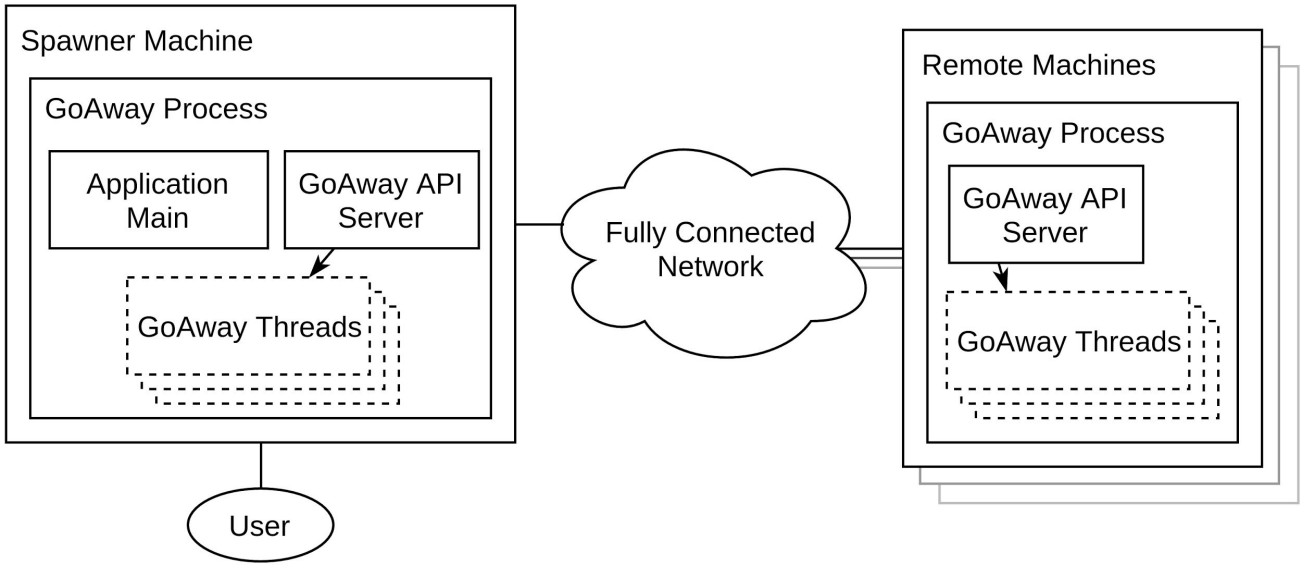
GoAway

Jessica Kenney, Andres Perez, Miles Steele

System

- User runs an application on a spawner machine.
- GoAway threads are sent to remote machines in the cluster.

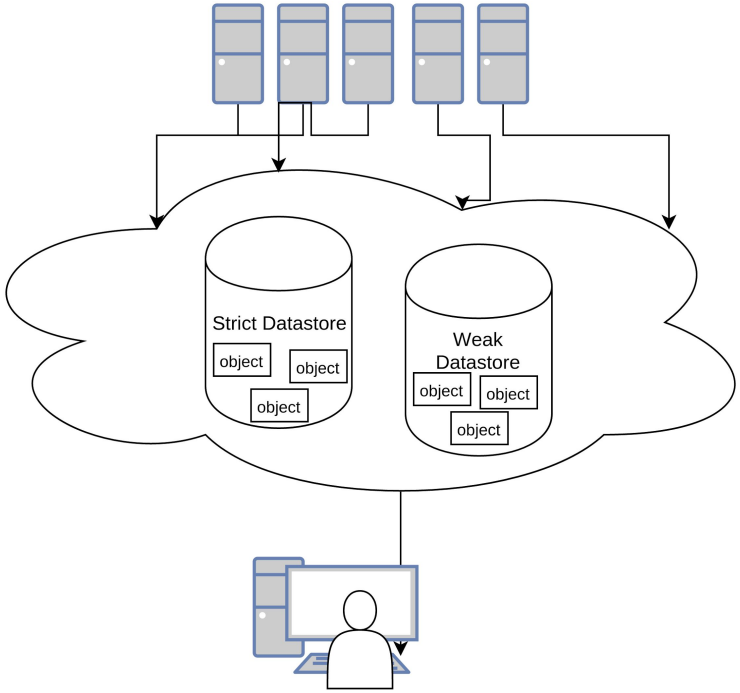


Data Stores

DataStores hold shared memory and provide a consistency model.

