

*Applications*

Files

Tables

CRDTs

*Application Interface*

Directories

Key/Value Pairs

Graphs

*Wide-area SDS System*

Manifest

Manifest

Block

Block

Block

Block

**chunks**

*Service Interface*

create(), read(), delete()

Object storage

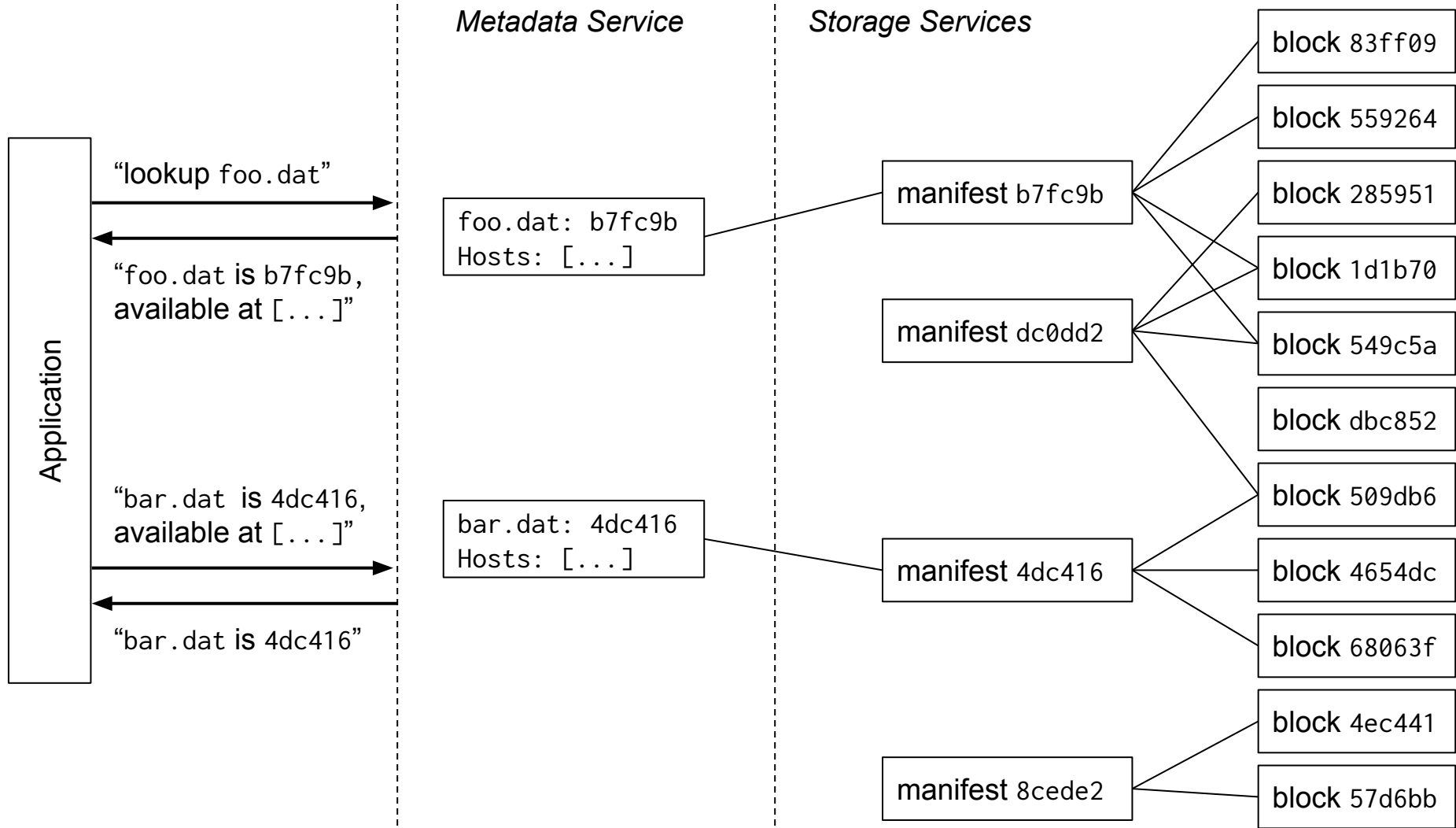
HTTP proxies

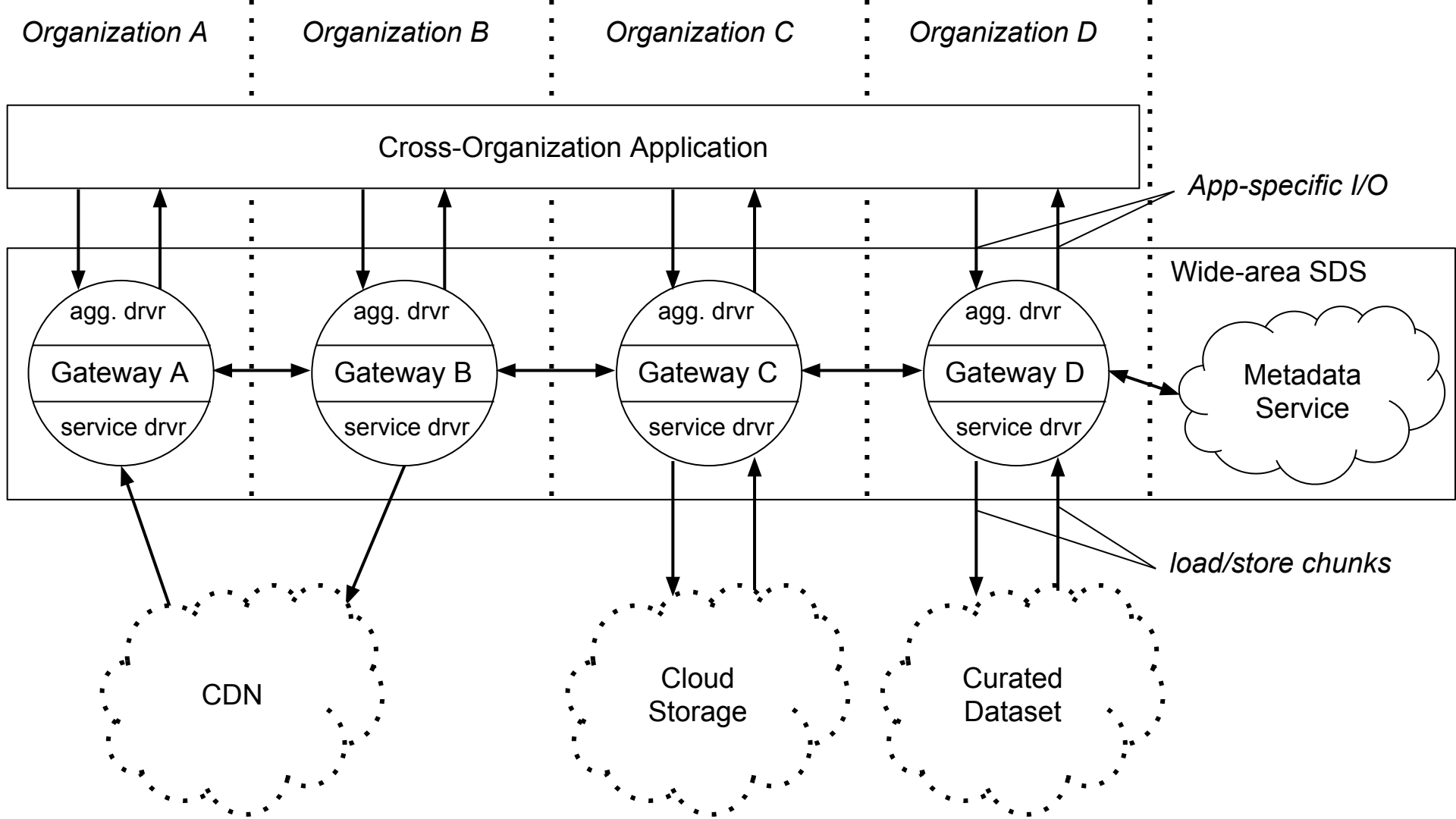
WebDAV

iSCSI

P2P networks

