controllers will not double the performance as UC3200 uses ALUA (Asymmetric Logical Unit Access) but will provide redundancy to servers connected to the controllers via switch. The secondary link is reserved for failover and only the primary link is optimized. For using the failover feature, network port pairs used must use the same subnet and MTU. DSM (Disk Station Manager) is the Operating System used by UC3200 and can be accessed via web portal. iSCSI Manager in DSM can be used to create iSCSI Target which are accessed by iSCSI Initiators. Servers which need to access this storage solution will have to be configured as iSCSI Initiators and UC3200 will be the iSCSI Target. When iSCSI target service is used, it gives an illusion that drive is attached locally to a computer as the drive can be seen on the Initiator server/computer as a local drive. This drive will then be managed locally by the Operating System of the computer/server. LUN needs to be created and mapped to target, which can be done using Storage Manager in DSM. A target will have an IQN (iSCSI Qualified Name), which is a logical name and used by Initiator to connect to it. If Linux

Operating System is used, IQN needs to be configured in initiator configuration file present in /etc/iscsi. In case, of Windows, iSCSI Initiator utility needs to be used for creating an Initiator and connecting it to iSCSI Target/Gateway.