GoAway provides four:

- Strict Centralized
- Linearizable Fast Read
- Weakly Consistent
- Release Consistency

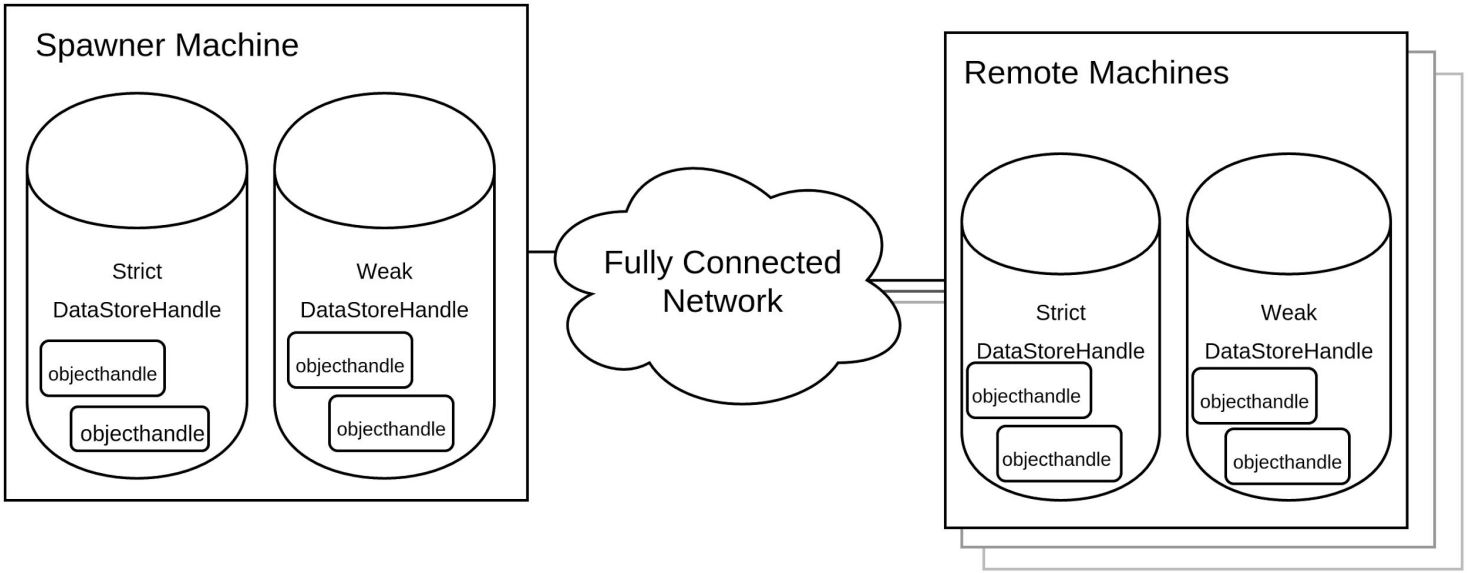


Usage

```
import goaway
# Initialize a shared lock.
lock = goaway.Lock("lock")
# Initialize a shared object in centralized linearizable datastore.
s = goaway.StrictCentralized("s")

def increase(value):
    with lock:
        s.counter += value

if __name__ == "__main__":
    # Initialize GoAway and start the remote servers.
    goaway.init(config_file_path)
    for i in range(n):
        # Run the function on a remote machine.
        goaway.goaway(increase, 1)
```

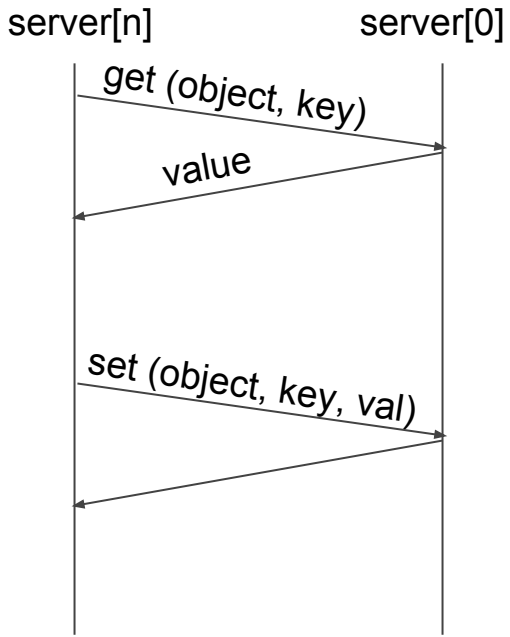

Spawner Machine
Strict
DataStoreHandle
objecthandle
objecthandle
Weak
DataStoreHandle
objecthandle
objecthandle
Fully Connected
Network
Remote Machines
Strict
DataStoreHandle
objecthandle
objecthandle
Weak
DataStoreHandle
objecthandle
objecthandle