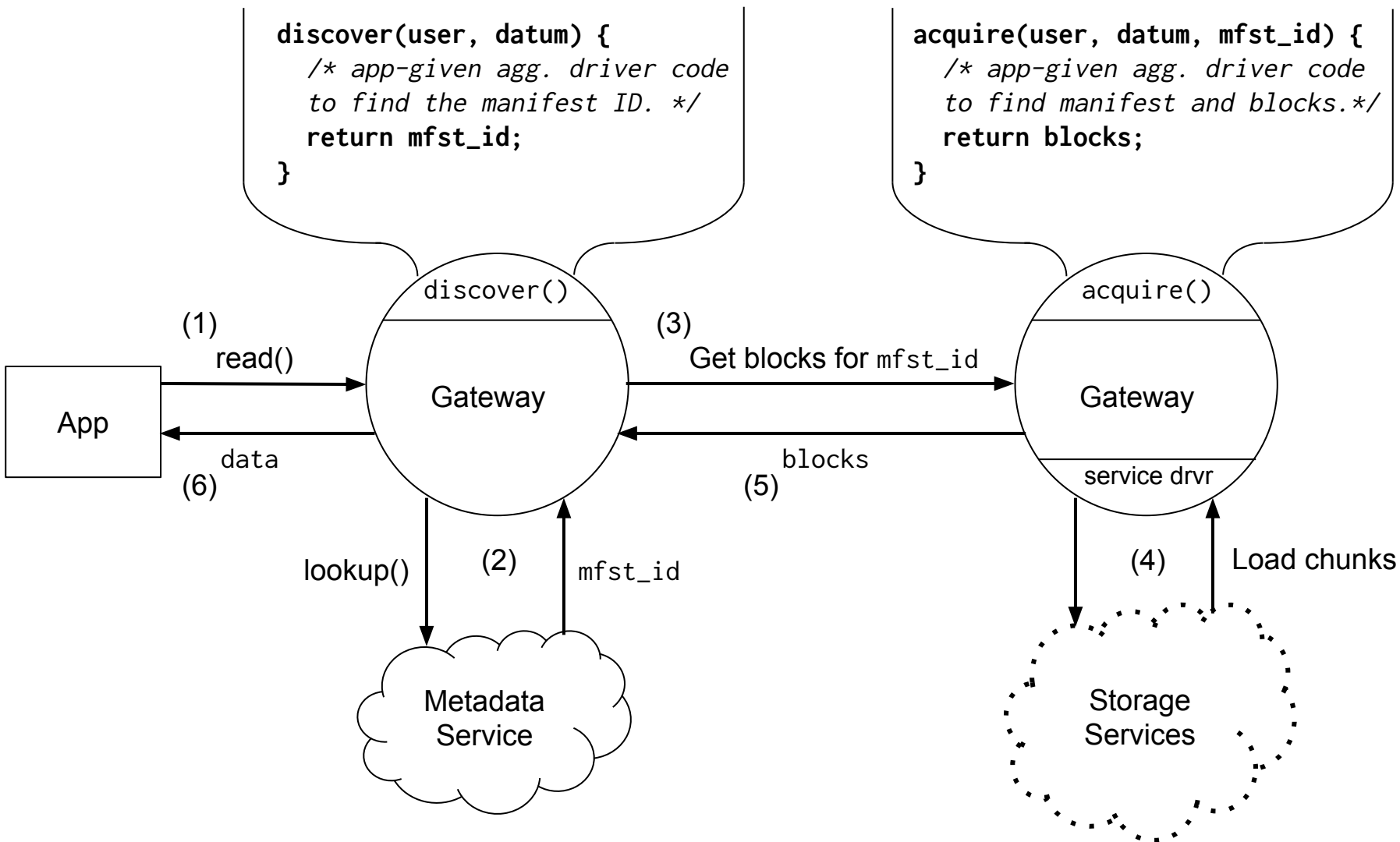
*Services*





```
discover(user, datum) {  
    /* app-given agg. driver code  
    to find the manifest ID. */  
    return mfst_id;  
}
```

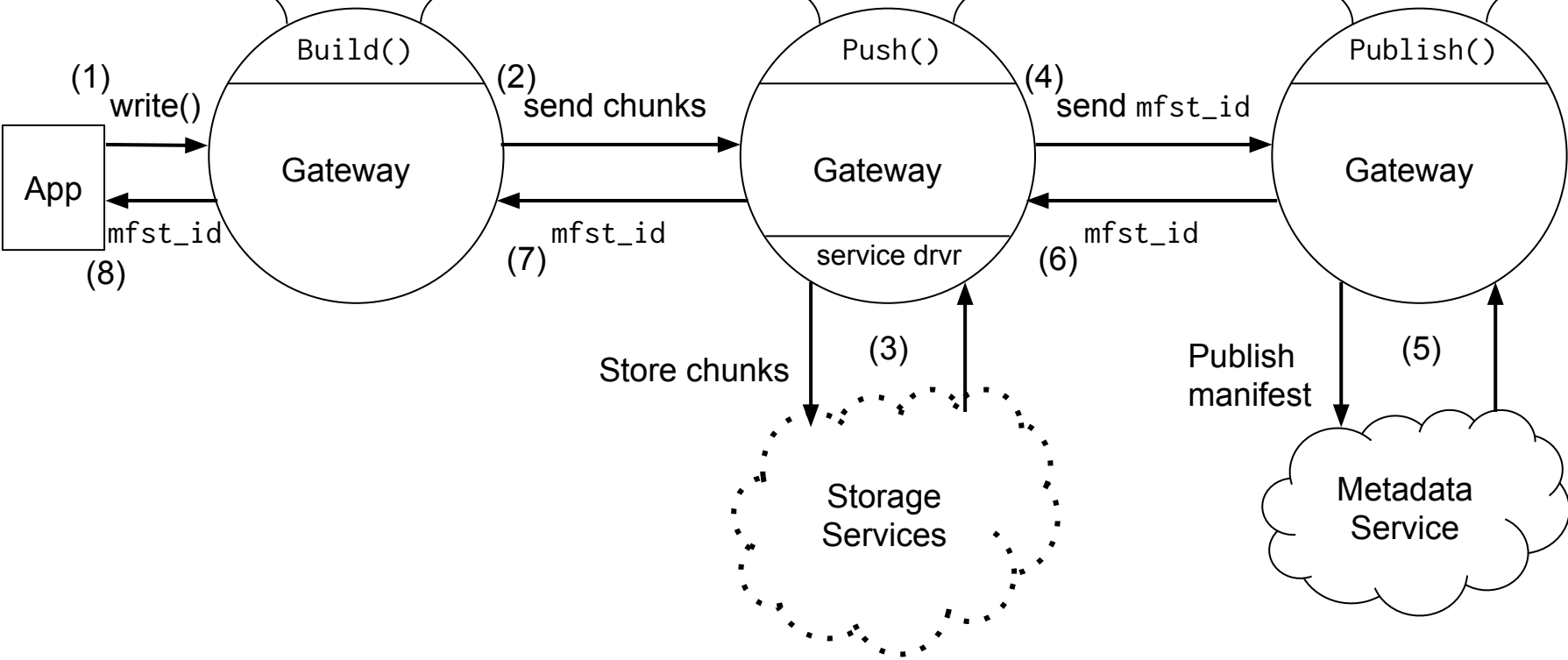
```
acquire(user, datum, mfst_id) {  
    /* app-given agg. driver code  
    to find manifest and blocks.*/  
    return blocks;  
}
```



