NdnDrop

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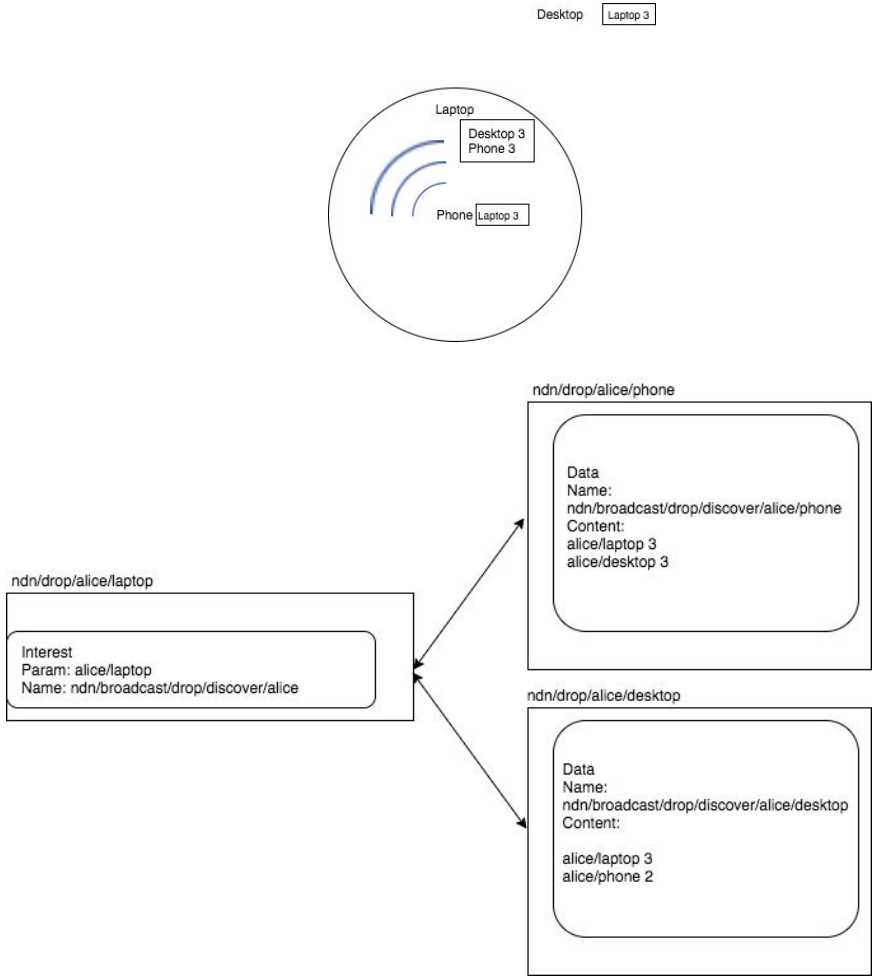
Introduction

- Our goal was to create a device-agnostic file sharing system.
- Users should be able to share files with nearby devices regardless of their access to the internet.
- A users files should not have to cross the internet when shared between two nearby devices.
- No unauthorized user should be able to access those files.

