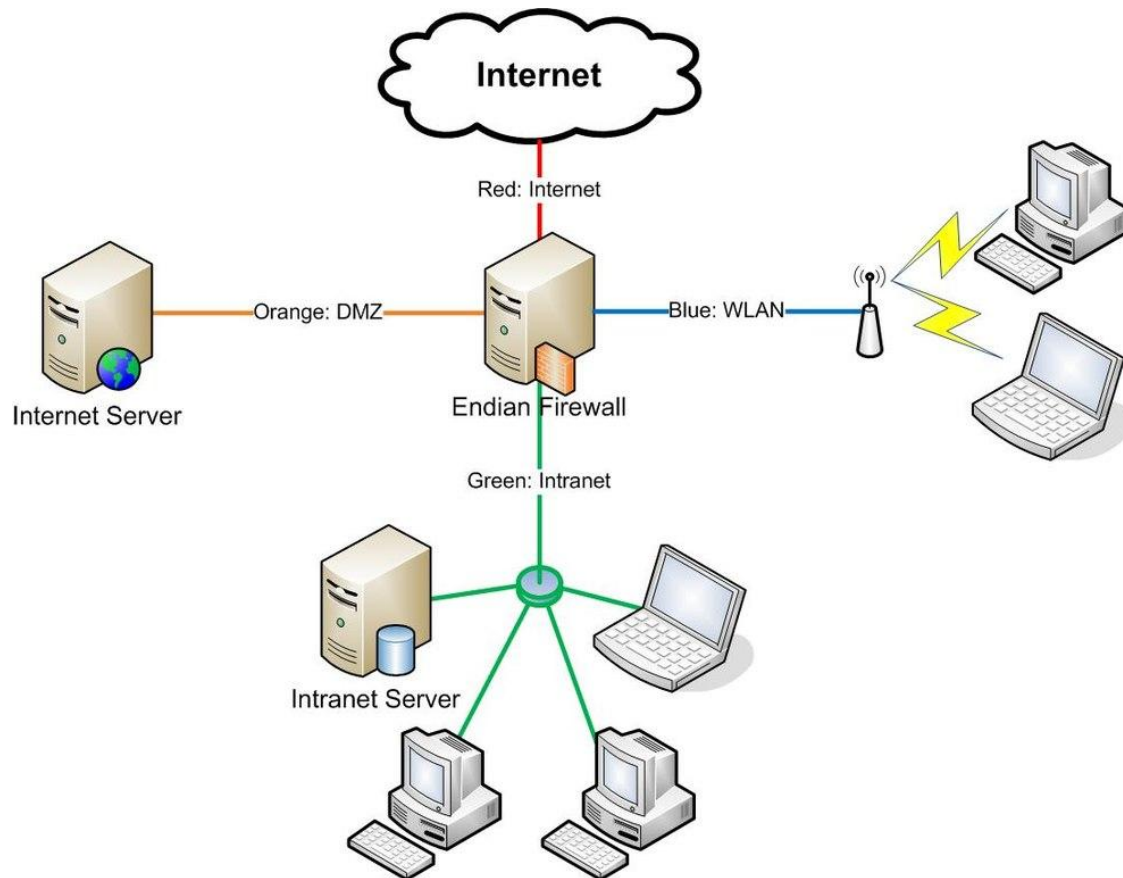# ISM 324 and CSC 580

Collaborative Project Meeting

Introduction to Cloud Computing and Storage
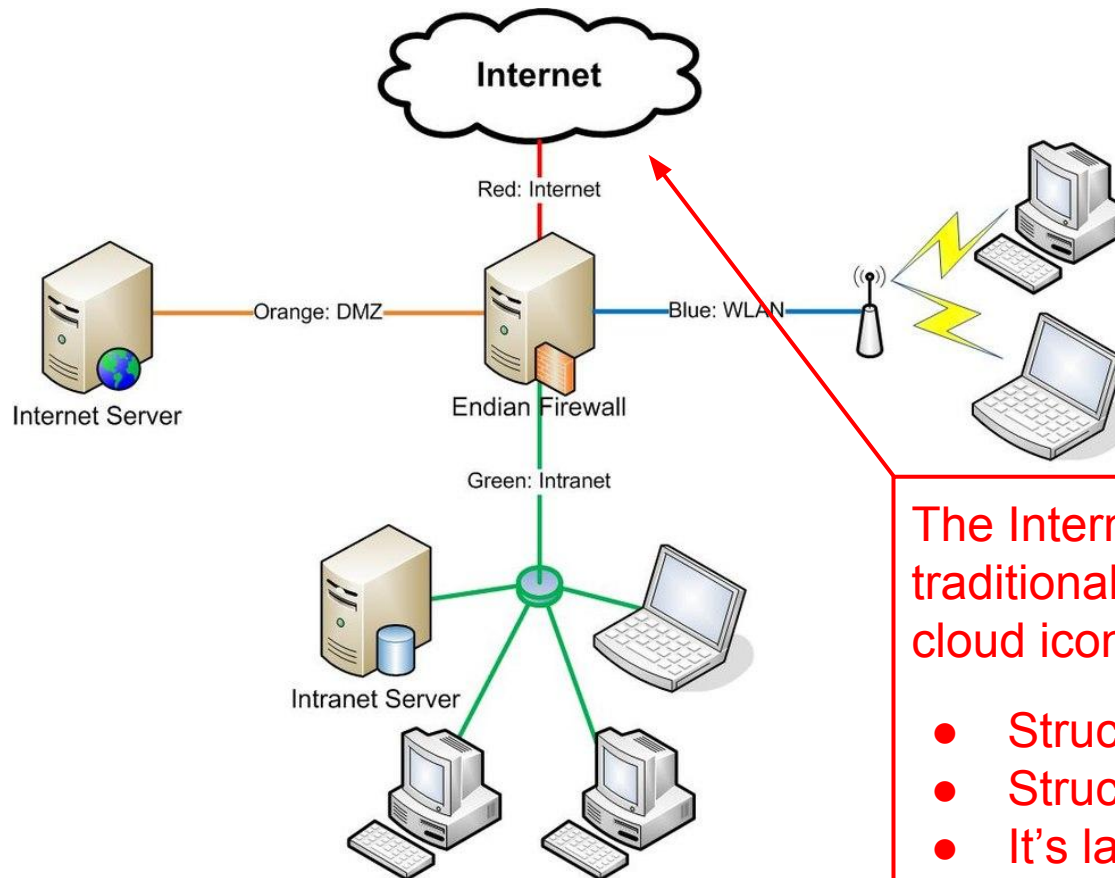
January 16, 2018

What does "the cloud" mean?

An example of a typical network diagram:

What does "the cloud" mean?

An example of a typical network diagram:

The Internet was is traditionally drawn with a cloud icon - indicating

- Structure is unknown
- Structure is irrelevant!
- It's large

Cloud Computing / Services

Definition: Using remote, Internet-based servers for computational or storage resources.

Some benefits:
- Accessible from anywhere, any time
- Maintenance done by someone else (unless self-hosted!)
- Cost-effective, as part of a shared data-center
- Scalable resources

Some drawbacks:
- Availability relies on Internet connection and server reliability
- Long-distance communication creates a performance hit
- Your data is on someone else's machines (unless self-hosted!)
- Co-located with others - maybe even competitors

Trust is key!

Cloud Computing

Idea: Computational resources that run your programs are located and managed remotely.

Some examples:

- Amazon EC2 (Elastic Compute Cloud)
  - https://aws.amazon.com/ec2/

- Microsoft Azure
  - https://azure.microsoft.com

- Google Cloud Platform - Compute Products
  - https://cloud.google.com/products/compute/

Many services have a "free trial" account, or even free student accounts!

Cloud Storage
Concepts

Idea: Your data / files are stored on a remote server (not a computational service - just storage!)

Two main models:

| _File sync_	_File stream_
All files on local sys and server ● Both monitored for changes ● Local file change → Upload ● Server file change → Download	Files not generally on local system ● File-by-file access ● Limited local storage during use ● Download/use/upload
Ex: Dropbox desktop sync client	Ex: Google Drive streaming Note: Kumo @UNCG makes files available as virtual drives

