pShare

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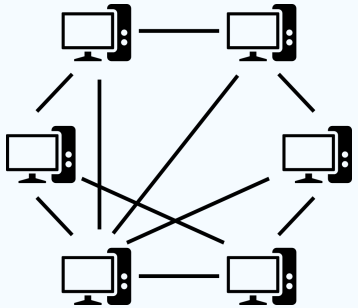
Traditional Solutions

- cloud services ($$$)
  - accessible online only
  - need to place trust in the cloud provider
  - bandwidth limitations

- hard backups ($$$)
  - mechanical failures & single point of failure
  - must constantly maintain drives and monitor failure
  - must know geographic location of drive

Our Proposal

- pShare: a self-healing, efficient, redundant storage system on LAN networks
  - 0 upfront cost
  - utilizes p2p networking to store files across multiple computers on the network, easy upload & download
  - *scalable without any configuration necessary*
  - redundancy, efficiency, integrity, and confidentiality guaranteed

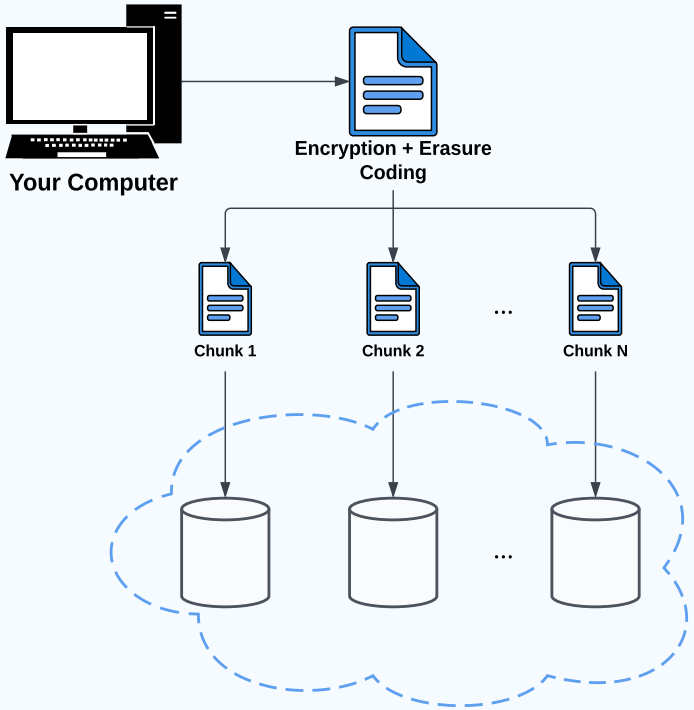


Who?

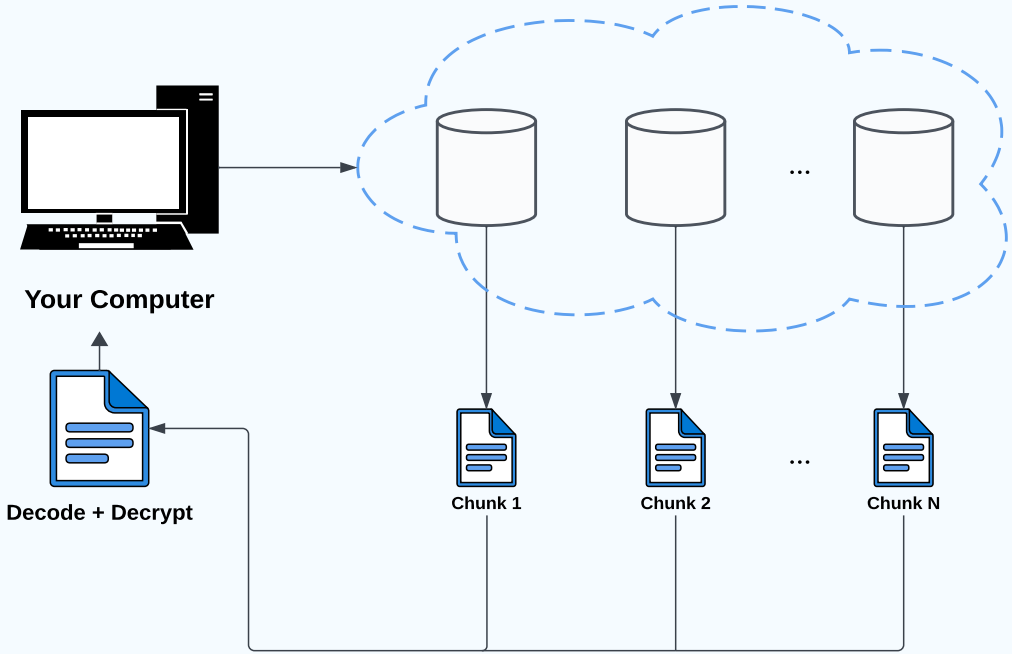
any person or business who:

- wants to securely backup / distribute lots of data
- don't trust cloud service providers to be secure and ethical with their data
- has access to many computers that don't fully utilize their storage

High Level Overview of Upload



High Level Overview of Download



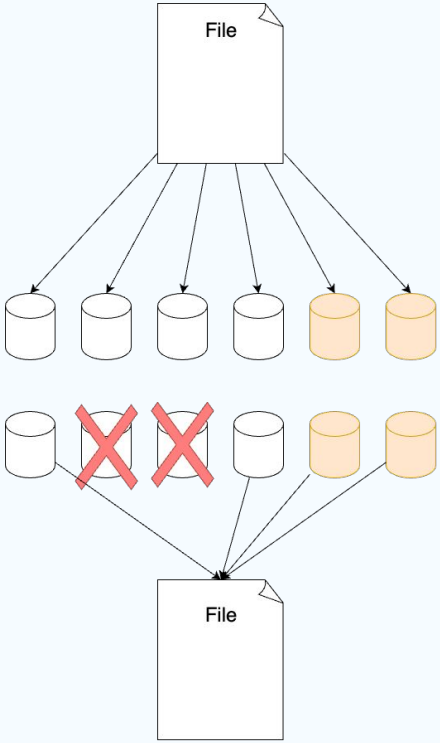
Files in the System

when uploaded:

1. **n** = (**k** data chunks + **m** parity chunks created)
    a. **m** determines max # of chunk loss
    b. **n** is automatically determined
2. **n** chunks distributed to **n** nodes

when downloaded:

1. **k** nodes pinged for collection
2. **k** chunks downloaded



Deeper Dive (Connection)

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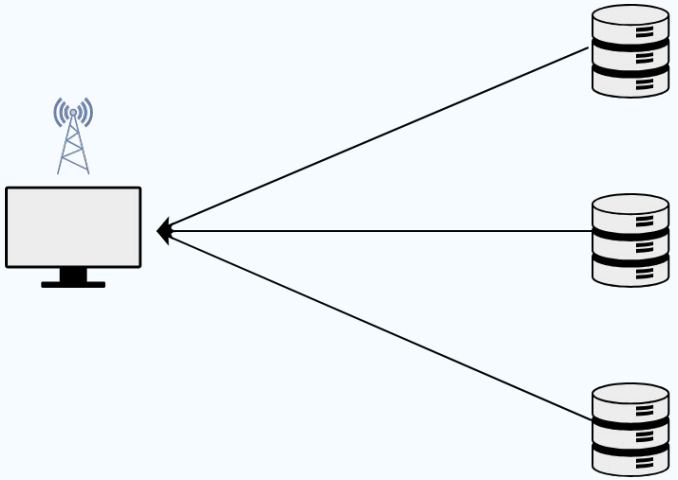
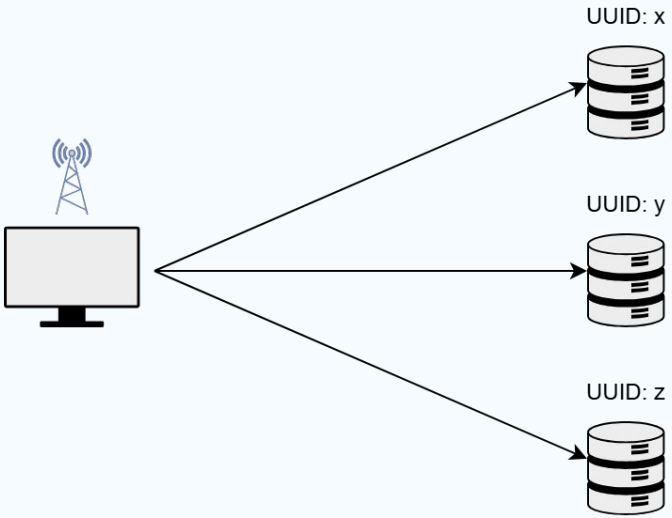
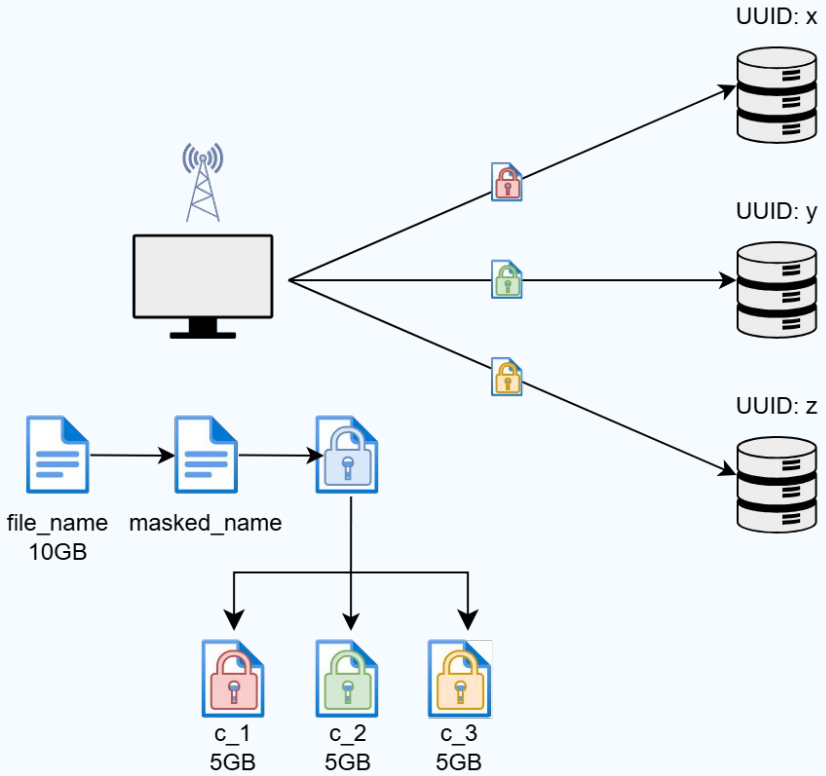