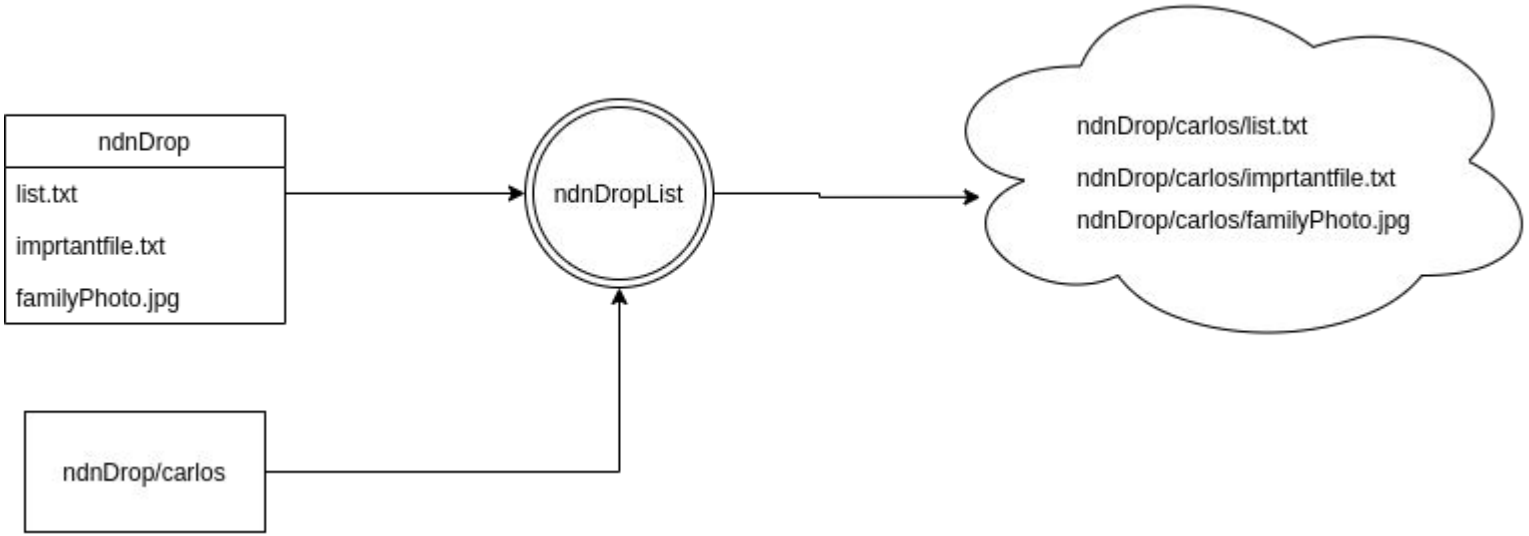
Neighbor Discovery

- The user wants to know which devices are available
- A soft state protocol maintains a list of neighbors and timers.
- Nodes send period discover interests requesting neighbor lists.
- Nodes learn of neighbors from receiving discover interests and from the neighbors in the neighbor list.



Listing Files - Overview

- Consumer needs to know which files are available
- Consumer sends interest packet and receives a list of downloadable files
- Producer contains a ndnDrop directory which hosts all shareable files
- Producer maintains list.txt file which contains names of all files available



Listing Files - Initial Challenges

- How does a consumer know what files are available?
  - Used a NDN's ability to have a naming schema so each user can expect a list.txt in the root of their ndnDrop directory
- Seamlessly updates list.txt when ndnDrop directory is modified
  - Created bash helper script to watch directory and change list.txt on change
- Example command:

```
ndndroplist -n /ndnDrop/carlos/ -d /home/carlos/Documents/CS217B/ndnDrop
```

- -n flag is the prefix the files will be uploaded to
- -d flag is the directory of the ndnDrop folder to publish files

