Massively Multi-player Online Environments

Memories of the Past,

Visions of the Future.

Jeffrey P. Kesselman
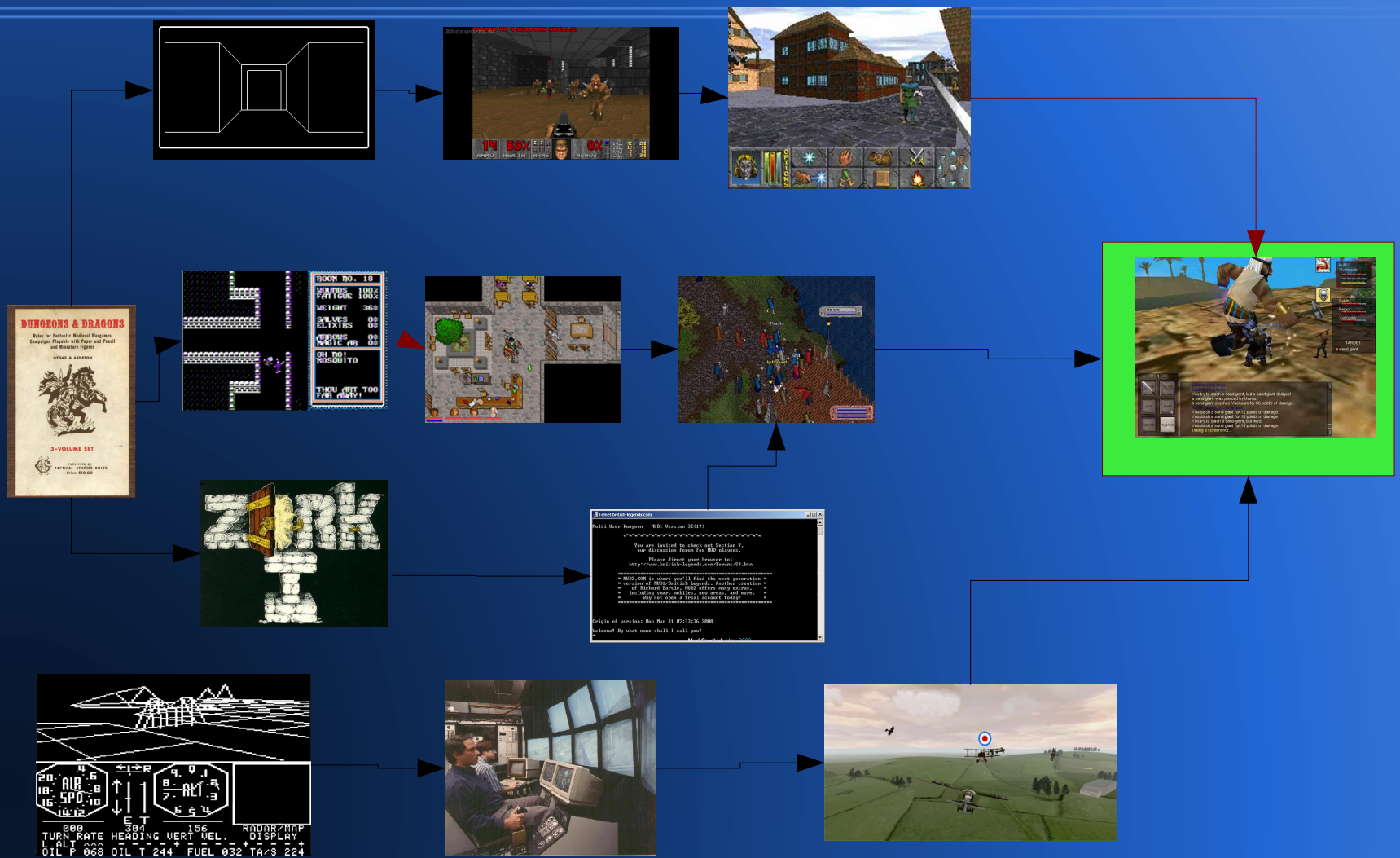CTO Rebel Monkey Inc
Originator of Project Darkstar

