Project Cloudy

A Cloud like Home Network and Computing Architecture.

Project Cloudy is an IT and network solution for Scalability, Connectivity and Single point management for personal files. The aim of this project is to build up a network architecture to access the personal resources in an effective, faster and protectable way for Everywhere, Every Computer and Every OS. All data will be accessible and protected by the cloud and storage technology. So that users can keep clean to their computer OS. Or even after changed to different OS, the file will still can be accessible.

Project Background

Nowadays, the network becomes faster and more reliable. Different kind of the end device is nearly able to always connect to the internet (online). With the cloud technology, we can easily to share and access the files through the internet. However, it still cannot avoid duplicate downloaded files and store the copy of the files on different end devices. To make good use of the space and network, Project Cloudy is a redesign home network and computing architecture. The network planning will design for future scale (Easy to Join and Easy to Upgrade). The storage will consider of the duplicate data, upgrading the space and recoverability. It is a low-cost solution for everyone to make good use of the space and should be able to increase the productivity.

Scalability for network and storage

With the advantages of using public cloud storage, the size of storage can be upgraded by just pay to the cloud storage operators like Microsoft or Google. For private cloud, storage can be upgraded by increasing the HDD size in NAS. Or using the computer storage as a shared folder within the intranet. Due to the current storage is enough, based on the energy consideration, the design will not consider using the shared computer storage which is required the computer always online.

Cost

Item	Description	Price	Necessary?
TP-Link Archer C7	AC1750 Wireless Dual Band Gigabit Router	$ 550	Yes
TP-Link TL-SG105	Non-manage 5-port Gigabit Desktop Switch	$ 185	No
Lan Cable (Cat. 6)	Physical connection for end devices	$ 20 * 7	Yes
10 Gb Direct Connect	2x 10Gb Lan card + SFP cable	$ 290	No
Synology 213J	2-Bays NAS (RAID1- 1TB)	$ 1399	Yes
Two 6TB HDD	2x Seagate Ironwolf 6TB HDD	$ 1500	Yes
HP Gen 7	I5-4440+ 4GB RAM+ 3x 1TB+ 500TB	$ 597	No
Google Drive	19 GB Cloud Storage + Unlimited Photo Storage	Free	Yes
OneDrive	30 GB Cloud Storage	Free	Yes
	Total:	$ 3589	

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Specification

Private Clouds Storage

Synology 213J 2-Bays NAS	
RAID1(SHR)- 6TB	6 TB
[DIY] HP Gen7	
RAID5 - 3.5" 1TB WD Blue HDD x3	2 TB
500GB Toshiba HDD	500 GB
Total:	8.5 TB