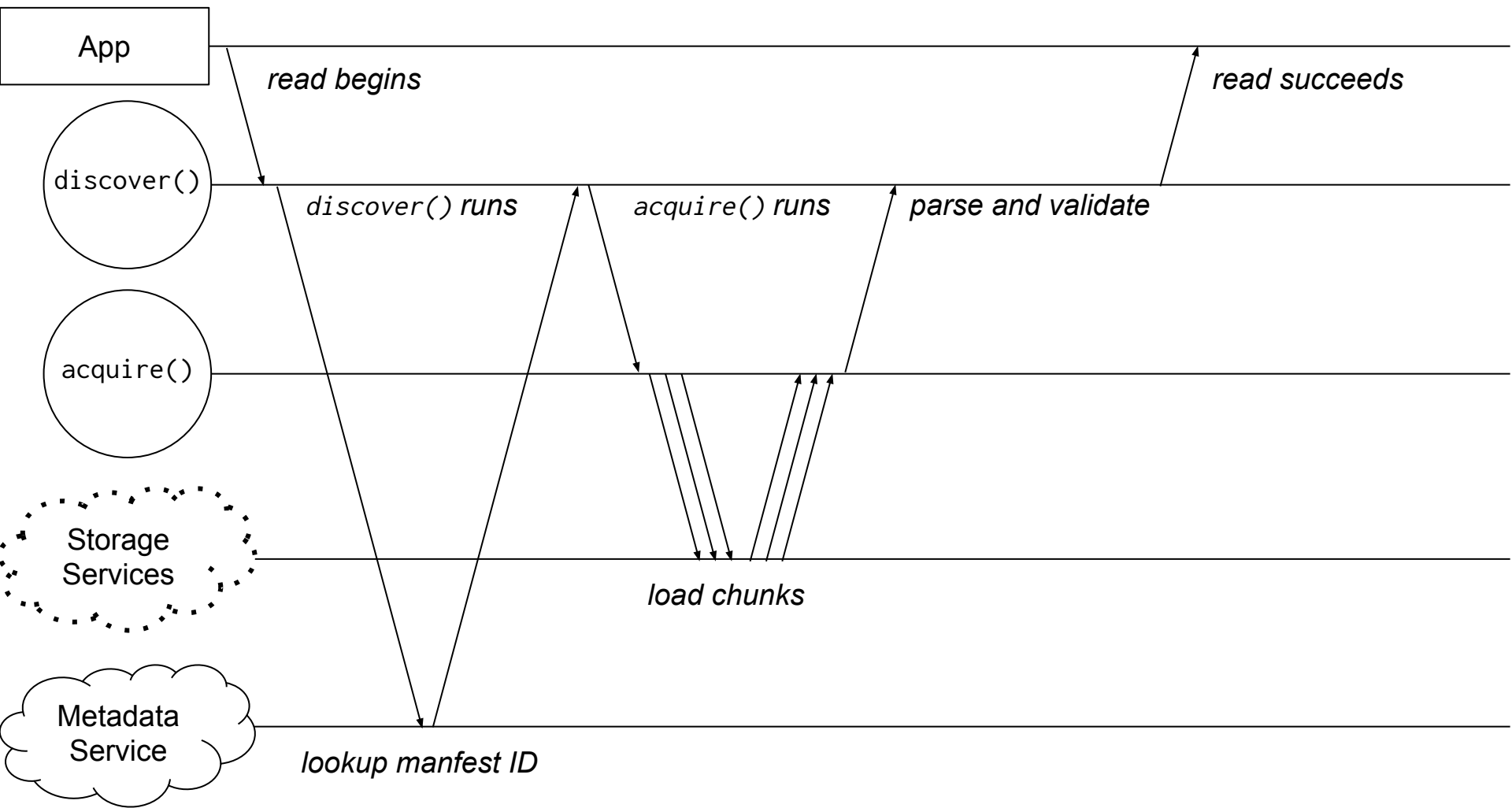
```
Build(user, datum, data) {  
  /* app-given agg. driver code  
  to generate new data. */  
  return (manifest,blocks);  
}
```

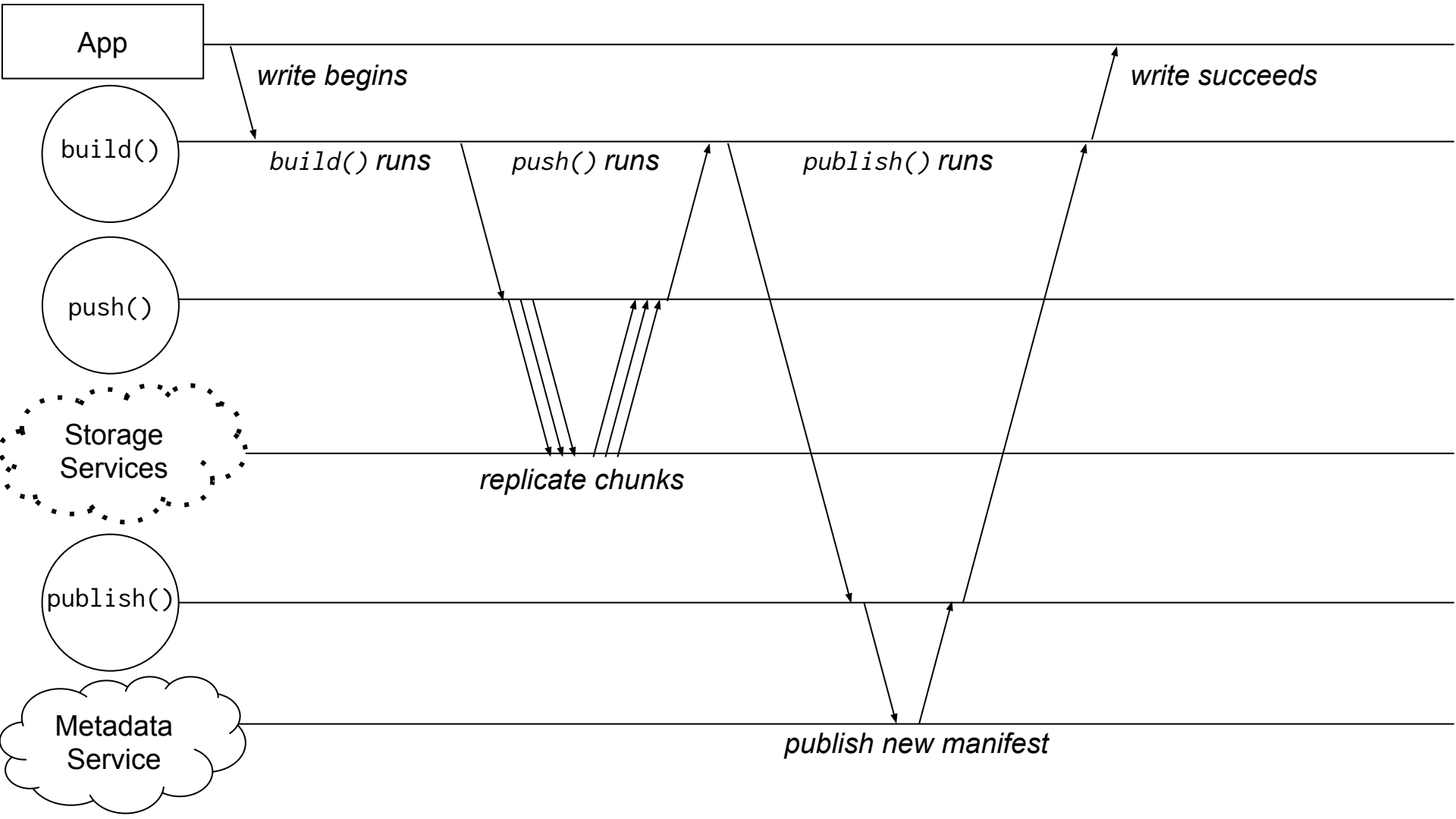
```
Push(user, datum, chunks) {  
  /* app-given agg. driver code  
  to replicate new chunks */  
  return manifest_id;  
}
```