Part 1: History of the MMO

Or the long and winding road to Everquest
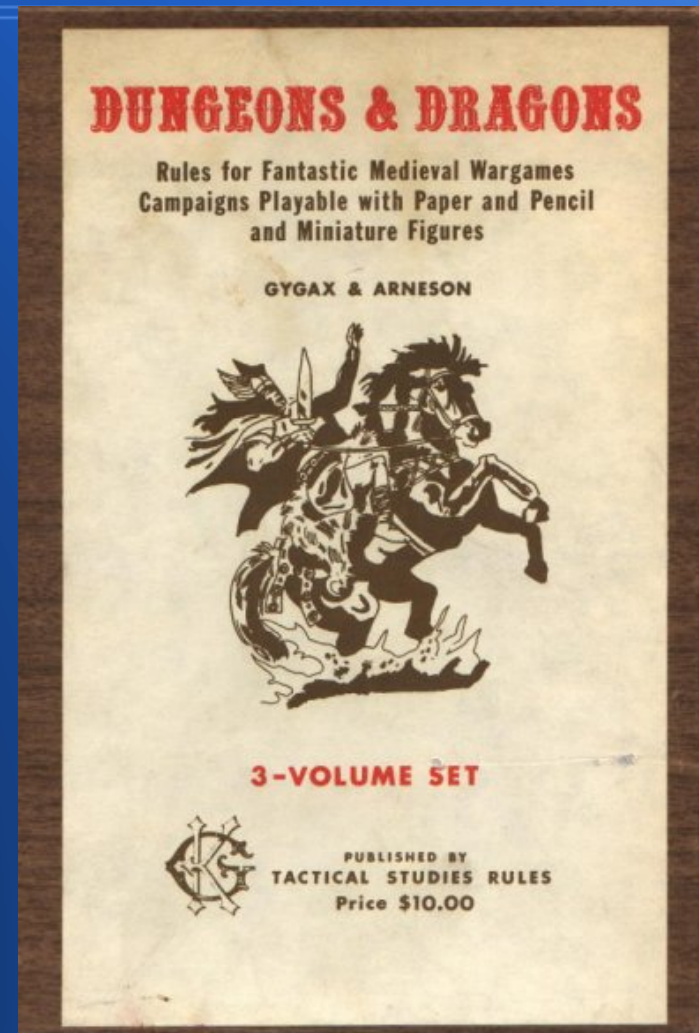
Part 1: History of the MMO

History's like a story in a way: it depends on who's telling it.
-- Dorothy Salisbury Davis