A Little Deeper Dive (Connection)



A Little Deeper Dive (Upload)



A Little Deeper Dive (Self-Healing)

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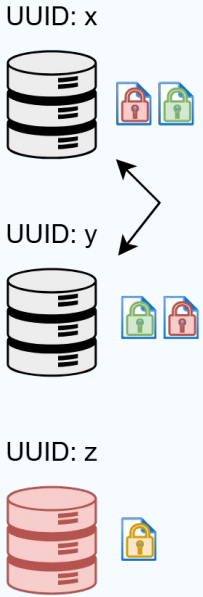
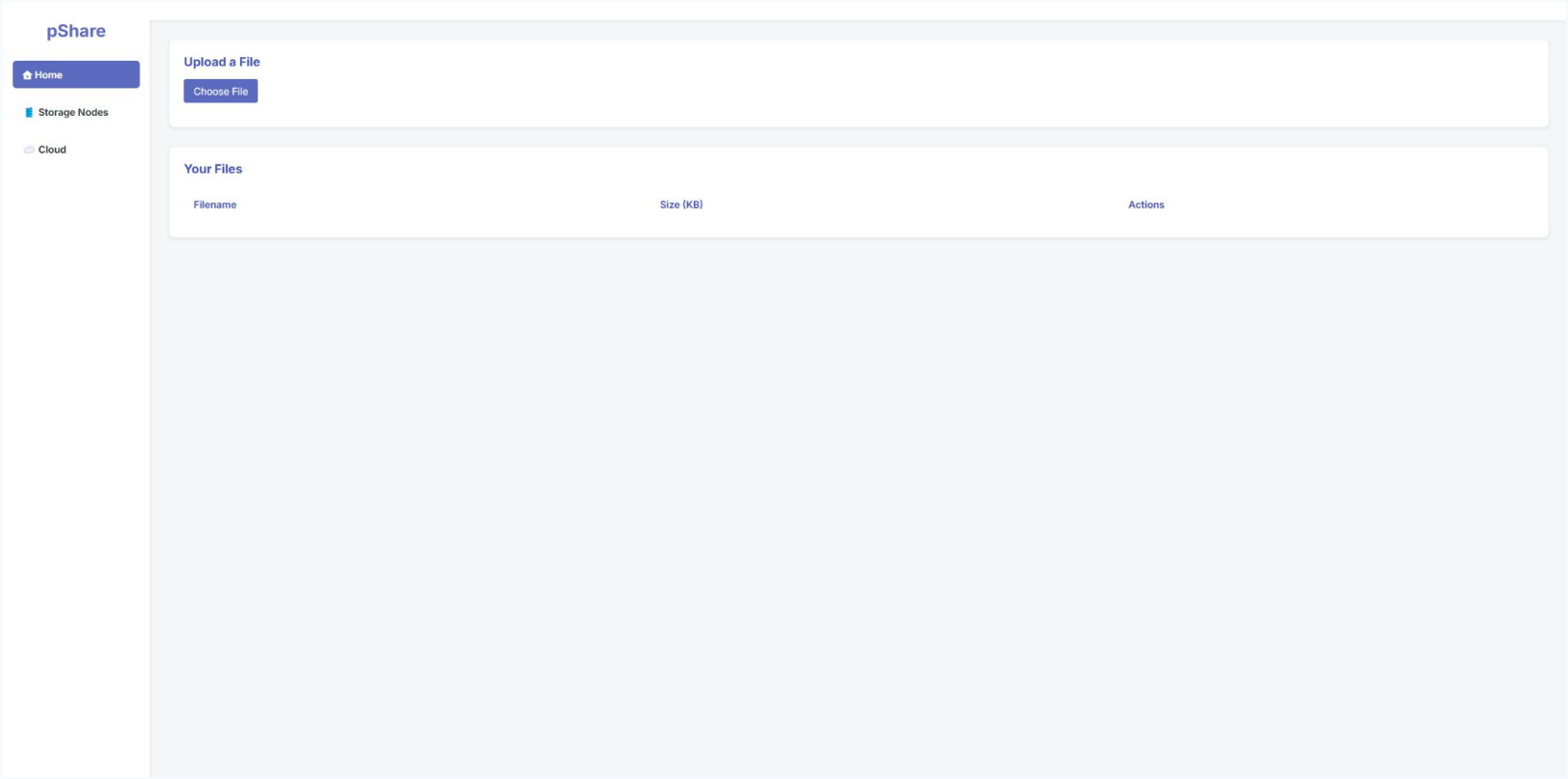


