

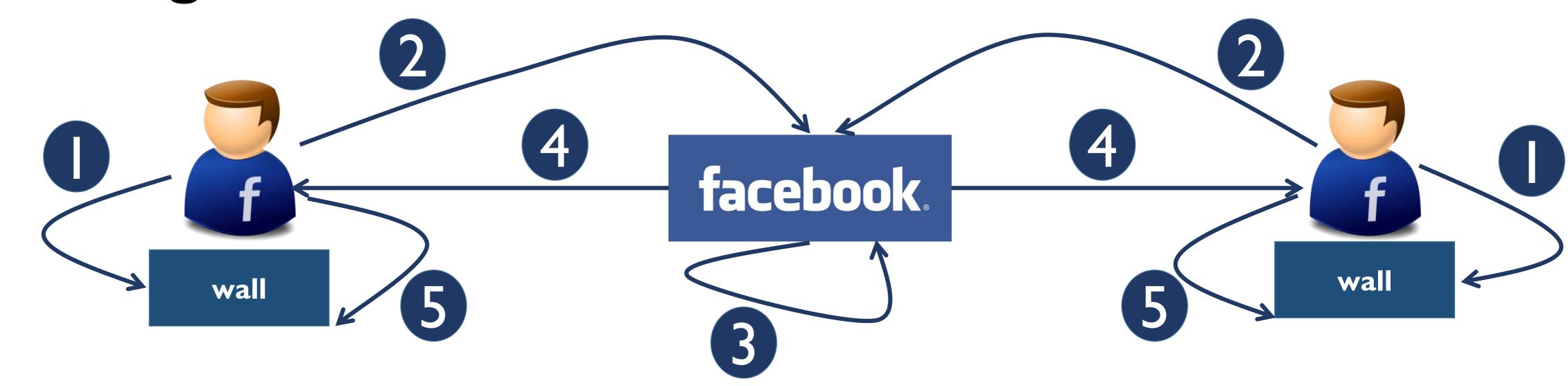


Sunny: Synthesis of Interactive, Cloud-Based Heterogeneous Software Systems

students: Aleksandar Milicevic (MIT) and Milos Gligoric (UIUC) recommenders: Daniel Jackson (MIT) and Darko Marinov (UIUC)

Consider implementing Facebook wall

- I. Post on wall
- 2. Send update
- 3. Synchronize
- 4. Propagate
- 5. Update view