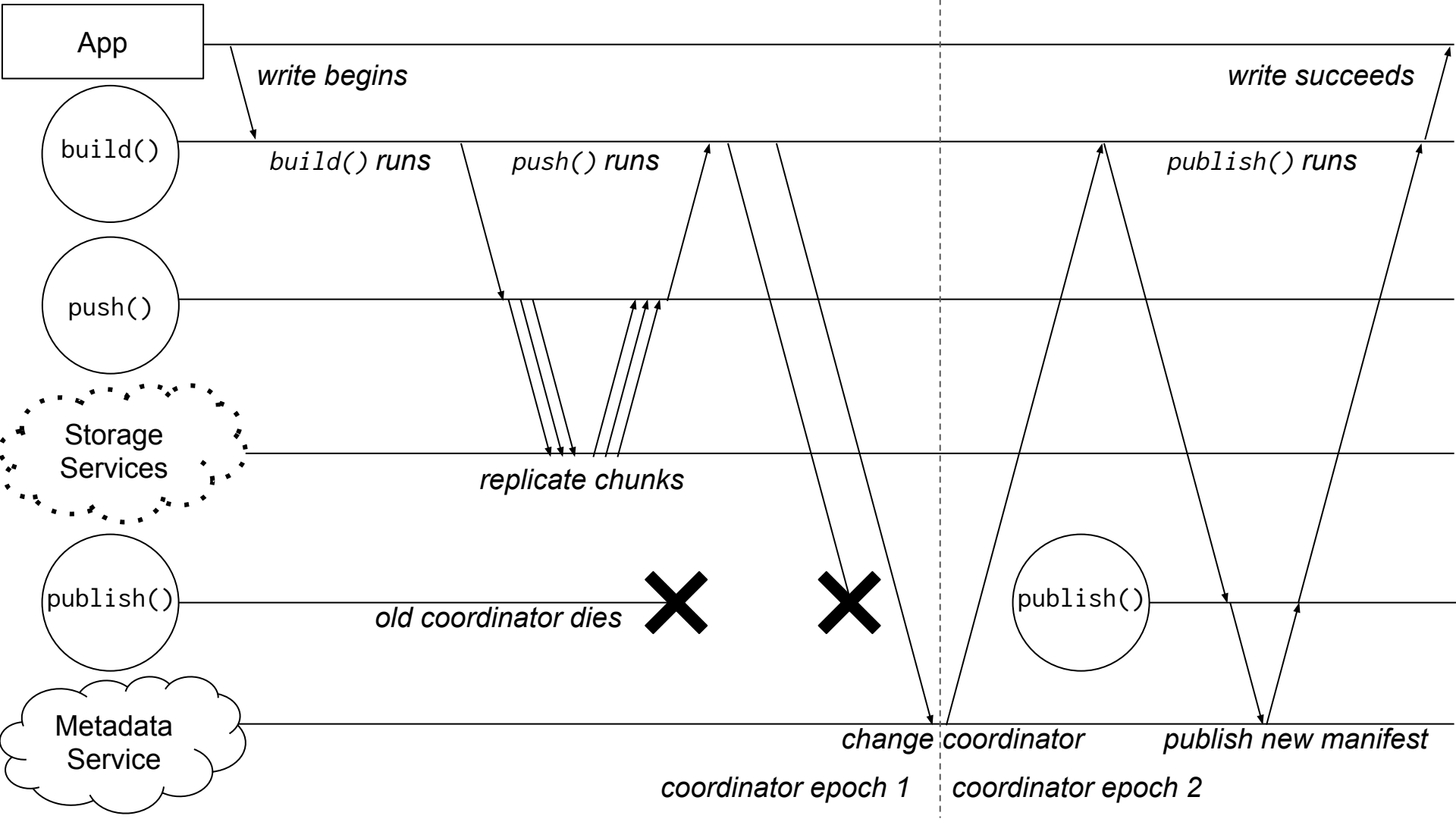
```
Publish(user, datum, mfst_id) {  
  /* app-given agg. driver code  
  to expose new data globally */  
  return mfst_id;  
}
```