Public Cloud Storage

Microsoft OneDrive	30 GB
Google Drive	19 GB
Total:	49 GB

Total Storage

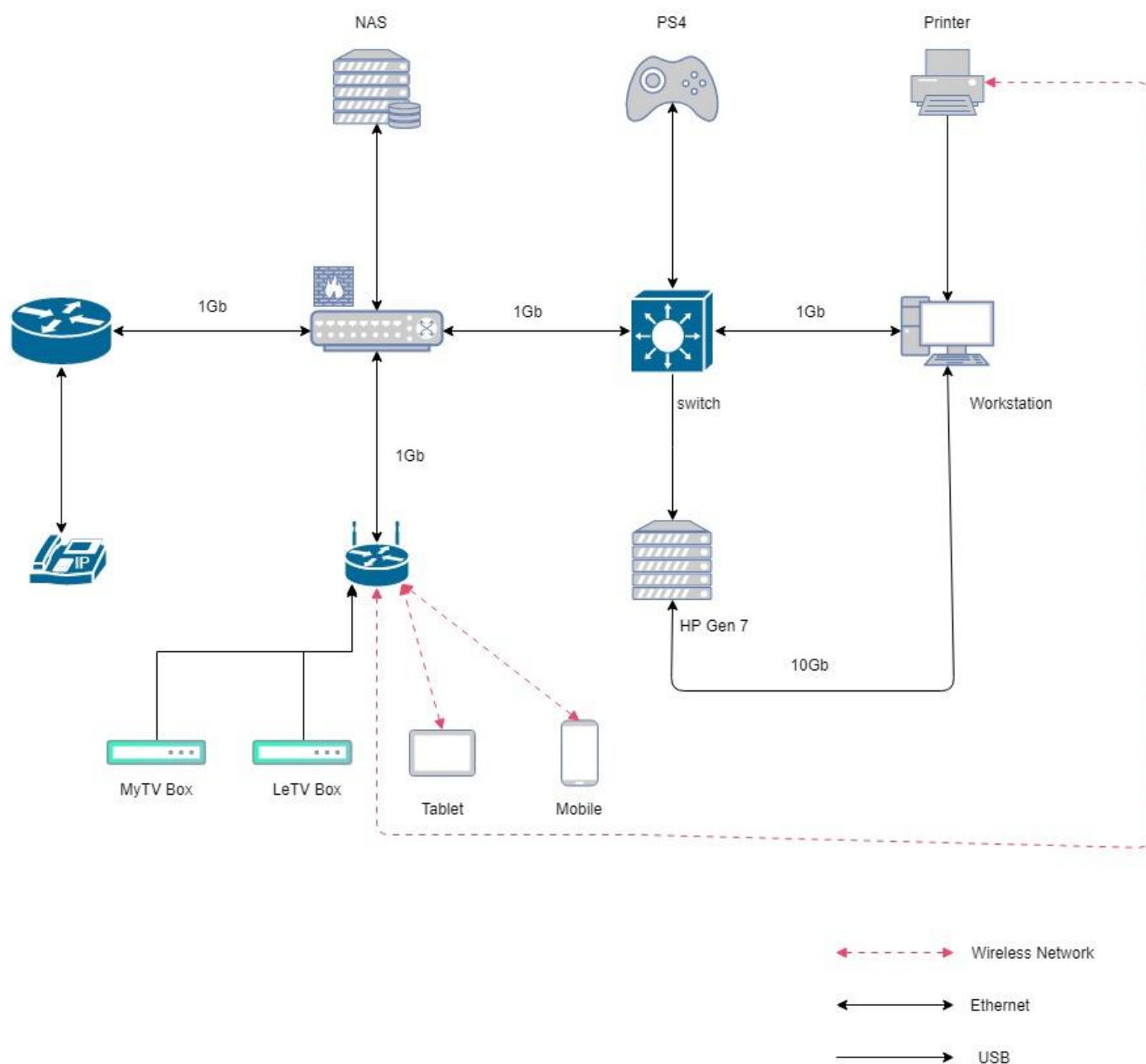| Private Clouds Storage	8.5 TB
Public Cloud Storage	49 GB
Total:	8.55 TB

This solution supported Any end devices which supported the following services:

- Web Browser
- SMB Protocol
- VPN Client
- NFS Protocol
- FTPs/SFTP Protocol
- Windows software installation
- PlayOnLinux supported Linux System
- Mac OS File System

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Network Topology

Software Requirement

- Backup & sync from Google
- Microsoft OneDrive (Windows Build-in)
- FTP Client (OS Build-in / FileZilla)
- VPN Client (OS Build-in)
- Network Drives (OS Build-in)
- OpenVPN Client

IP Table

Cisco RV320	10.0.0.1
ESXi Server (HP Gen 7)	10.0.0.10
Synology D213J	10.0.0.110

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Public Cloud and Private Cloud Evaluation

Public Cloud – Google

Google Drive provides a fast and unlimited high-quality photos storage on the public cloud. Also, Google Doc is one of the best online co-operate documents editors. Google Drive will be designed for the photo storage, Google Doc. Draw.io also based on the Google Drive so that all the Draw.io file will save in the Google Drive.