Cloud Storage
Simple Model

Think about: Where is data in the system?
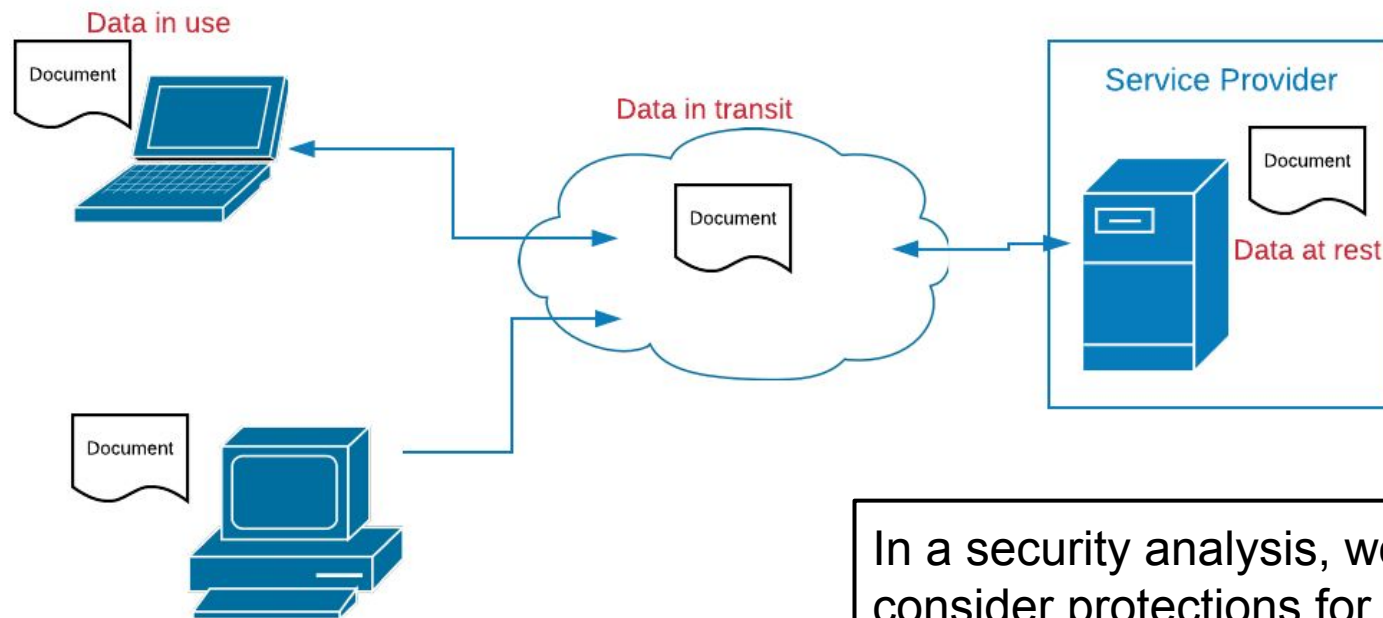
In a security analysis, would consider protections for each data location and context.

Cloud Storage
Examples - Mainstream Providers

Dropbox
- First widespread system
- Released June 2007
- Created by 2 MIT students
- Broadest support
- Personal, premium, and business accounts
- Over 500 million users

box
- Started in 2004
- College project @USC
- Powerful sharing settings
- Support on all but Linux
- Workflow support
- Business policy support
- Over 50 million users

Google Drive
- Tightly integrated w/GSuite
- Good sharing w/Google accts
- Support on all but Linux
- Supports HUGE files (5TB)
- Over 800 million users

Microsoft OneDrive
- Tight integration in Win 10
- Great integration w/Office365
- No file versioning
- Some cross-platform support
- Over 115 million users (?)

UNCG users have unlimited storage on Box and Google Drive, and 1TB on OneDrive

Cloud Storage
Example - Nextcloud

Free, open-source system

- Server is simple PHP web application
- Sync clients for:
  - Windows, OSX, Linux
  - Android, iOS, Windows Mobile
- Company/development is funded by support contracts

Security advantage of open source: Anyone can audit!

- But: Because people can, doesn't mean they will!
- … in CSC 580 we will! (at least partially…)

Still a matter of trust!

Upcoming version (13.0) will support end-to-end encryption

- E2E encrypted data never leaves device unencrypted
- Version 13.0 currently at "release candidate 1" level

Cloud Storage
Nextcloud - Usage model 1: Get the software
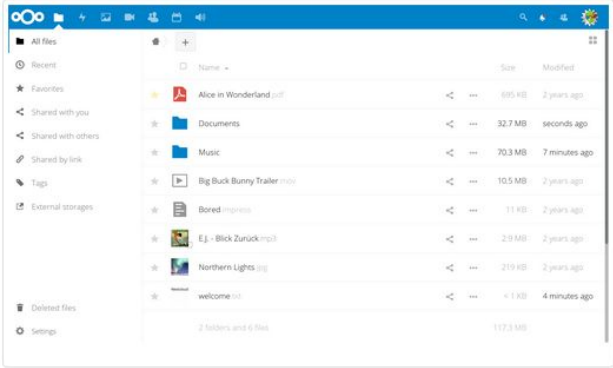
Download the software, run it on your server…

- If on your server: No cost after buying hardware (IT staff?)
  - … can use a remote managed server (e.g., Amazon EC2)
- All data stays on your equipment and in your control
- But: Must install, maintain, backup, patch - all yourself

Cloud Storage
Nextcloud - Usage model 2: Buy a dedicated device

Buy a box and plug it in!