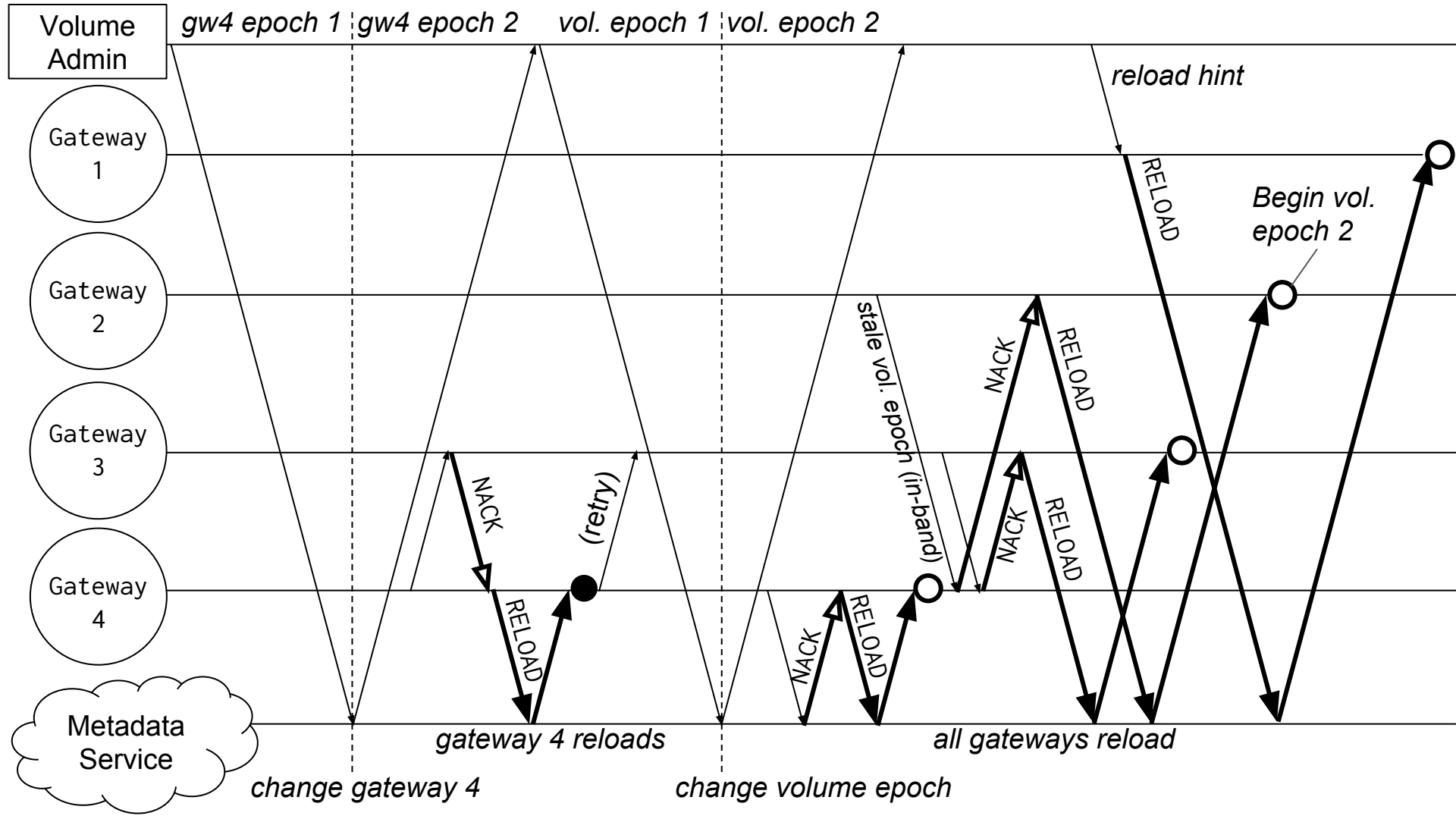


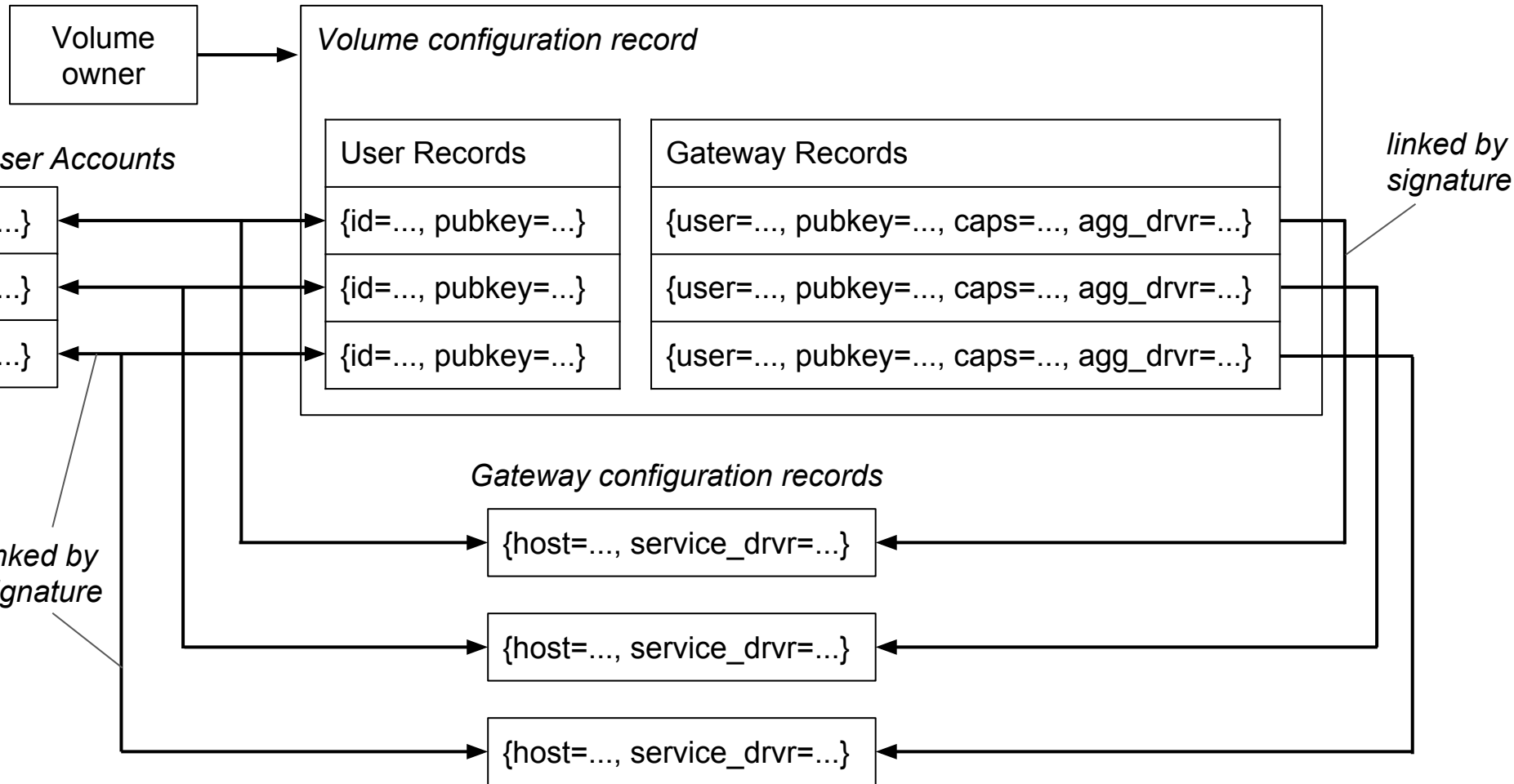