24 years in a slide

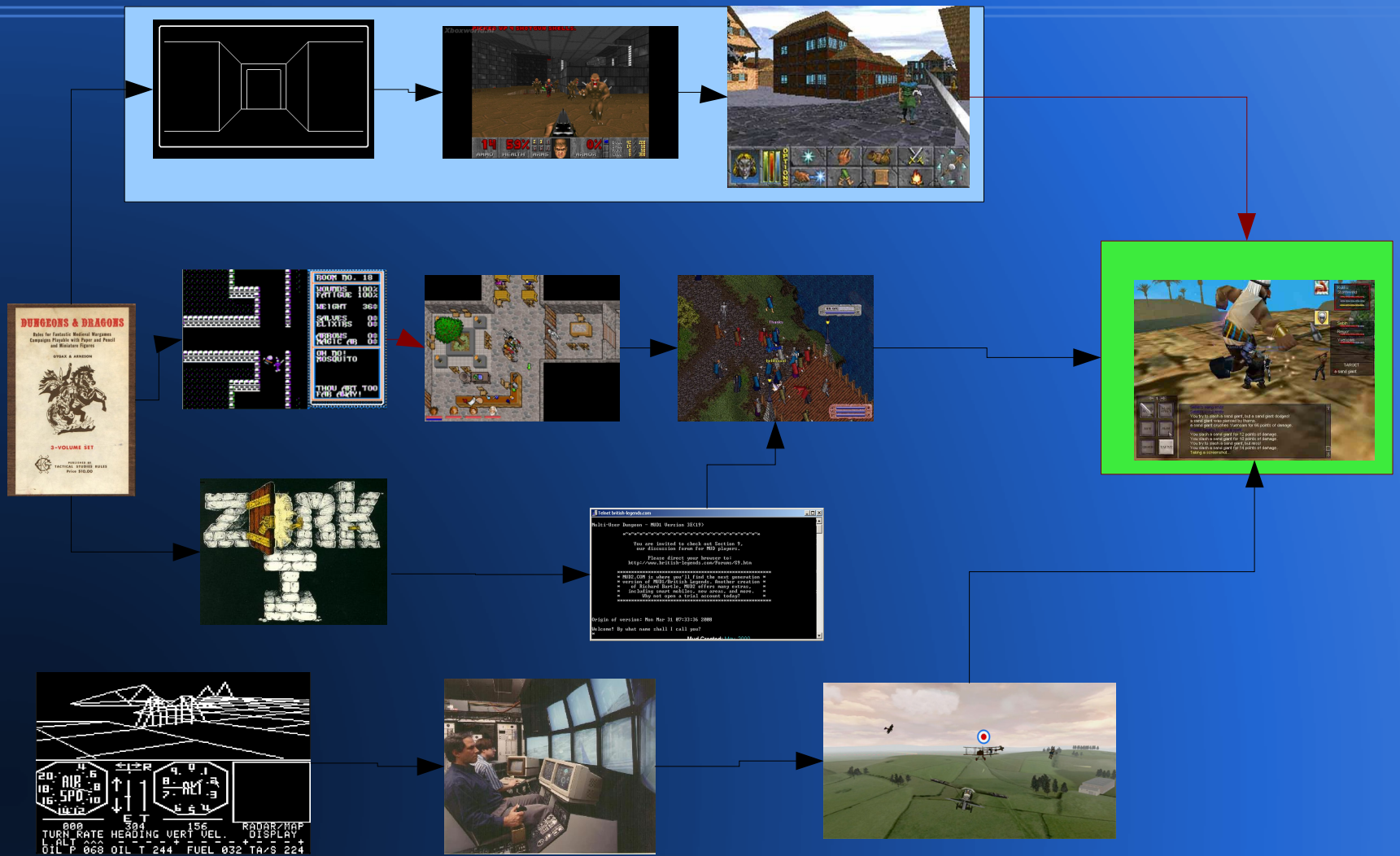# In the beginning, there was Dungeons and Dragons

- Originally intended as wargame miniatures rules.

- Purely imaginative play quickly became the dominant form.

DUNGEONS & DRAGONS

Rules for Fantastic Medieval Wargames
Campaigns Playable with Paper and Pencil
and Miniature Figures