Retrieving Files

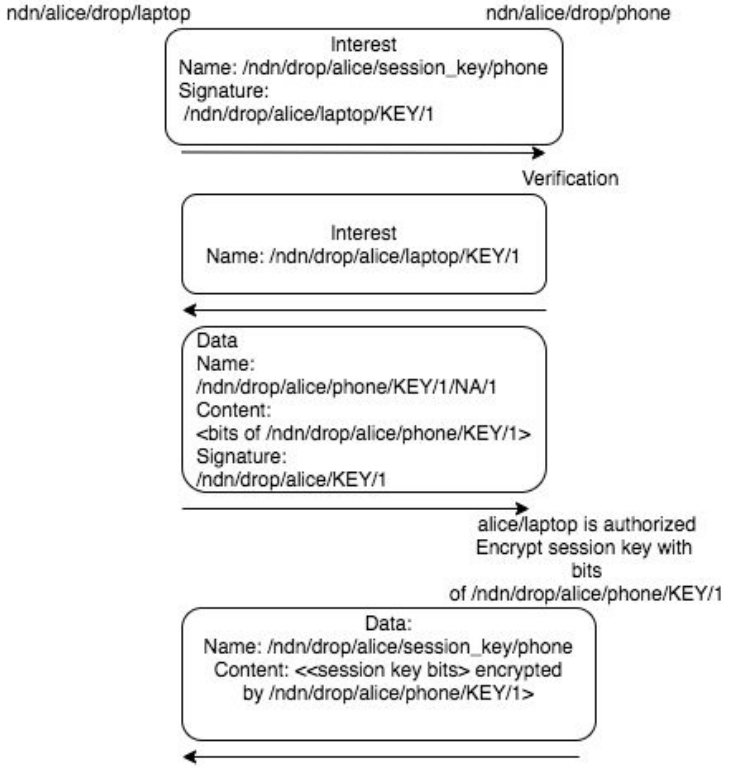
- A Consumer needs to be able to download files
- Built on top of ndn-tools but downloads file instead of printing to stdout
- Example command:

```
ndndropretrieve /ndnDrop/carlos/list.txt
```

- Aforementioned command would download list.txt to local machine

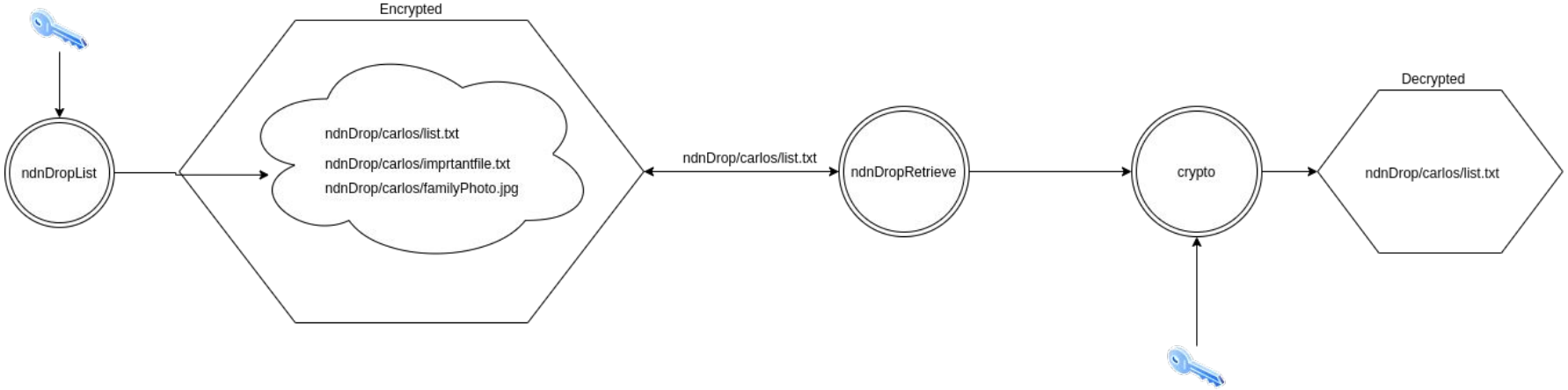
Access Control, Security, and Privacy

- We want to ensure that a user's files cannot be accessed by anyone else.
- Unauthorized users should not be able to gain access to the files in plain text.



Encryption/Decryption -Overview

- Files are encrypted upon publishing for confidentiality
- When files are downloaded they still have to be decrypted



Benefits of NDN

- No need for IP address management
- Security comes easy with schematized trust.
  - Trust anchors, signed interests, and certificates that are built-in with NDN made verifying authenticity and ensuring privacy simple.
- Naming data translates well to the application layer.
  - /Alice/familyPhoto/spot.jpg -> ndnDrop/Alice/spot.jpg
- Neighbor discovery became a simple task with NDN