Strict Centralized DataStore

All of the data lives on server[0]

get(object, key):
    return rpc(server[0], “get”, object, key)

set(object, key, value):
    rpc(server[0], “set”, object, key, value)



Linearizable Fast-Read DataStore

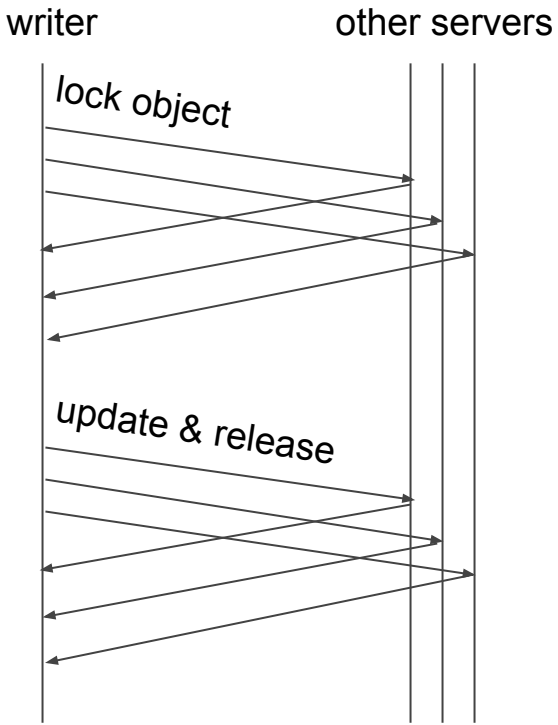
Optimized for fast reads at the expense of slow writes.
Guarantees linearizability.

Get

- Local read (fast)
- Reads occur even if the object is write-locked

Set

- 2-phase locking commit (slow)
  - Lock object on all servers in order
  - Update and unlock object on all servers

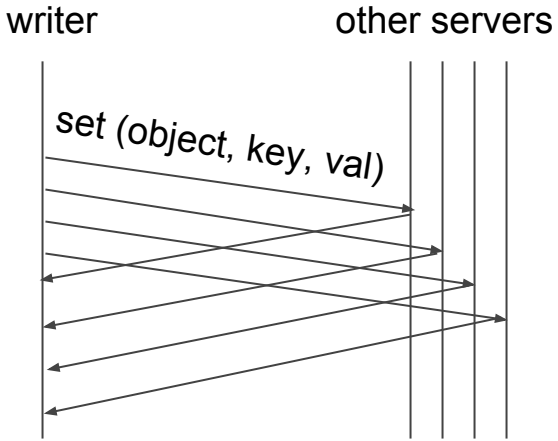


Weakly-consistent DataStore

```
get(object, key):
        return self.data[object][key]

set(object, key, value):
        for server in servers:
                spawn thread(rpc(server, “set”, object, key, value))

sync(object):
        while outgoing RPCs for object:
                # wait
        return
```



P0: W(x, 1) S
P1: W(x, 2) S
P2: R(x, 1)
P3: R(x, 2)
~~P4: R(x, 0)~~

Update-on-Release DataStore

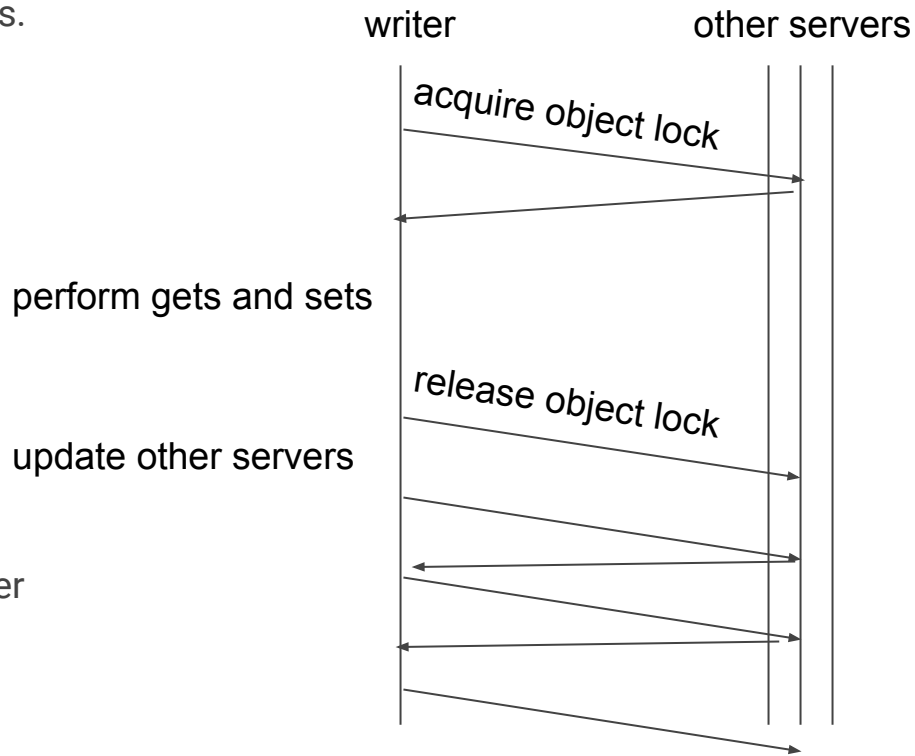
Optimized for fast reads at the expense of slow writes.
Guarantees release consistency.