Public Cloud – Microsoft

Microsoft OneDrive provides an easy access via their Microsoft Office Suit software. It is the most directly way to accessing and editing the documents on different devices including mobile phone, tablet and over the OS whatever is Android or IOS. Due to Microsoft office is limited on the Linux system like Ubuntu, user can follow this solution to use office on Linux system:
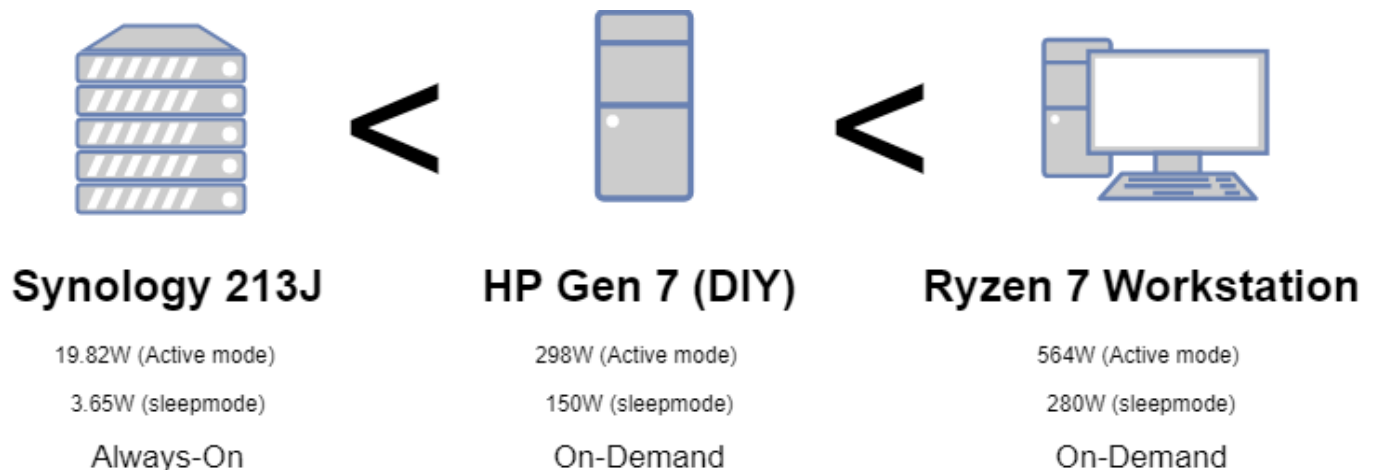
> OneDrive on Linux Solution is
> 1. Install the Microsoft office in a virtual machine mode. (PlayOnLinux)
> 2. Use the LibreOffice which is comparable to Microsoft office document and pre-installed in Ubuntu.

Private Cloud – Synology

NAS (Network Attached Storage) is one of the solutions to provide the private cloud storage and other network service. Synology DSM is based on Linux and can provide Windows File System Sharing (SMB), Linux File Sharing or even Apple Mac OS File Sharing. With the cloud technology, each user will have their owned private storage and can access the public resources.

Power Consideration

Synology 213J	HP Gen 7 (DIY)	Ryzen 7 Workstation
19.82W (Active mode)	298W (Active mode)	564W (Active mode)
3.65W (sleepmode)	150W (sleepmode)	280W (sleepmode)
Always-On	On-Demand	On-Demand

HP Gen 7 and Workstation boot up through the Wake on Lan (WOL) function. The magic packet sent out from the Always-on NAS Server through the internal network. The usage of power and the uses of the computer has been considered in this design.
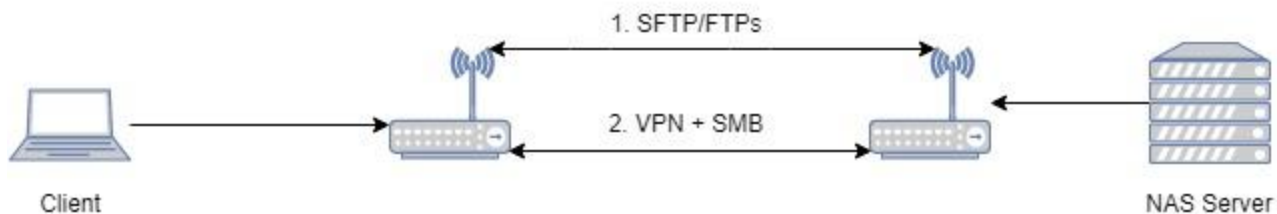
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Public Cloud and Private Cloud Federation

