Plexus 2 Overview

3D Fun and Games

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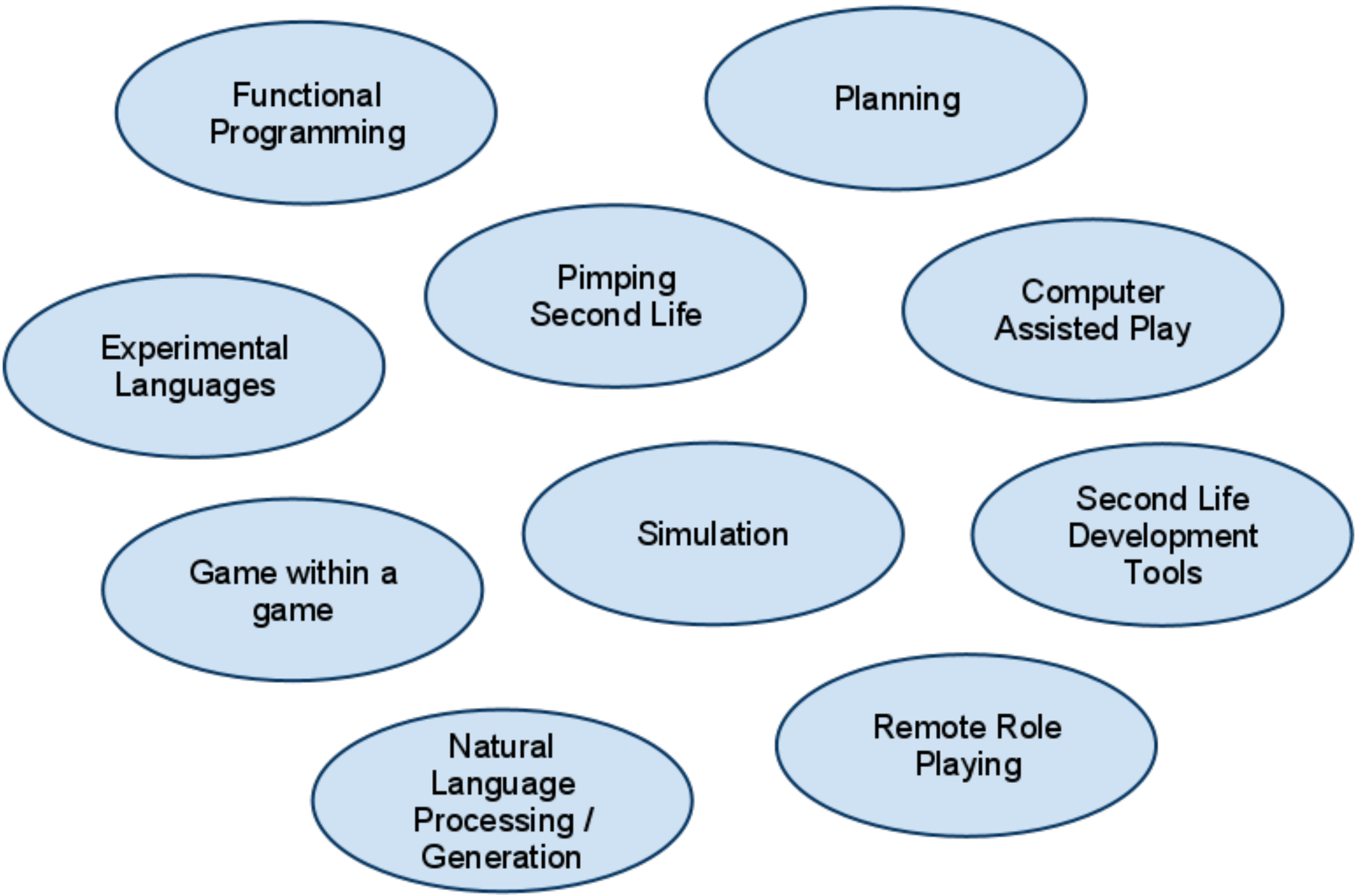
TEAM CTHULHU