GYGAX & ARNESON

3-VOLUME SET

PUBLISHED BY
TACTICAL STUDIES RULES
Price $10.00

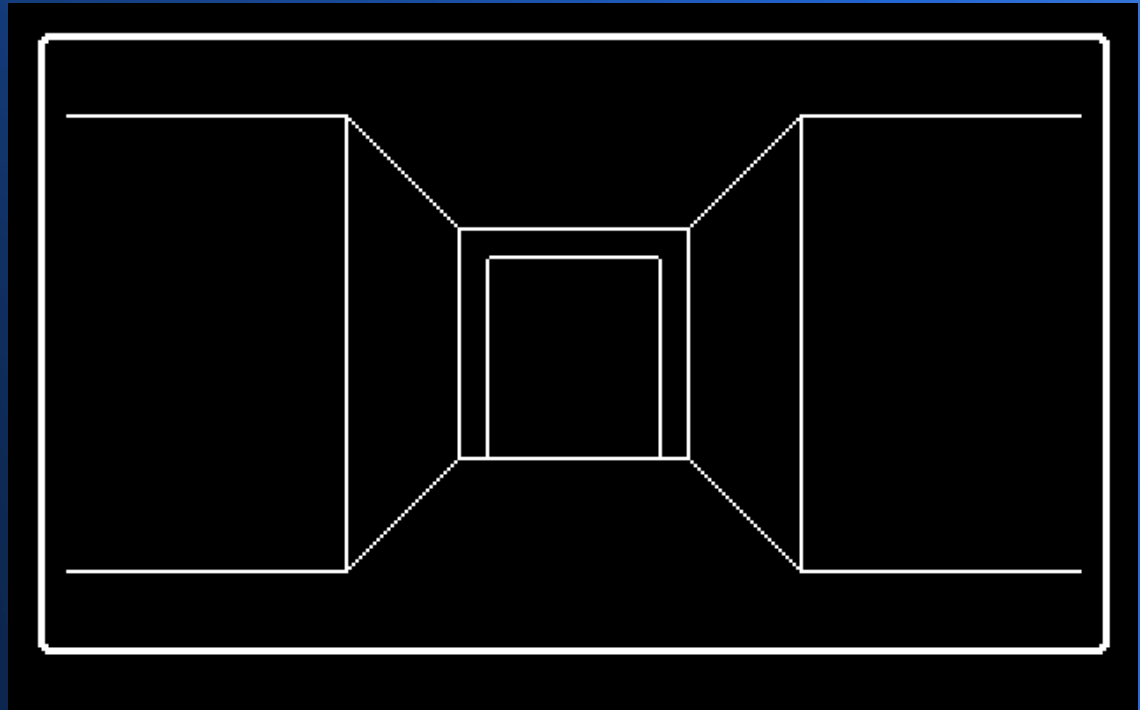# Remember your roots... they'll keep you humble.

First Person DnD games

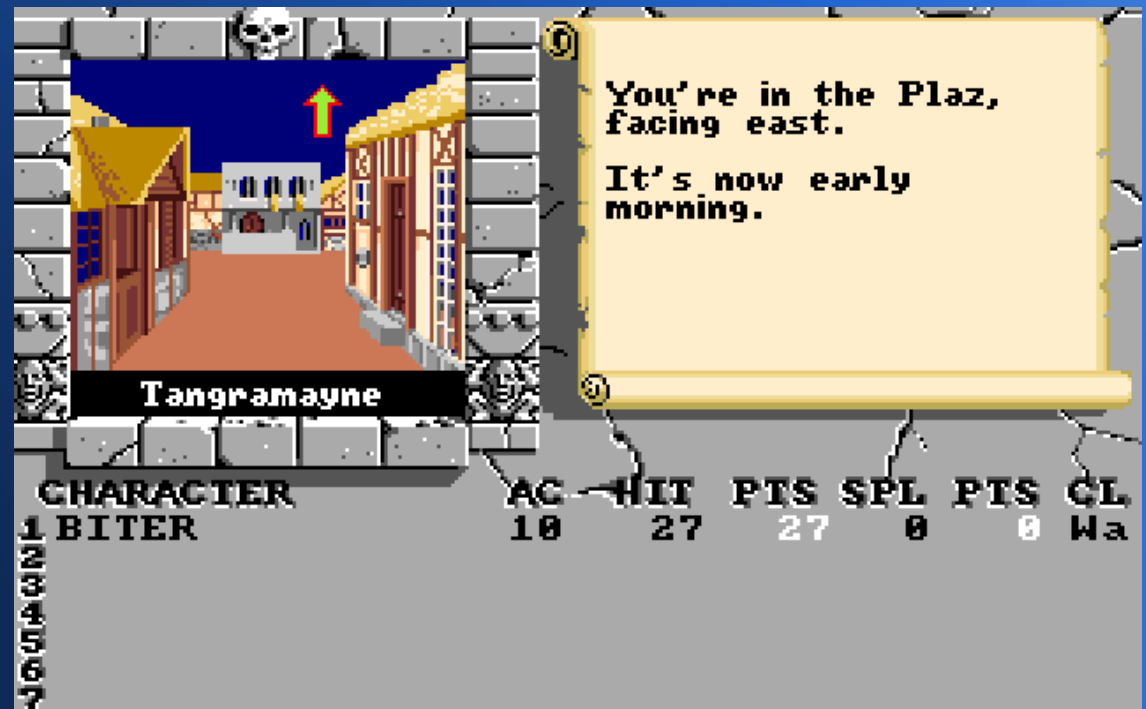# Attempts to visualize DnD go back to the first PCs