Goal is plug and play
- Reality: Not quite…
- Access from anywhere
- Data on your devices

Note: Some similar proprietary solutions:
- Seagate Personal Cloud
- WD My Cloud

Nextcloud Box

The Nextcloud Box comes preinstalled with Nextcloud, running on Ubuntu Core (based on the new super-secure, remotely upgradeable Linux app packages known as snaps) as the OS.

The box consists of a 1 TB USB3 hard drive from WDLabs, a Nextcloud case with room for the drive and a compute board, a microUSB charger, cables and adapters, a screw driver and screws

The Box is compatible with the Raspberry Pi 2 (not included!). Support for other boards (e.g. Raspberry Pi 3) is coming soon.

Learn more →

Spreedbox

Behind the award-winning designed device by struktur AG operates a secure video chat and file exchange solution for small enterprise usage.

It offers Strong end-to-end encrypted audio and video chat, a Nextcloud based file sync and share solution and advanced security features with a silicon hardware key generator.

The Spreedbox offers an optional SIP gateway, enabling web conferencing participants to dial in through a traditional telephone connection.

Learn more →

Syncloud

Syncloud is a home server device which fully supports Nextcloud.

It features easy installation and activation, selection of hardware among 10+ boards, easy use of external hard drives for storage, domain name for device and access to device through Internet, automatic HTTPS setup and more

https://nextcloud.com/devices/

Cloud Storage
Nextcloud - Usage model 3: Get a service provider

True 3rd party cloud
(like Dropbox, etc.!)

Over 50 different providers
- Different service levels
- Free - Enterprise
- Different locations

Quality Location Systemhaus
Quality Location UG
We offer German-hosted Nextcloud hosting as well as dedicated servers and webspaces. All services are protected by strict german privacy law.

manitu
manitu GmbH
German web hosting with strict data privacy. Powered by 100% green energy. First class customer service.

PROHosting
PROHosting
PROHosting is a first Belarussian organization, respectful of privacy. We offer free and alternative Cloud solutions for all. Ready to use or dedicated server.
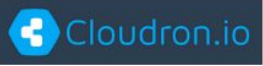
GreenAnt
GreenAnt Networks
GreenAnt offers an Australia-based Nextcloud option. Our servers are peered on AARNET so syncing is super fast and reliable.

punkt.de hosting
punkt.de Hosting
Professionelle Business Nextcloud-Lösungen mit großem Speicher (ab 500 GB), inklusive 7 Tage Backup. Gehostet in Deutschland.

Cloudron.io
Cloudron
Cloudron is a platform to run apps on your server, hosted on DigitalOcean. Cloudron makes self hosting Nextcloud easy!

windcloud
Windcloud
Windcloud - Your Green Data Center. Based on our renewable energy infrastructure we are your partner for cloud storage, -infrastructure, VMs...

KD Kaster Development
Webdesign aus NRW
Kaster Development
Ihre eigene Cloud für privat und Business Kunden. Ihre Daten sollen Ihre Daten bleiben, deshalb deutsche Server in qualifizierten Rechenzentren.

RACK::SPEED
rackSPEED GmbH
We offer German-hosted Nextcloud hosting and dedicated servers with daily off-site backup. All services are protected by strict german privacy law.

SaaS Web Internet Solutions
Saas Web Internet Solutions GmbH
Managed Nextcloud for your business. Store and share large files easily. SaaS Web manages the Nextcloud environment in all technical aspects.

Linuxfabrik
Linuxfabrik GmbH
As specialists we support companies from consulting to the safe operations of selected Open Source Software on demand with technical support 365 days a year

GWC Systems
GWC-Systems
Eine Cloud in Ihrem firmeneigenen Design! Die Daten liegen bei GWC-Systems auf deutschen, gesicherten Clustern und sind jederzeit durch Sie abrufbar.

KLÖCKER

eXtro.hosting

GETCON

https://nextcloud.com/providers/

Demo….

Live demo of Nextcloud

And if that doesn't work… a pre-recorded demo

https://youtu.be/BgjTHdzYC5w