TEAM CTHULHU MUD Timeline

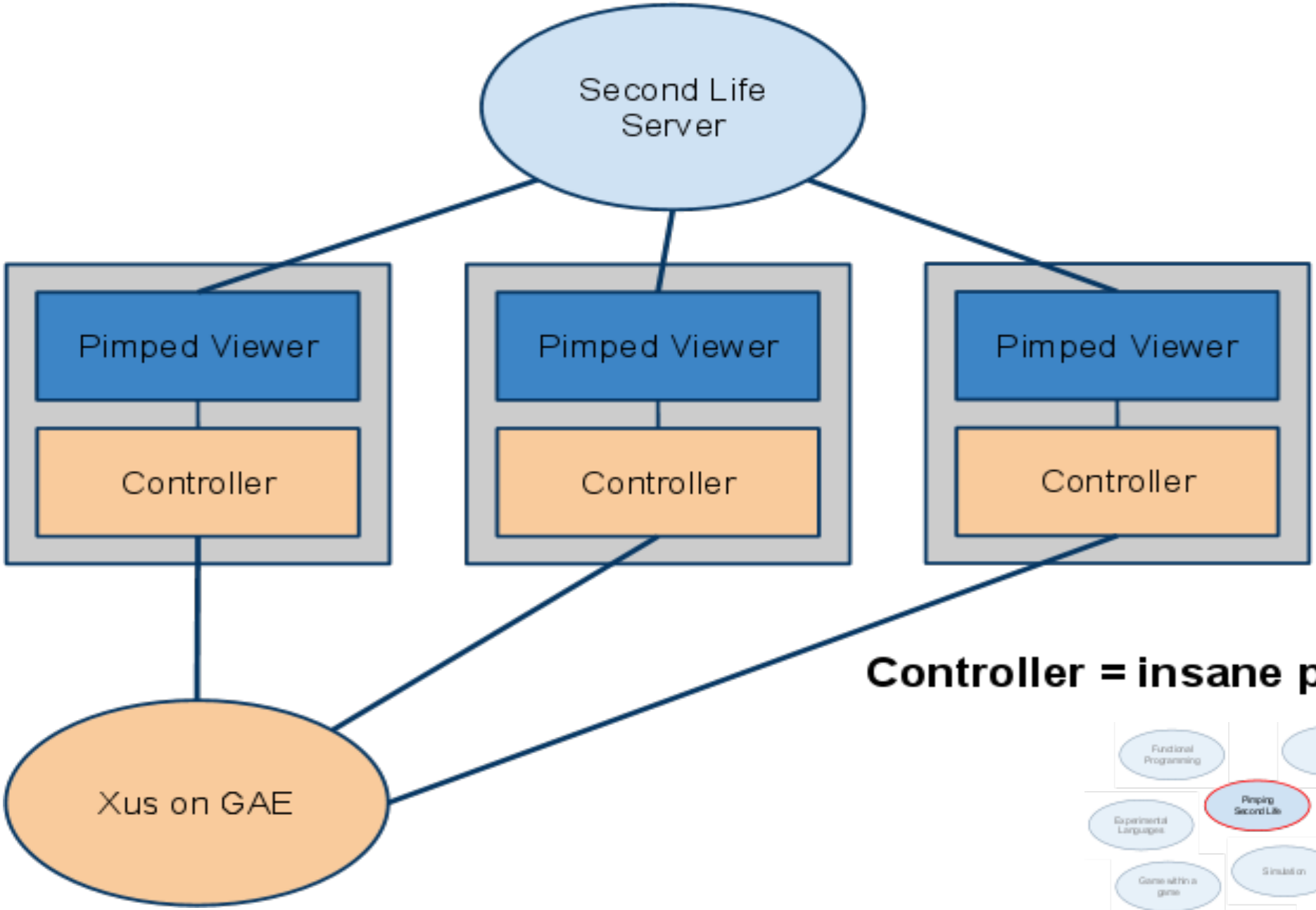
TEAM CTHULHU: Bill Burdick, Roy Riggs

- 1988: Our first (text-based) MUD, in C, then LISP
  - 12 players logged in, some from other countries!
- 1989: in MOB (wrote OO language on top of LISP)
  - Yay! 2nd version == 6 hours of college credit, each!
- 1990: in Sludge, no more college credit from here on :(
  - Developed on a NeXT machine!
- 2004: JavaScript, HTML -- rich internet app with images!
  - "Switchboard" in PHP
  - Each browser becomes a "server"
  - Entire MUD in one HTML page (updates itself like TW)
- 2008: Plexus 1, Controller <-> Sauerbraten -- our first in 3D
  - Controller in Java
  - FreePastry P2P framework
- 2011: Plexus 2, Controller <-> (Second Life, Xus)

An Open Source 3D Toy



Pimping Second Life



Controller = insane power

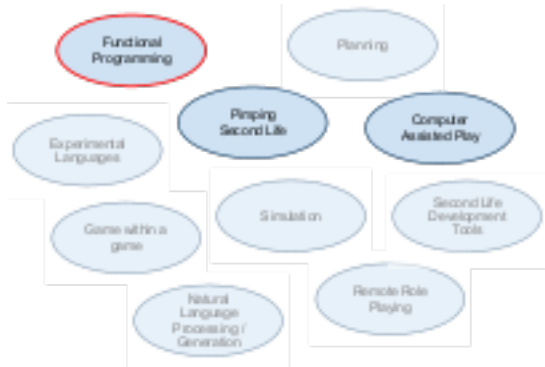
Computer Assisted Play

The Controller

- VERY loosely coupled to the viewer (separate program)
- Communicates with other controllers in addition to SL
- Remote-control scripted objects
  - Broadly-scoped actions
    - Sensor nets
    - Crowd-effects
  - AI-controlled herds of NPCs (like a whole dungeon)
- Viewer-only objects (unknown to the server)
  - share state with Xus
  - no load on the server
  - communicate richer information