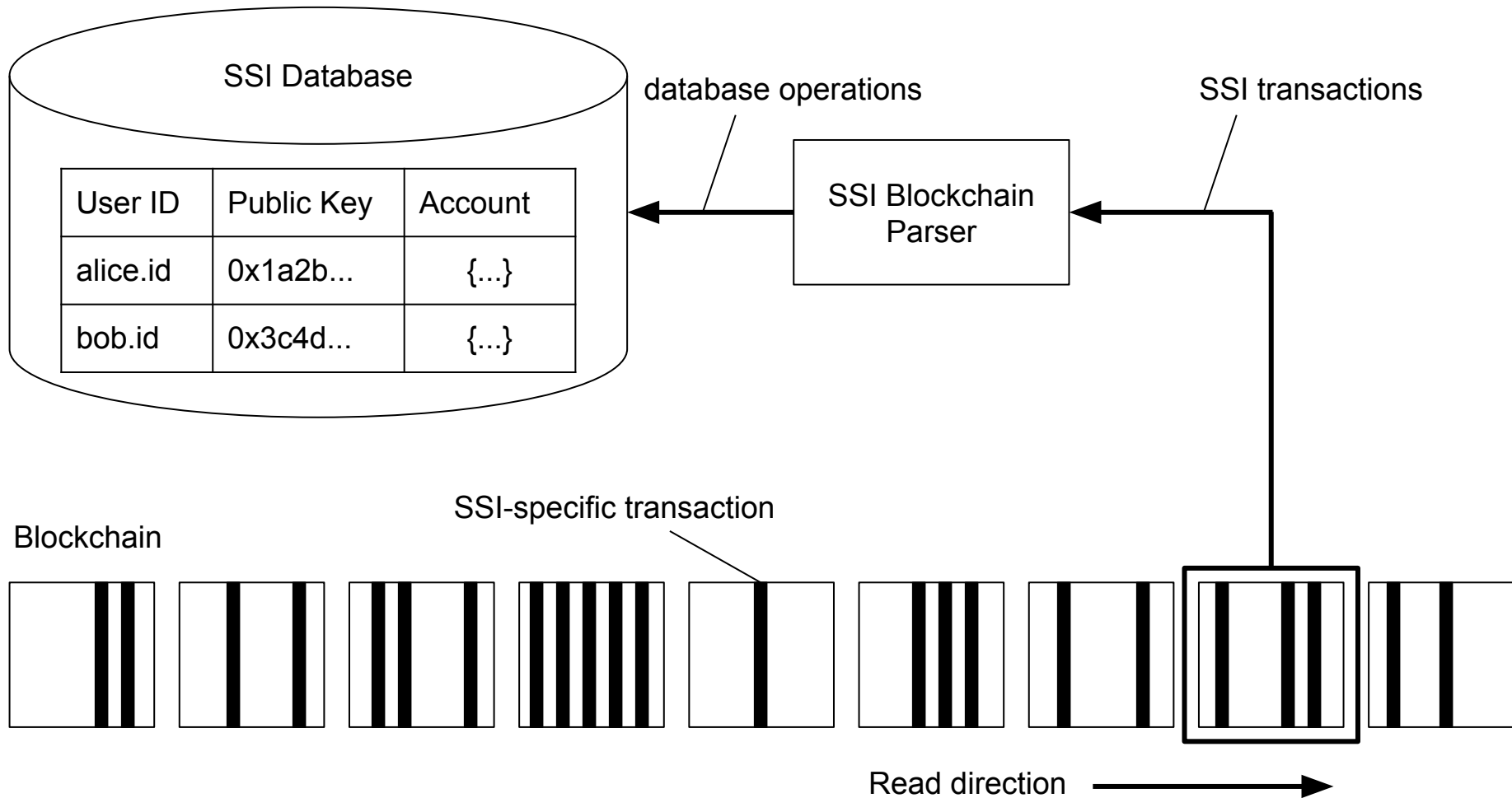










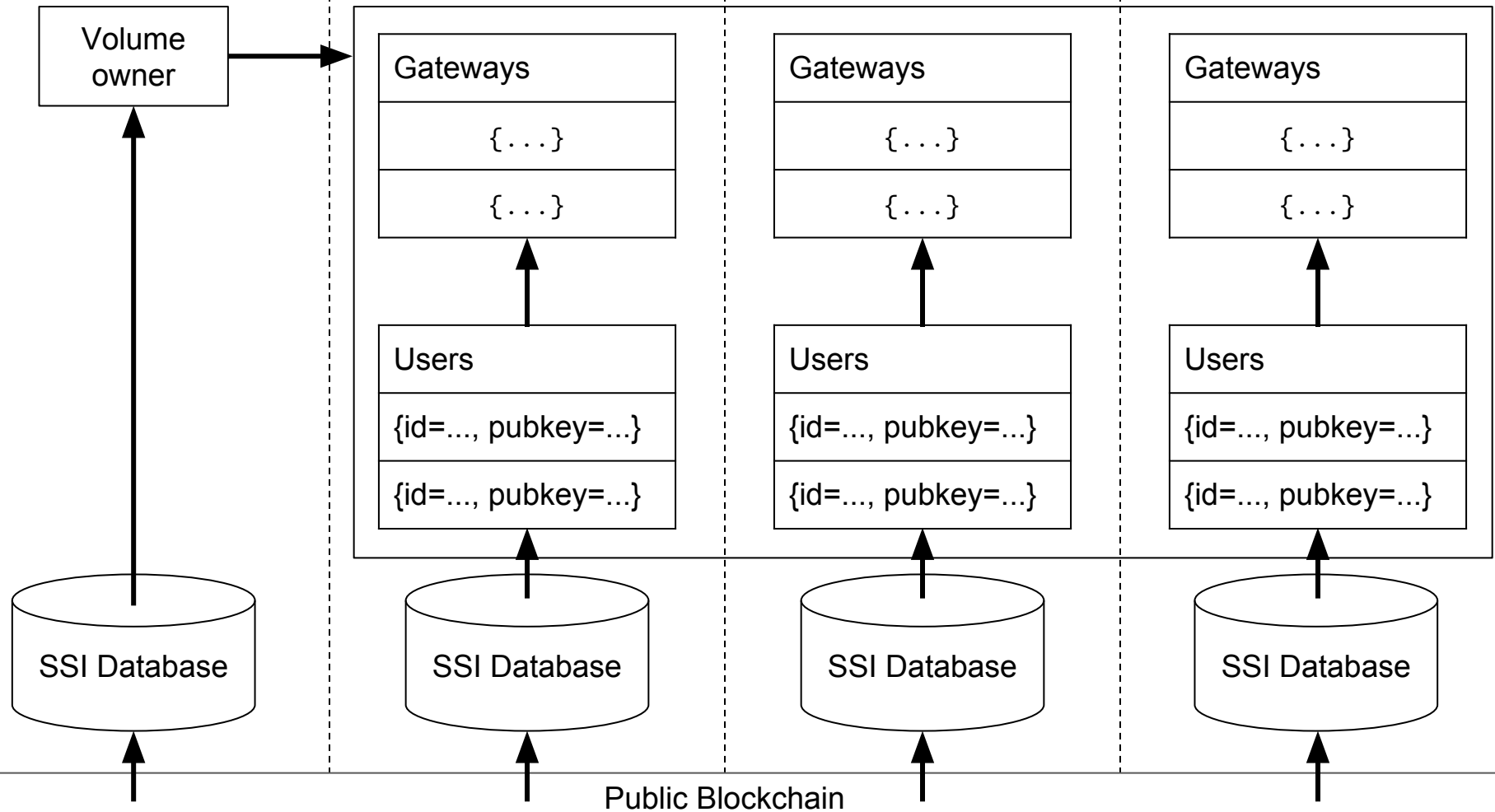