- Wizardry
  - Apple II
  - 1978

New hardware brought incremental improvement

- Bard's Tale
  - DOS
  - 1985
  - Improved Graphics
  - Deeper story

The influence of the First Person Shooter

- DOOM
  - 1993
  - Free movement

First true "environmental" RPG

- Elder Scrolls: Arena
    - 1994
    - Free movement in Fantasy World
    - Open "sandbox" environment
    - Holy grail of RPGs
    - Lacked Roleplay
    - Roleplay requires others

Third Person DnD Games

Temple of Apshi

- First 3rd person DnD game
    - Apple II
    - 1979

The Ultima Series

- Platform improvements brought game improvements
    - DOS
    - 1992
    - Improved graphics
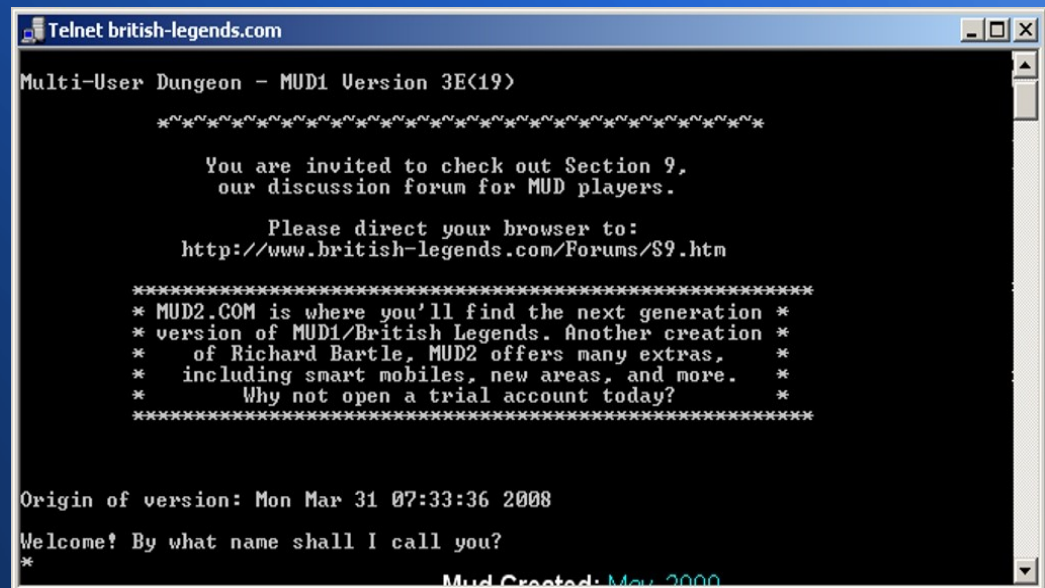   - Deeper story

Not all DnD programs were visual

Zork

- First text adventure

  - Apple II and other 8 bit machines

  - 1979

  - Textual story simulation

  - No graphics

MUD

- The First MMORPG
  - 1980ish
  - Multiplayer text adventures
  - Had to solve N-square
    - Rooms

Convergence begins

Ultima Online

The First Graphical
MMO Environment

- 1997

- MUD + Isometric
  RPG

- Rooms gained
  maps

- Players gained
  position

- Birth of the "Zone"