Functional Programming

- Invented by Alonzo Church (Turing's prof) around 1928
- Radical view of state
  - Same input to a function ALWAYS produces same output
  - => No variable reassignment
  - => All data is immediately frozen
  - => Different view of how you do programming
  - How do you do I/O?
    - Input & Output are streams
    - Monads/Monoids
- => Safe, massive concurrency with shared memory
- Google's Map/Reduce is based on functional concepts



Experimental Languages

- Modding Cofeescript (compiles to JavaScript)
- Added "mofor" construct
  - map-comprehension
  - fold-comprehension
- ReductionGizmo monoid + fold-comprehension for FRP
  - Allows much more "natural" feeling functional code
- Need threads + shared mem -- world is many megs of data
  - node.js fast, but no support for threads + shared mem
  - WebWorkers don't do shared mem
  - Rhino is only JS engine that does: slow and big
- Started writing Cs Lua code generation (gradual progress)
  - Lua supports threads and shared memory
  - LuaJIT almost 1/2 as fast as optimized C
  - LuaJIT is small (< 200K)
  - LuaNode is similar to node.js

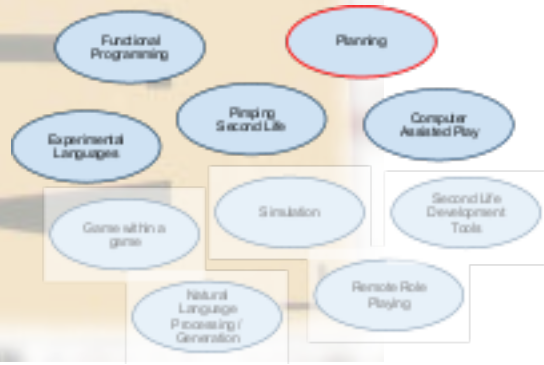
Planning

"Thought Process" Based on Minsky's Society of Mind

- Multiple brains
- Heavy thinking done concurrently for each brain
  - Actors: shared mem, thread pool; idle = 0 overhead
  - a world model for each alternative outcome
  - 1 actor for each alternate world
  - lots of alternatives
  - lots of actors

"Thought process" outputs a simple plan for each brain

- the output plan for each brain is a decision tree
- compile decision trees into LL scripts
- upload and go

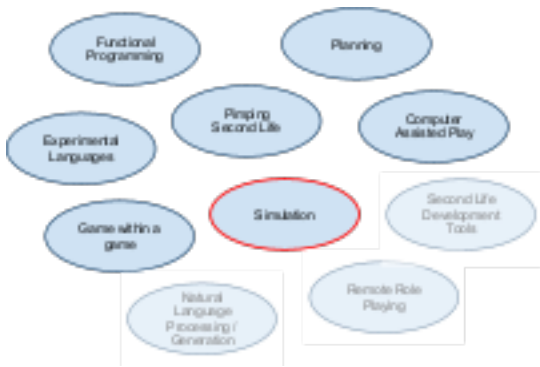


Game Within a Game

- Controllers + Xus provide game framework
- Viewer-only objects can provide extra functionality
- Gigantic Golf
  - You are the ball
  - Reverse kick-back gun provides the stroke
  - Keep shooting until you hit the target
  - Watch out for lava pits
  - Giant Windmills
  - Fun to watch
    - People catapulting around
    - Face-plant into famous monuments

Simulation

- Training
- Integrate controller with real-life systems
- Second Life can do serious work



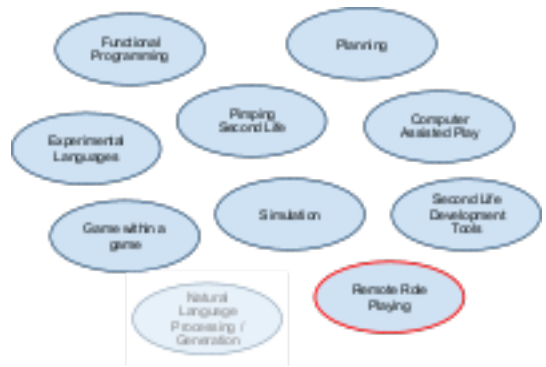
Second Life Development Tool

- Bulk operations
  - Autoload scripts
  - Autocreate objects
  - Apply templates to land

Remote Role Playing

Tabletop Role Playing Games (like D&D)

- Suitable for trad-RPGs
- Suitable for story games
  - Change world on the fly as the story fleshes out
- Group DMing -- a bit like Neverwinter
- NPCs can be partly autonomous
- Visual Power Tools
  - Monster-gun sprouts NPCs from ground
  - Motivation/emotion/objective guns affect NPCs
  - Grenades apply mot/emo/obj to crowds/herds
  - Possession gun takes over an NPC
  - Control room with remote tools
  - Voodoo dolls
  - Camera management
  - Dirt gun
  - Disintegrator gun



Understand/Gen Natural Language

- Intelligent viewer control
- NPC interaction with people

Project

https://github.com/zot/Plexus/blob/master/README.md