DALi: Distributed Artificial Life

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KindSoftware, LLC and DALi, Inc. (2000)

Distributed Artificial Life

- What is Artificial Life?
  - Digital representations of biological constructs
  - Emergent systems
    - From Conway's Game of Life to DAI
    - From Tom Ray to Creatures
  - Used for science, problem solving, and entertainment
- Why make it distributed?
  - Three factors:
    - Scaling
    - Scientific
    - Social

Solving Three Scaling Problems

- Network
  - "Massive" does not mean thousands
  - Client-server is easy but very limited
  - Keystones are synchronization and security

- Content Creation
  - The two man-month rule $\longrightarrow$ day-per-species rule
  - Application to static and dynamic content
  - Unexpected angles

- Dynamism
  - Thesis: open systems are more interesting
  - Tired of canned, prepackaged experiences

Potential "Customers"

- Massive Multiplayer
  - Sony, Turbine, Microsoft, etc.
- Wireless Gaming
  - PDA phenomenon
- Intel and Sun
  - How to burn CPU cycles
  - Evidence that Java can be high-performance and WORA

Technical Components

- Distributed systems
  - Networking and Messaging
  - Mobile agents
- Simulation and interaction
  - Physics
  - 3D visualization
- Emergent systems
  - Learning systems
  - Artificial life

Artificial Life

- Thesis: Declarative specification of basic entities
  - Simulate with sufficient detail and realism results
  - Limits and goals

- Process of species creation:
  - Digital genome
  - Genotype to phenotype
  - Skeleton and musculature
  - Biochemistry
  - Senses
  - Basic and higher-level behaviors

The Technology Demo

- DALiWorld - a simulation of an ocean

- Reasons for choice
  - Technical and business

- Challenges in domain
  - Physics
  - Visualization
  - Entity scaling

- Fun technical aspects
  - Camera submarine
  - Buoyancy and orientation
  - Initial search points

Comparisons

- Biods, Biomorphs, and Biota

- Santa Fe Institute and Swarm

- MIT/Computer Museum Virtual Fishtank

- Sims, Ray, and Avida

- Creatures

- Black and White

Post-Mortum

- Who is the customer?
- Gating external technologies
    - Rendering
    - JITs and native libraries
- Characterization of effort
- Democratic business
- Social aspects

What's Next?

- DALi, Inc.

- My research
  - Independent but similar goals
  - Flatland, dinosaurs, and bugs
  - Evolution and the semantic web