At the same time, home flight simulators were being born

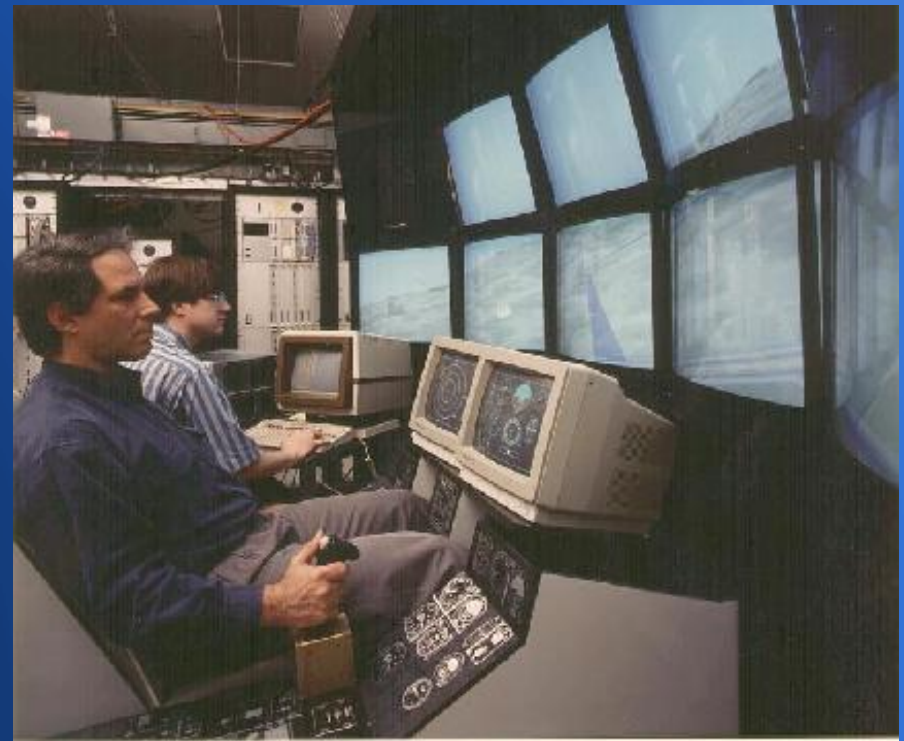# At the same time, home Flight Simulators were being born

- Sublogic Flight Simulator
  - Apple II
  - 1980

SimNet
Big boys with big toys

- Multi-vehicle networked combat simulator

  - 1990, DARPA

  - Custom hardware, 56K modems

  - Developed key networking technology(DIS)

    - Dead reckoning

Red Baron on The Sierra Network

- Multi-player network comes home
    - 1992
    - PC, 2400 baud modems
    - Used DIS like technology to hide latencies
    - Set the pattern for vehicle sims

The Final Convergence

Everquest

- 1999

- The prototype for all virtual environments to come

    - MUD logic and gameplay

    - Zones from UO

    - 3D world from 3D RPGs

    - Dead reckoning from DIS

End Part One
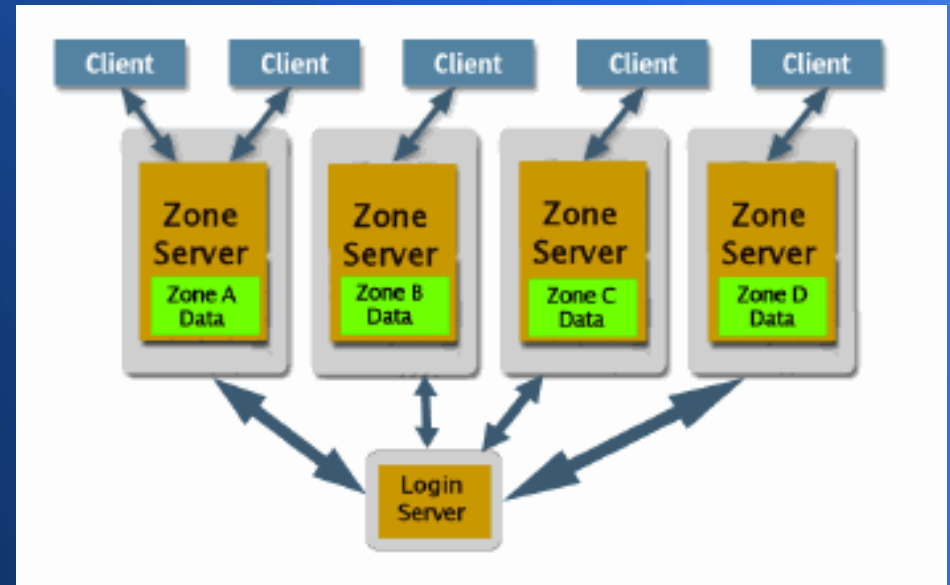
Questions?