Get
- Local read (fast)

Set
- Write locally
- Save writes to a buffer

Acquire
- Acquire per-object lock

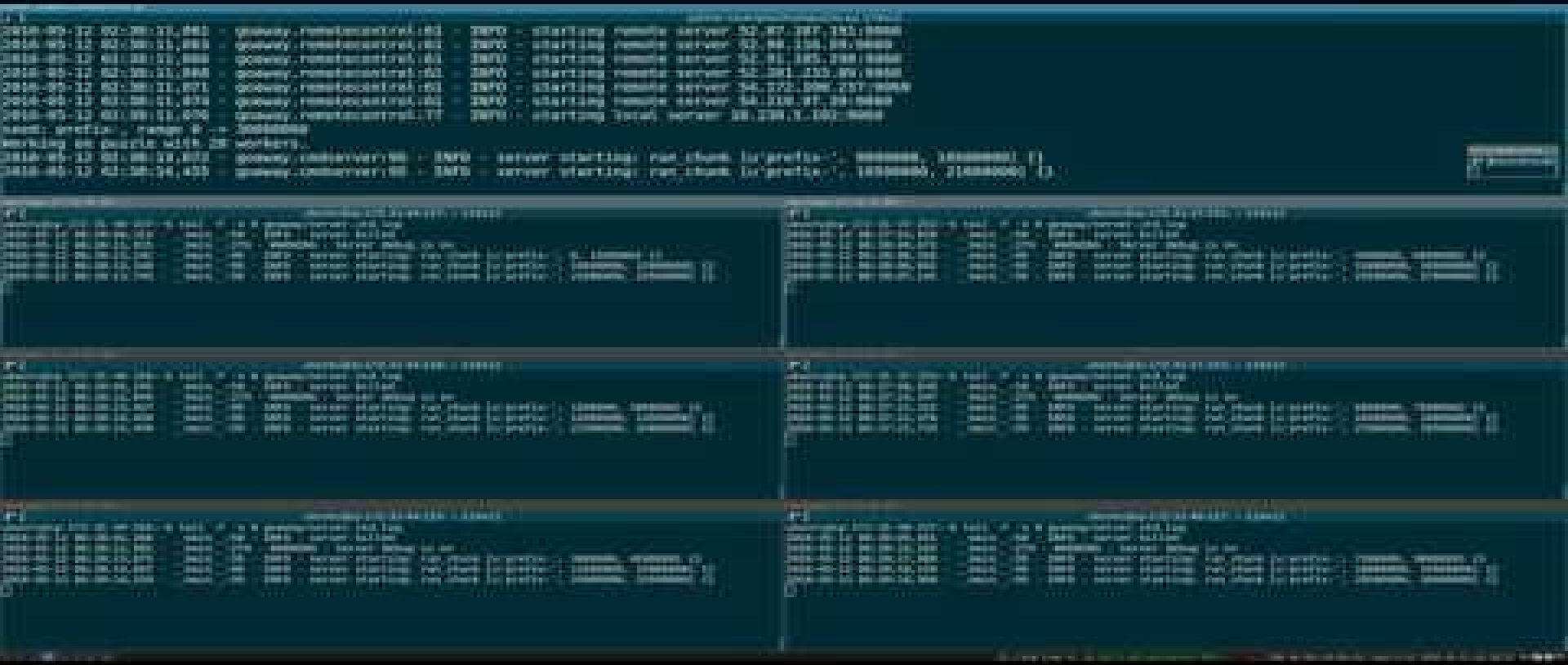
Release
- Update object on other servers by sending buffer
- Release lock



Demo (Hash Puzzle)

- Program that iterates through strings to find a hash with leading 0’s.
- On 7 machines.

```
# call run_chunk with the arguments a, b on seperate machines.
for a, b in bounds:
    goaway.goaway(run_chunk, seed, a, b)
```



GoAway

github.com/anpere/goaway