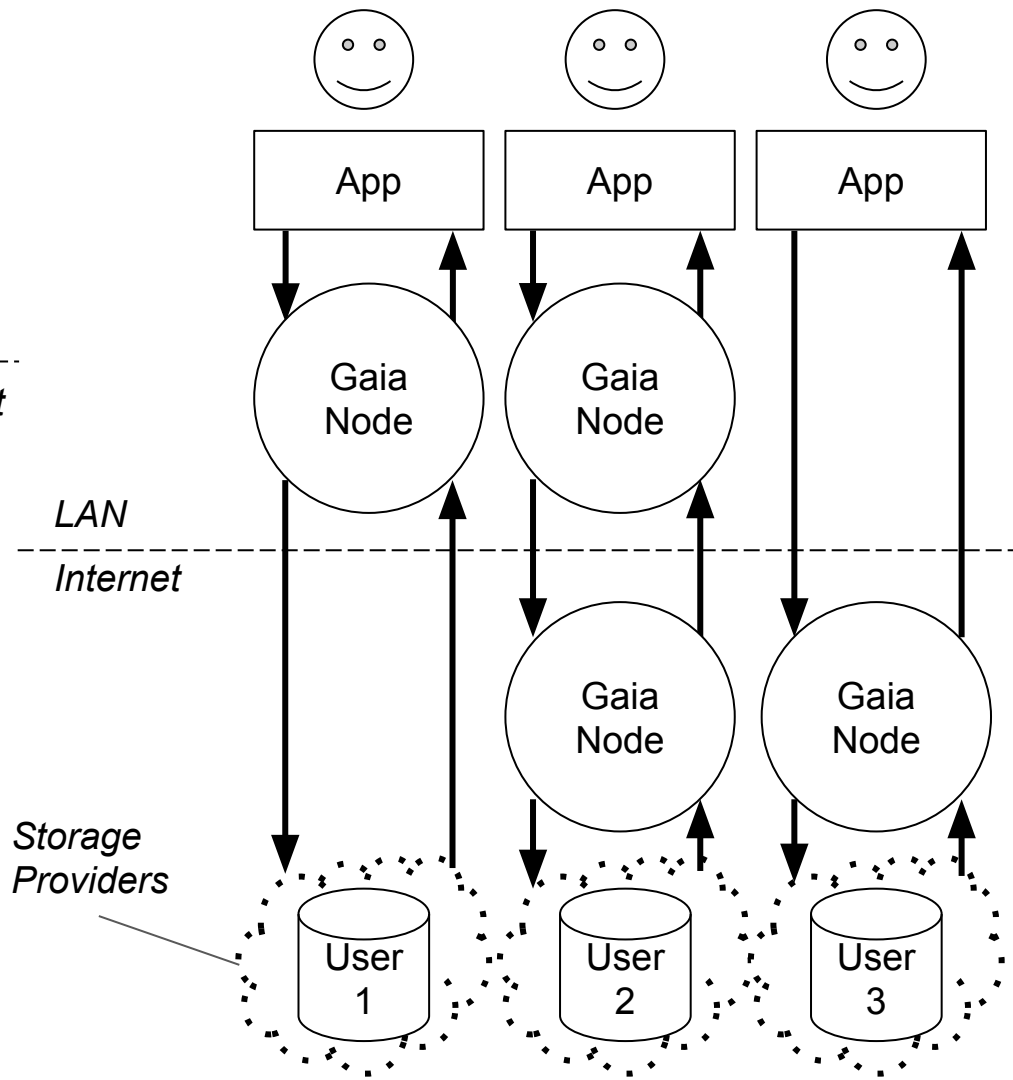
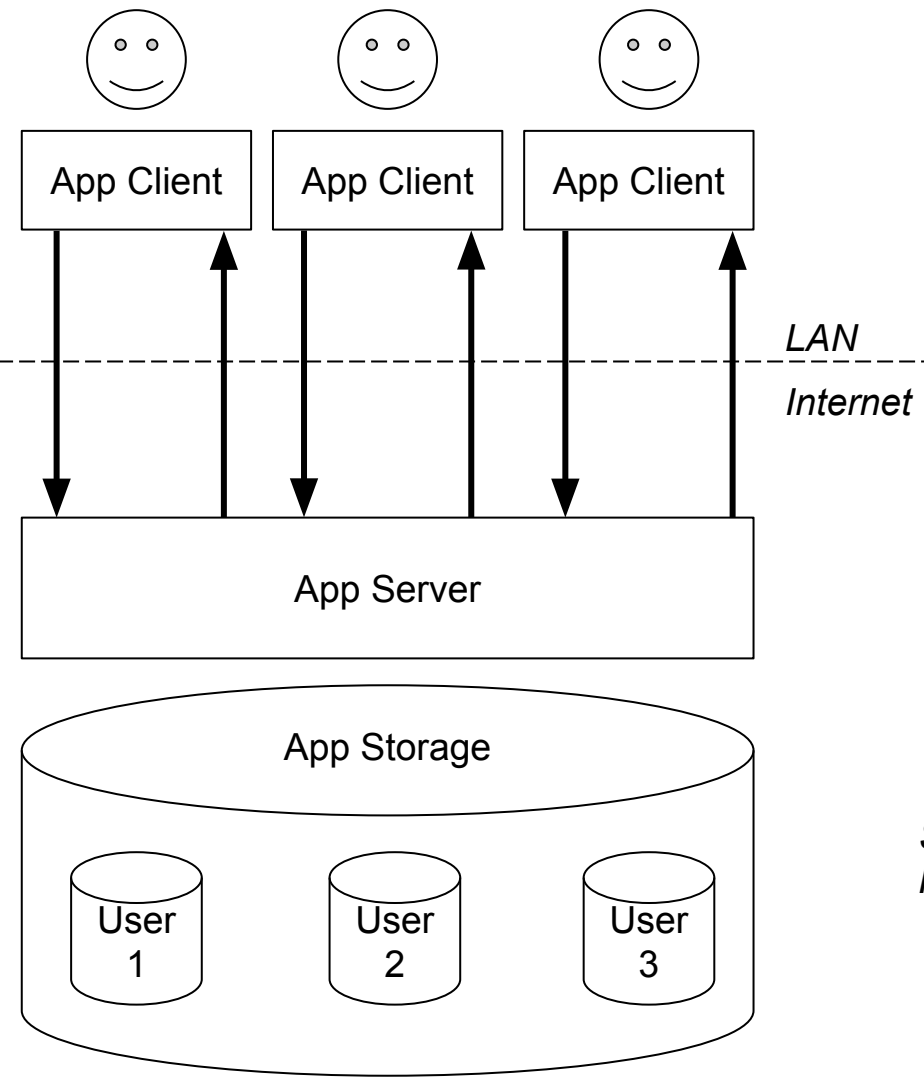
Organization A