iSCSI drive on Private Cloud share the single copy of public cloud for local area network (LAN). Each Modification will be done on iSCSI drive by the end device within the Local Network. synchronous software on the end-device will sync the file to the public cloud. Both ISCSI drive and public cloud file will up to date. And there will only one copy of the public cloud within the local network so that the storage is saved. That single copy also protected be the RAID setup within the NAS.
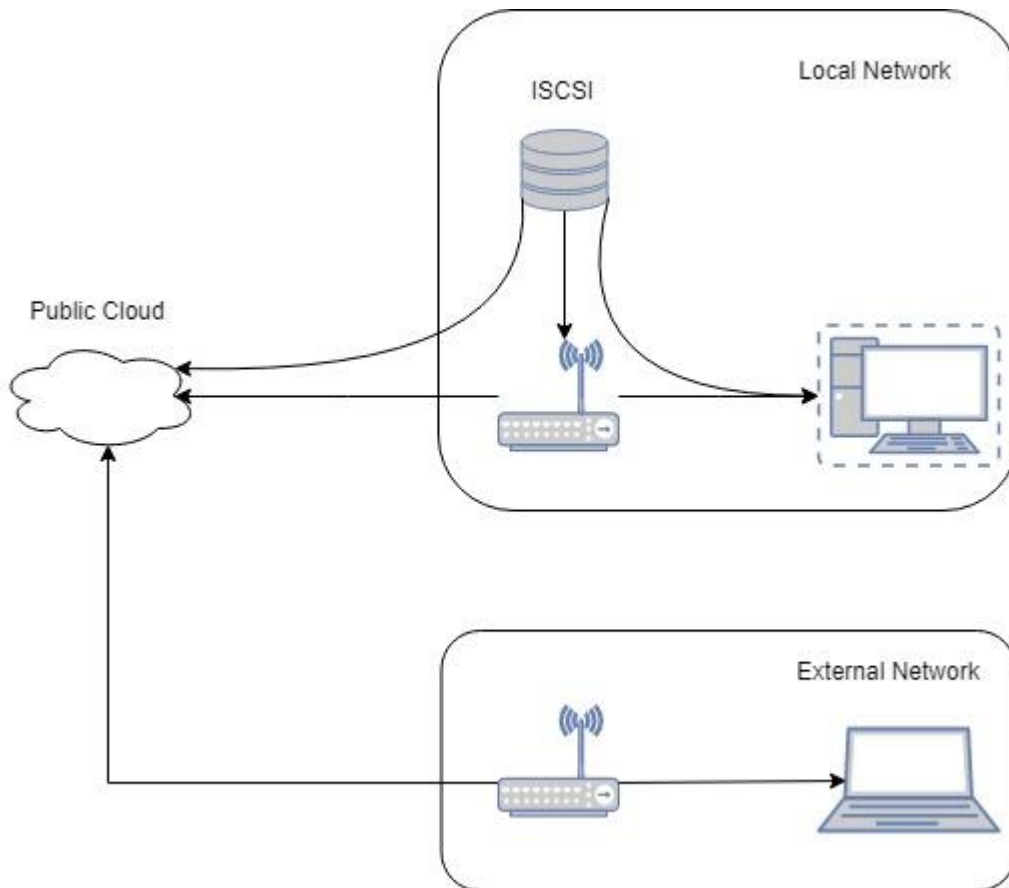
External Network Access Private Cloud

There are multiple methods to access the private cloud resources.

Direct Access (For one or less files access)

- SFTP/FTPs
- Synology Server Web Portal

Indirect Access (For large amount data access)

- VPN + SMB

*** Server Hardening and Information Security is not included in this document.

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