Fun & easy

model

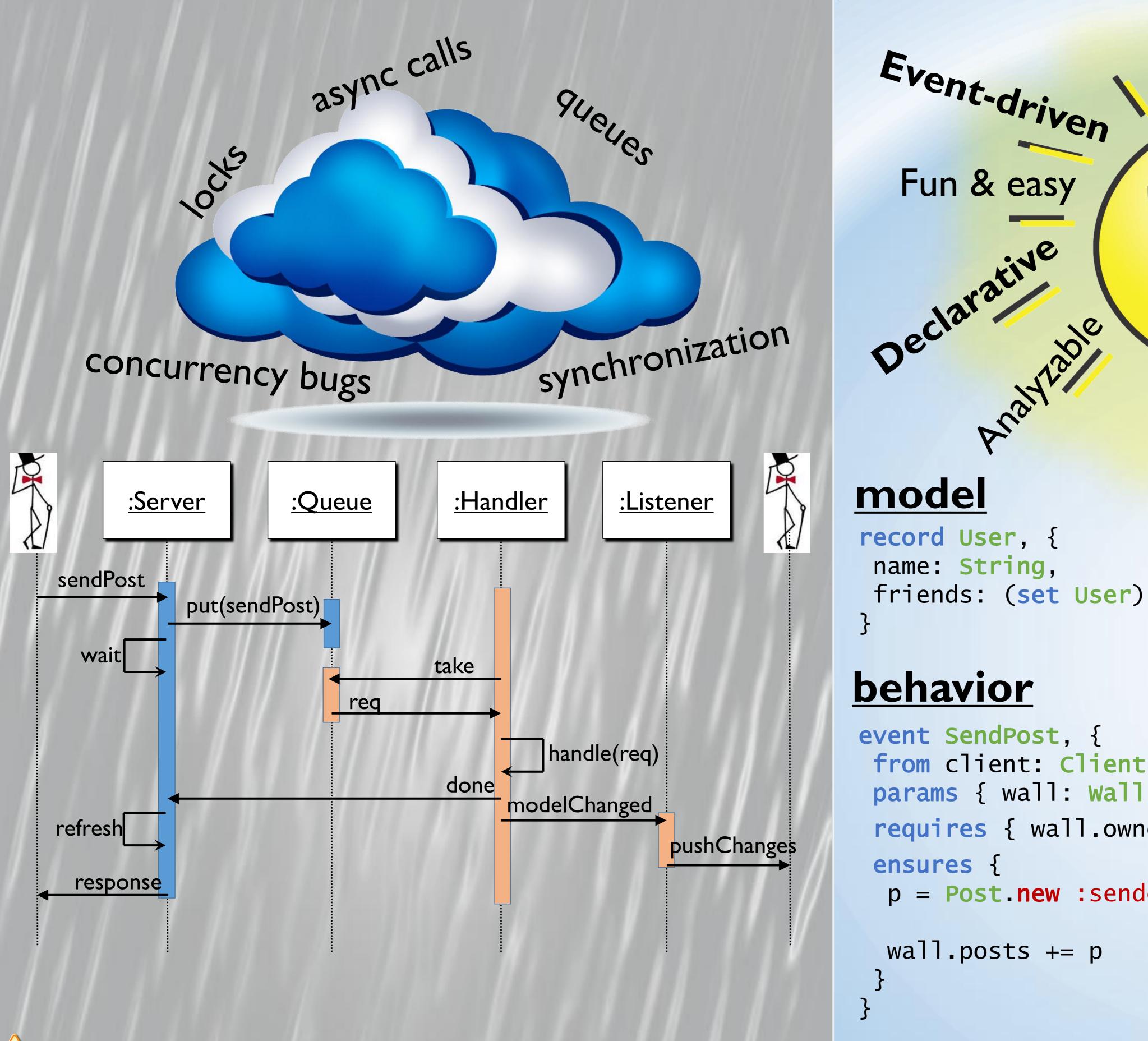
Current approaches

VS.

Sunny

Secure

Model based



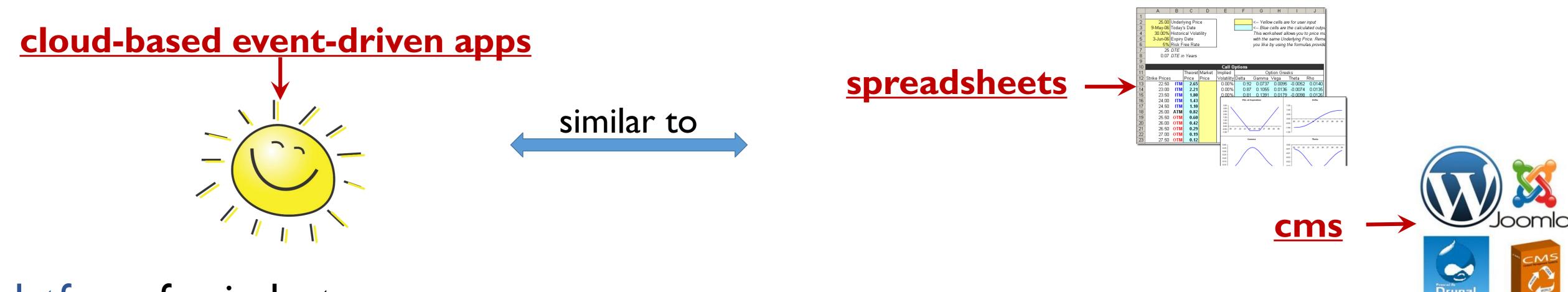
- record User, { record Wall, { record Post, { sender: User, owner: User, name: String, friends: (set User) message: String, posts: (set Post) time: Time behavior
- event SendPost, { from client: Client; to server: Server params { wall: Wall, text: String } requires { wall.owner.friends.member? client.user } ensures { p = Post.new :sender => client.user, :message => text, :time => Time.now wall.posts += p
- Complex (bug prone) programming model
- Pushing changes to clients is hard
- Platform dependent
- Little separation of concerns
- Security meshed with core functionalities

security

```
policy WallVisibility, {
principal client: Client
 var w: Wall
 restrict [:read, :write],
           :when => client.user.not_in? w.owner.friends
```

Innovation and benefits

•Generic platform for programming a whole class of event-driven system



- Rich platform for industry
 - *speeds up development and eliminates a whole class of concurrency bugs by construction
- Application in the cyber-security domain
 - *security policies defined independently and formally checked