Organization B

Organization C

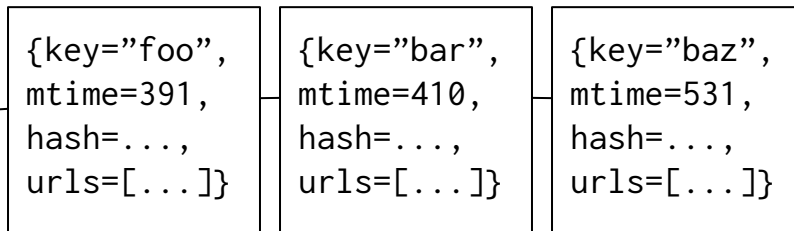
Organization D







## Application-level Key/Value Storage View



Gaia Volume

*Per-device manifest*

Manifest  
7ea4da

Manifest  
b86a62

Manifest  
135f0e

`{key="foo", mtime=100, hash=..., urls=[...]}`

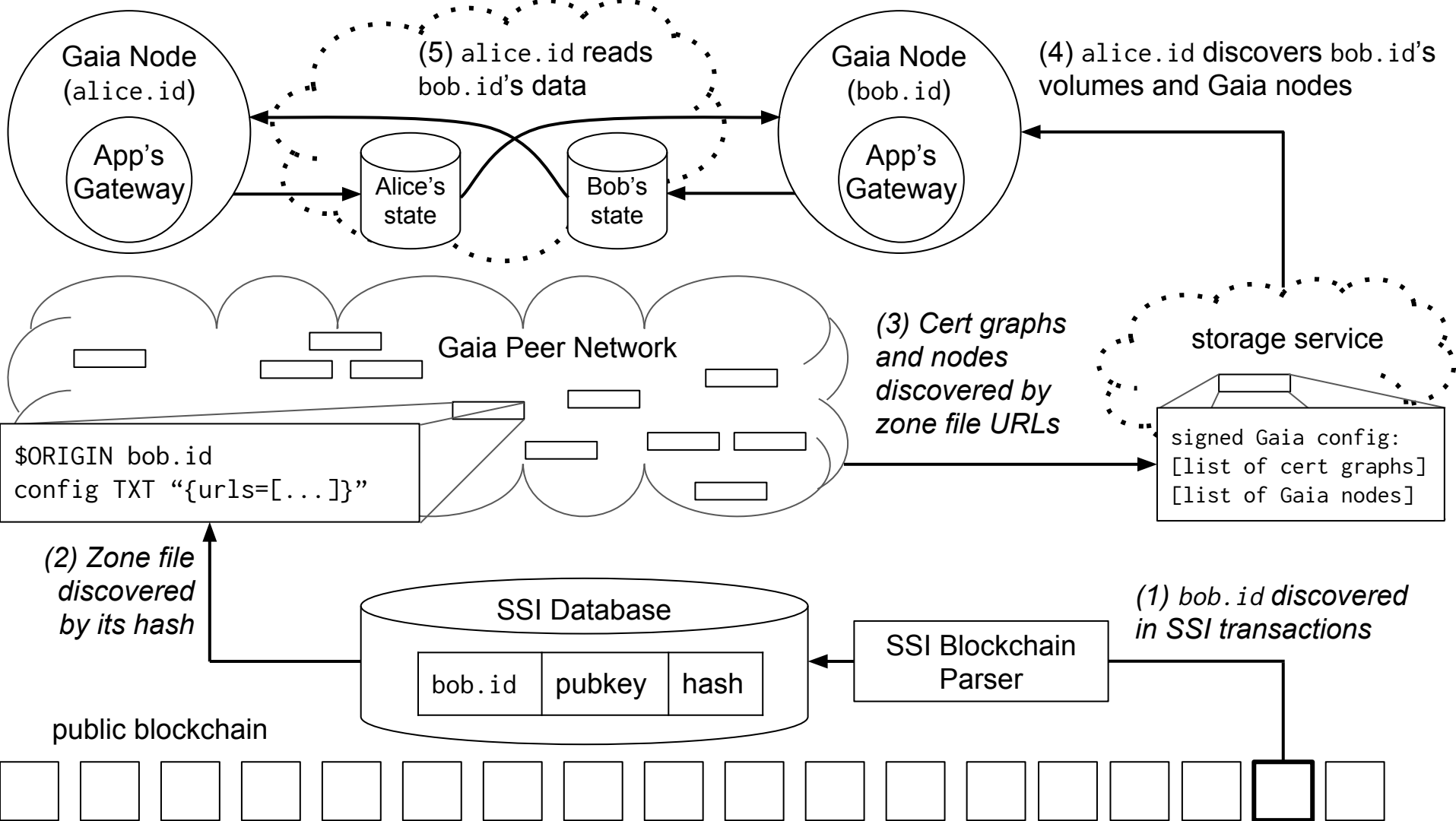
`{key="foo", mtime=210, hash=..., urls=[...]}`

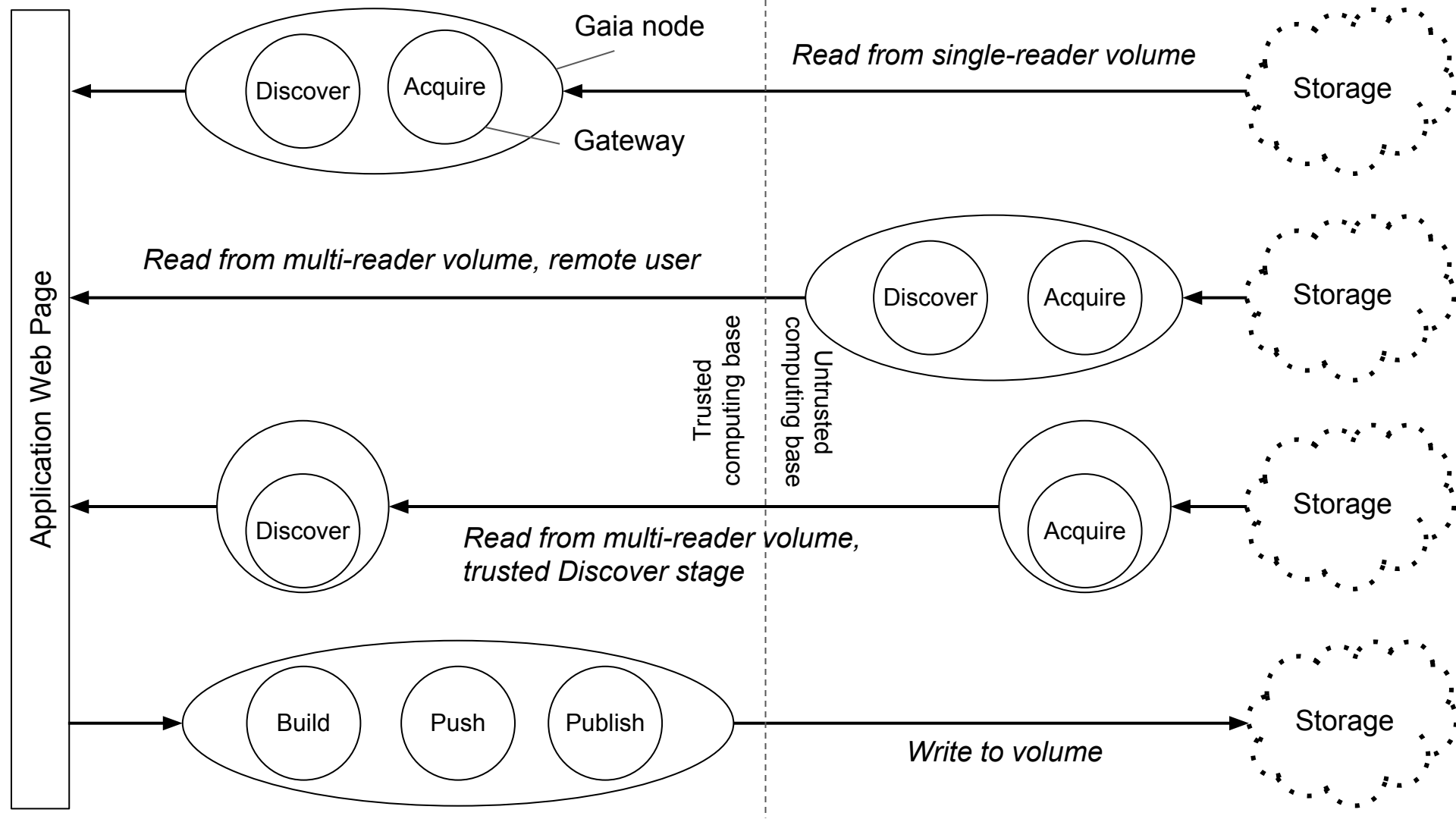
`{key="foo", mtime=391, hash=..., urls=[...]}`

`{key="bar", mtime=240, hash=..., urls=[...]}`

`{key="bar", mtime=410, hash=..., urls=[...]}`

`{key="baz", mtime=531, hash=..., urls=[...]}`





*Lab 1: Reads  
NIH data*

*Lab 2: Reads  
Lab 1's dataset*

*Lab 3: Reads Lab 4's  
data from cloud storage*

*Lab 4: Mirrors data to legacy  
and cloud storage*