Storage Overhead & Redundancy

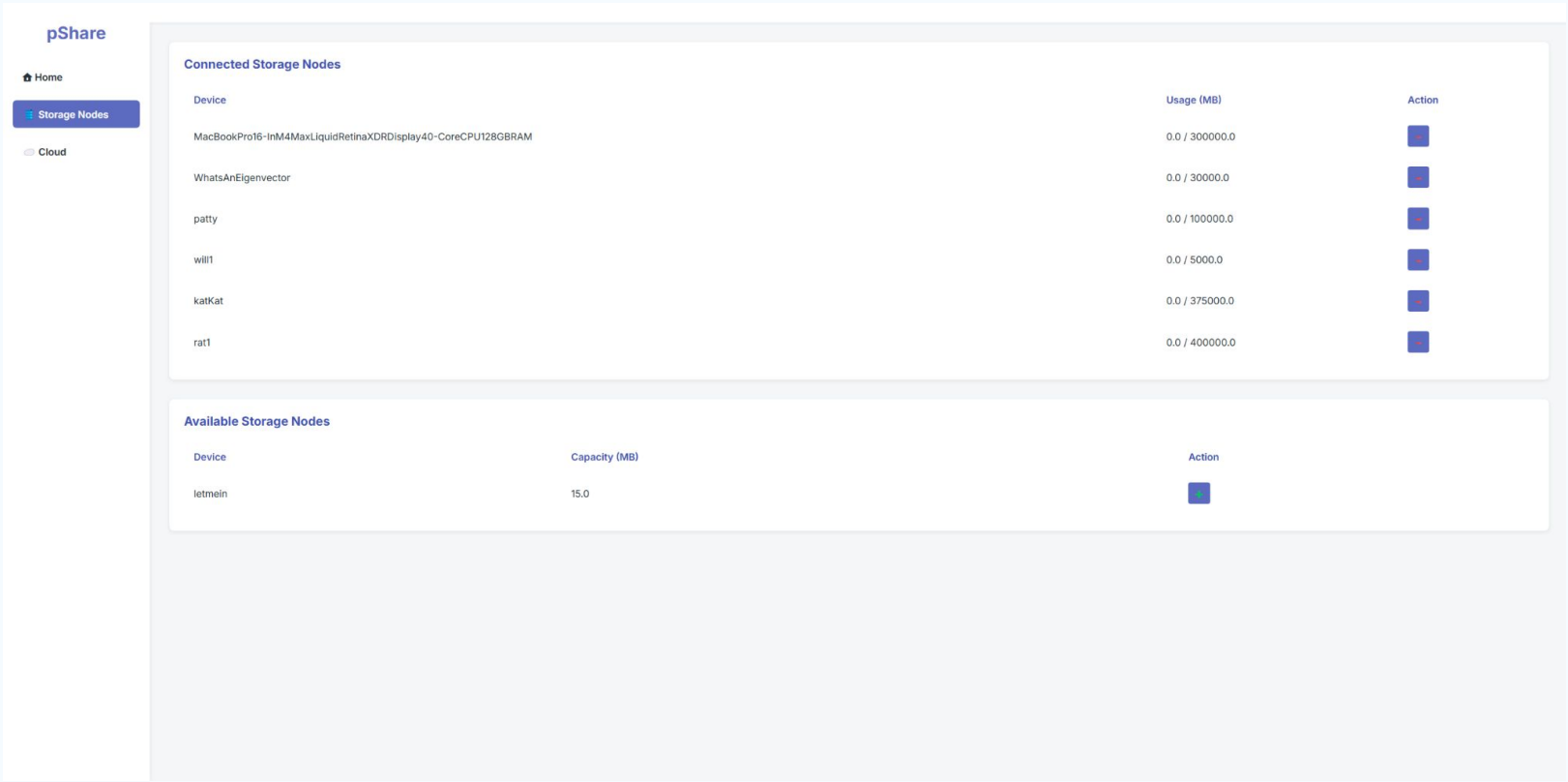
for a file that is 10GB in size:

- 1 or 2 nodes → direct file copies, erasure coding is not applicable
- 3 nodes → 2/1
  - *15GB total, tolerates 1 failure* (1.5x)
- 5 nodes → 3/2
  - *16.7GB total, tolerates 2 failures* (1.67x)
- 17 nodes → 12/5
  - *14.2GB total, tolerates 5 failures (1.42x)*
- 30 nodes → 25/5
  - *12GB total, tolerates 5 failures (1.2x)*

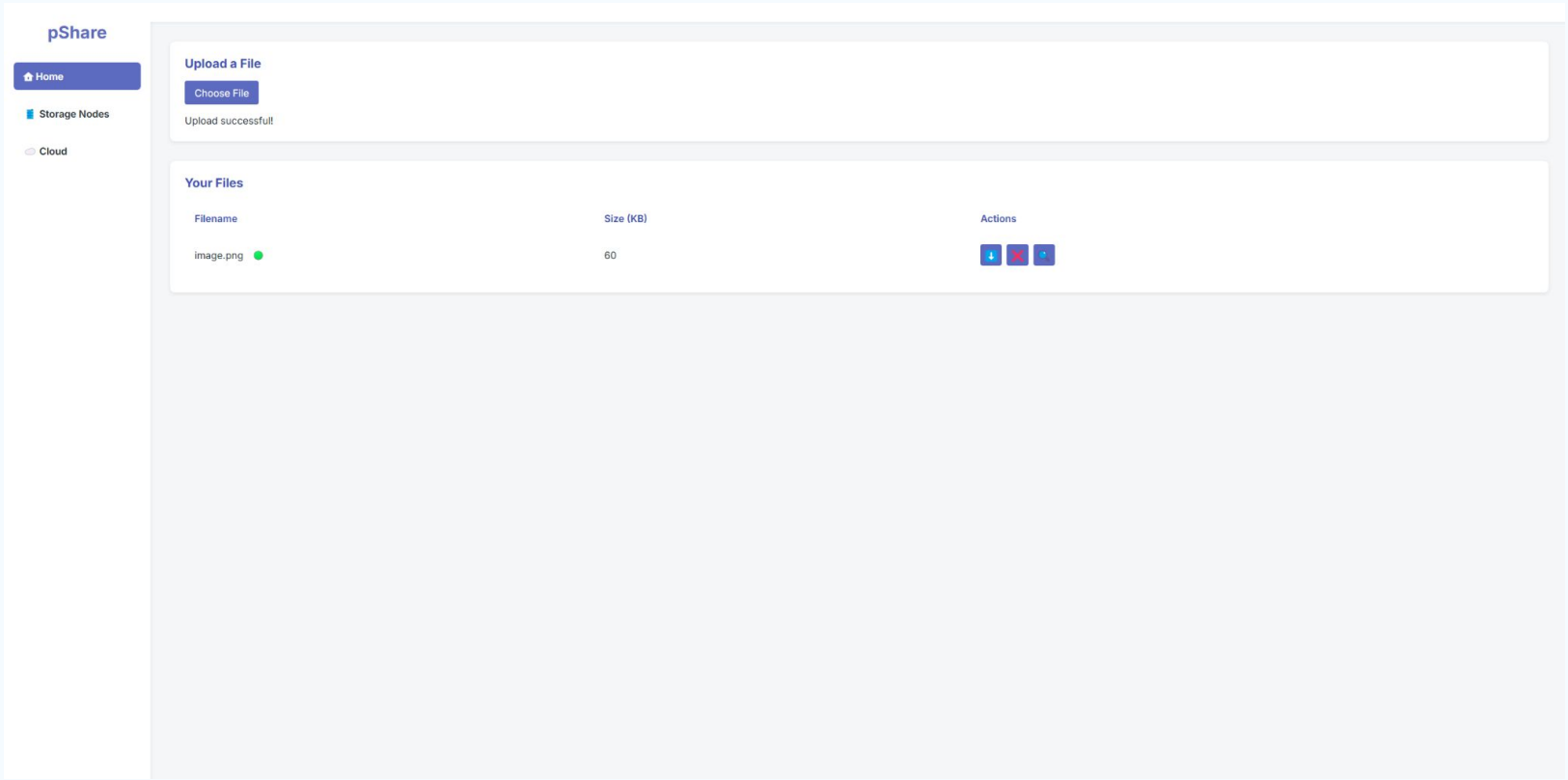
Demo!


