

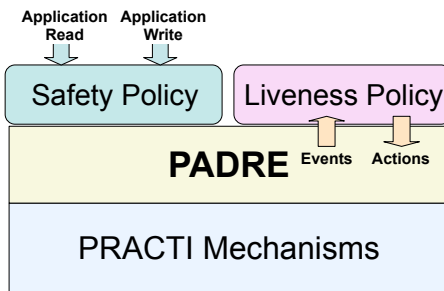
Making Replication Simple with PADRE

Believe it or Not!

Bayou, Chain Replication, Coda, Pangaea and TierStore
 Can be built *in a few dozen lines of code each.*

Building on PADRE

**Replication Systems =
 Safety Policy + Liveness Policy**



Safety = Consistency + Durability

Block Requests Until Safety Met

Specify 5 Access Predicates

ReadAtPredicate writeStartPredicate
 ReadEndPredicate writeEndPredicate
 ApplyUpdatePredicate

Example Predicates

ReadAtPredicate: isValid(Obj)
 WriteEndPredicate: hasPropagatedTo(Server)

Liveness = Routing

Declare Rules For Topology

Actions for Update Propagation
 Invalidation/Body Subscriptions, Fetch

Triggered by Local Events
 Blocked Reads, Connection Events,
 Messages Received

Example Rule

Fetch(@X, S, Obj) :-
 LocalReadMiss(@X, Obj), Server(@X, S)

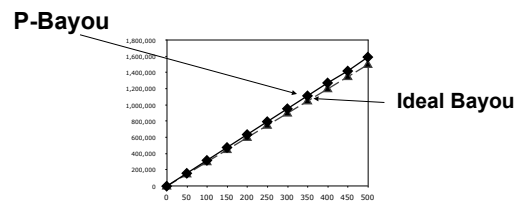
Reduces Development Time

**3 Grad Students + 2 Months
 = 6 Systems**

	Safety Policy LOC	Liveness Policy Rules
P-Bayou	12	29
P-Chain-Replication	85	79
P-Coda	124	55
P-Pangaea	12	67
P-TierStore	12	28
P-TRIP	12	22

Reasonable Performance

Network Overheads Close to Ideal



Bytes Transferred for Synchronizing 2 Nodes in Bayou

Easy To Add New Features

Cooperative Caching in P-Coda

Added in Only 4 Rules