pShare
Home
Storage Nodes
Cloud
Upload a File
Choose File
Your Files
Filename
Size (KB)
Actions

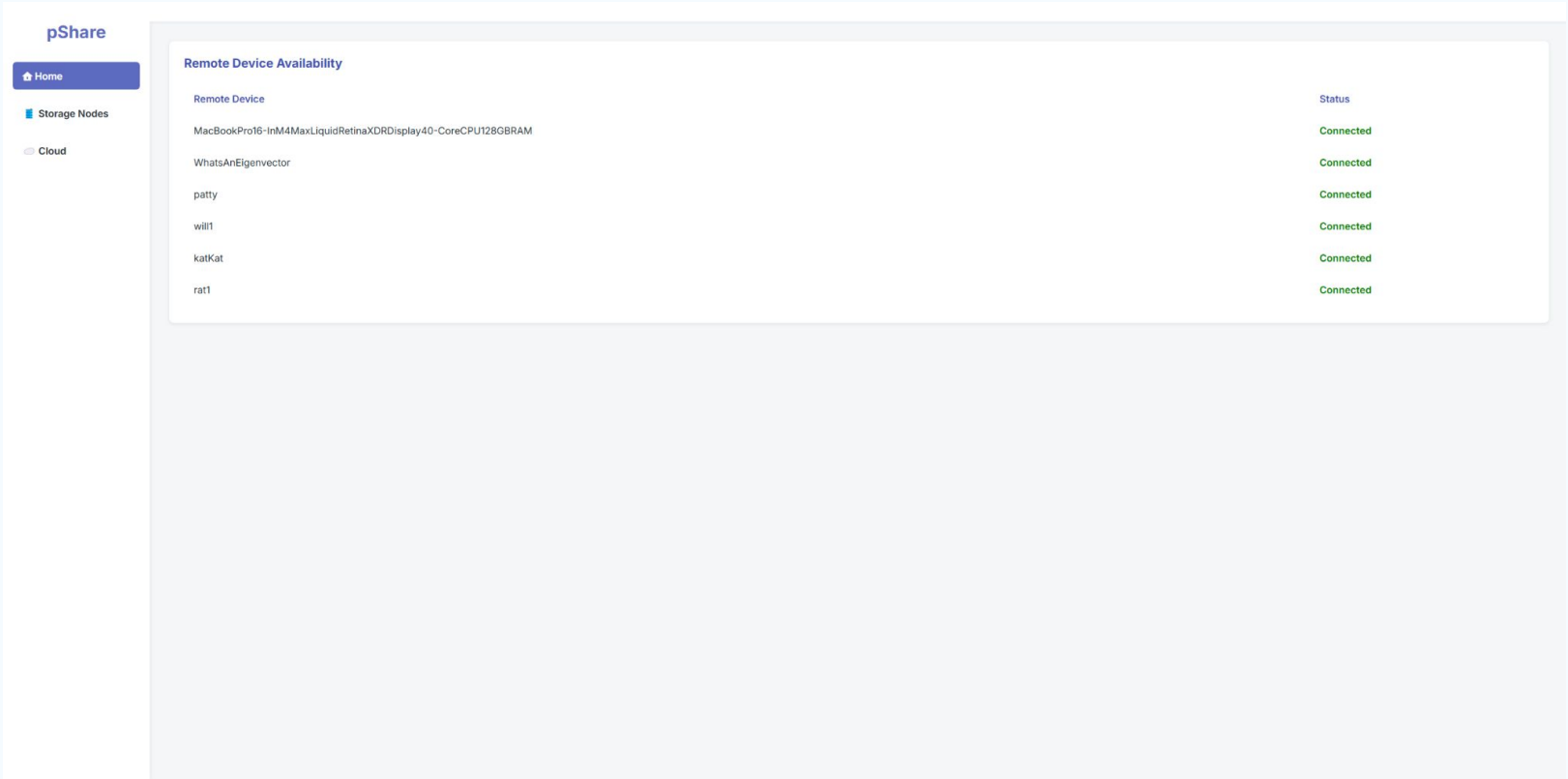
Demo!


pShare
Home
Storage Nodes
Cloud
Connected Storage Nodes
Device
Usage (MB)
Action
MacBookPro16-InM4MaxLiquidRetinaXDRDisplay40-CoreCPU128GBRAM
0.0 / 300000.0
WhatsAnEigenvector
0.0 / 30000.0
patty
0.0 / 100000.0
will1
0.0 / 5000.0
katKat
0.0 / 375000.0
rat1
0.0 / 400000.0
Available Storage Nodes
Device
Capacity (MB)
Action
letmein
15.0

Demo!


pShare
Home
Storage Nodes
Cloud
Upload a File
Choose File
Upload successful!
Your Files
Filename
Size (KB)
Actions
image.png
60

Demo!


pShare
Home
Storage Nodes
Cloud
Remote Device Availability
Remote Device
Status
MacBookPro16-InM4MaxLiquidRetinaXDRDisplay40-CoreCPU128GBRAM
Connected
WhatsAnEigenvector
Connected
patty
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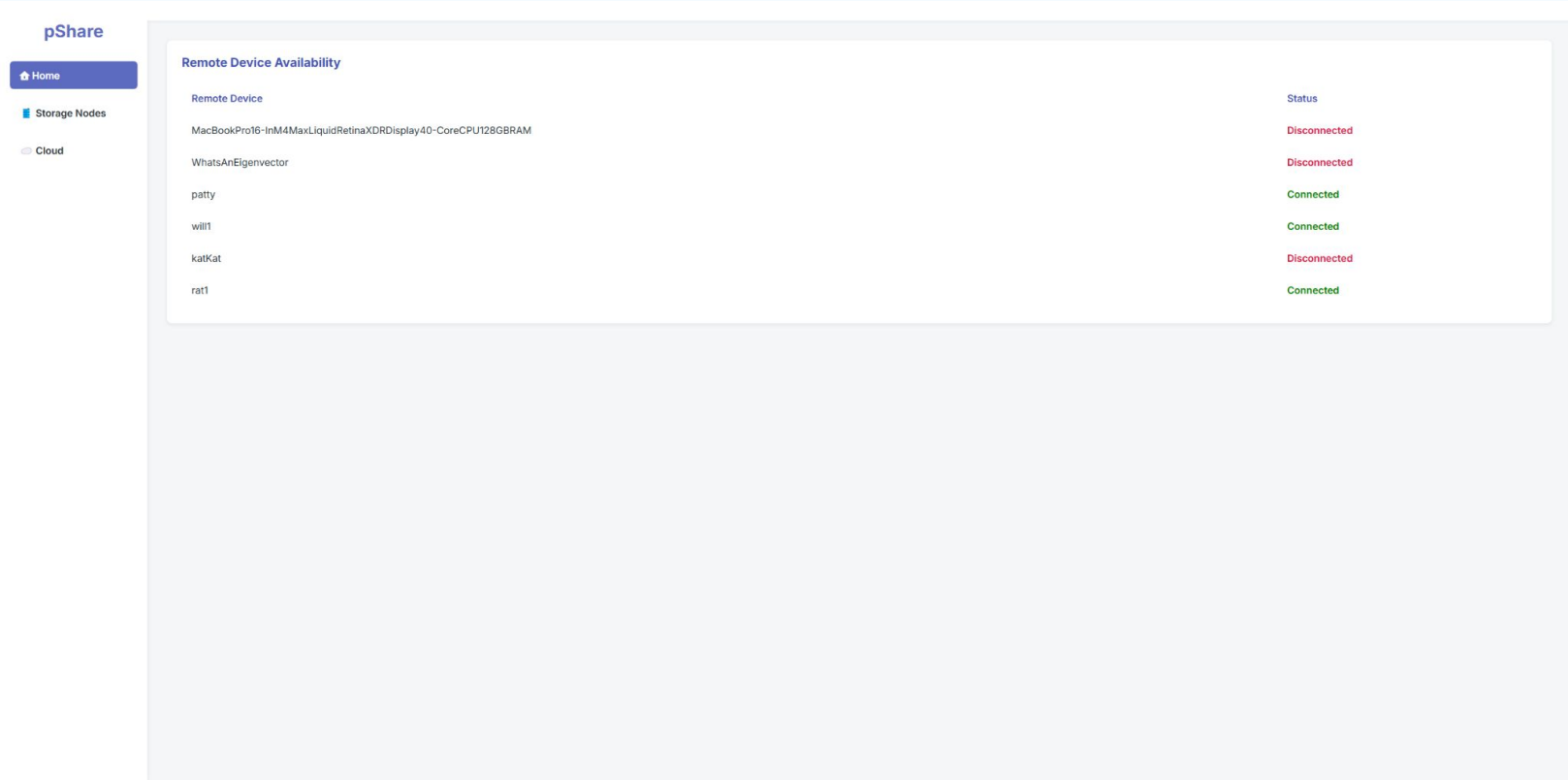
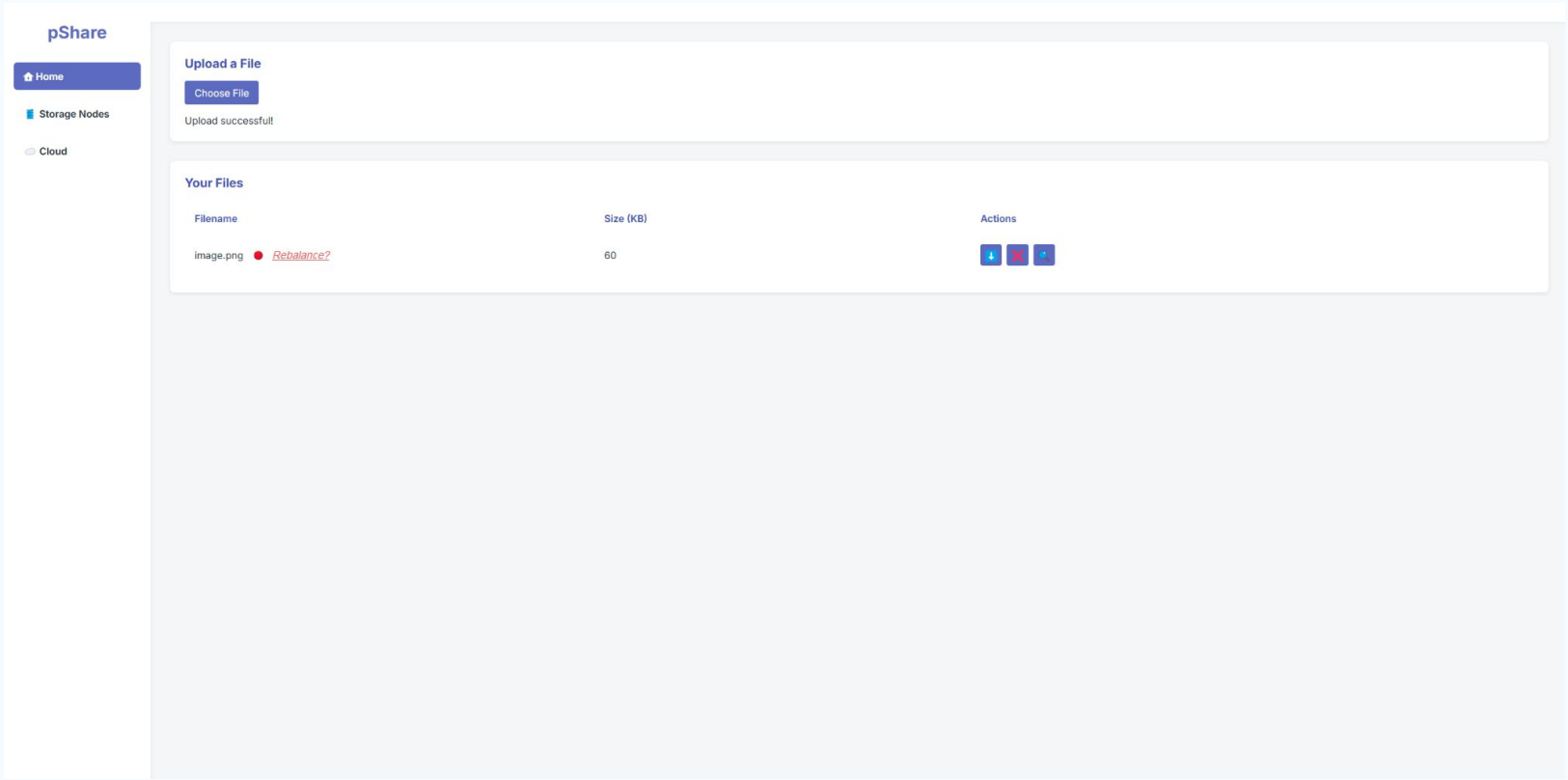
Demo!


pShare
Home
Storage Nodes
Cloud
Remote Device Availability
Remote Device
Status
MacBookPro16-InM4MaxLiquidRetinaXDRDisplay40-CoreCPU128GBRAM
Disconnected
WhatsAnEigenvector
Disconnected
patty
Connected
will1
Connected
katKat
Disconnected
rat1
Connected

Demo!


pShare
Home
Storage Nodes
Cloud
Upload a File
Choose File
Upload successful!
Your Files
Filename
Size (KB)
Actions
image.png
Rebalance?
60

Thank You