Part Two: MMOs Today

Everyone has baggage

- Technical Baggage
  - Zone architecture
  - Security Issues
  - Latency Effects
- Design Baggage
  - Static quests
  - The grind
  - Classes and Levels
  - Physical space

Zoned MMORPG Architecture

- Each zone is on its own physical machine

- Game state in memory

- Shared DB **only** for user data
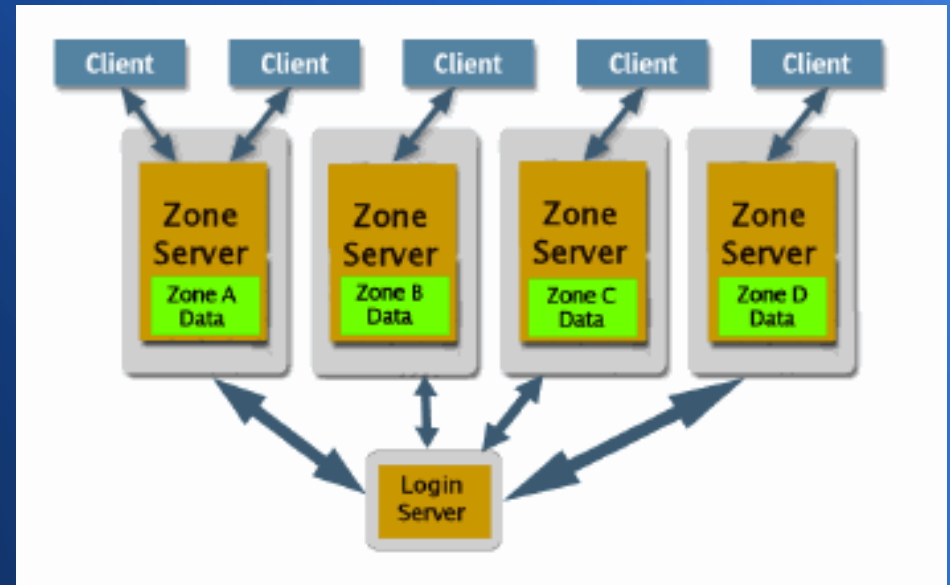
- Gating login server

Architectural Issue 1:
The Fire Marshall Limit

- Each zone has to be capped in terms of number of users

- Popular zones hard to get into

- Unpopular zones waste resources

- "virtual zones" break immersion

THE NUMBER OF PEOPLE
PERMITTED IN THIS ROOM
SHALL NOT EXCEED
123
BY ORDER OF
THE STATE FIRE MARSHAL

Architectural Issue 2: Game state fragile

- Loss of machine means loss of state

- Loss of machine means loss of access

- "Rollbacks" occur

- Non-transactional

    – Races occur

- Severe limit on game design

    – World is static

MMO Security Issues

- Players cheat
  - – Cheaters collude
- Client is inherently insecure
  - – State on client is manipulable
- P2P means exposed IPs
- Server side state a must

Latency Effects

- Broadband only games must expect up to 1000ms

- Modem games must expect up to 6 seconds.

- Dead reckoning a must

- Limits interactivity

Design Baggage 1: Static Quests

- Inherited from single-player RPGs
  - "The Story"
- Makes less sense multiplayer
  - 20,000 heroes with the same story?
- Compounded by static world limits

Design Baggage 2:
The Grind

- Inherited from DnD
  - Reward in DnD, focus in MMORPG
  - Boring and repetitive activity
  - Many players will ignore everything else til they "max"
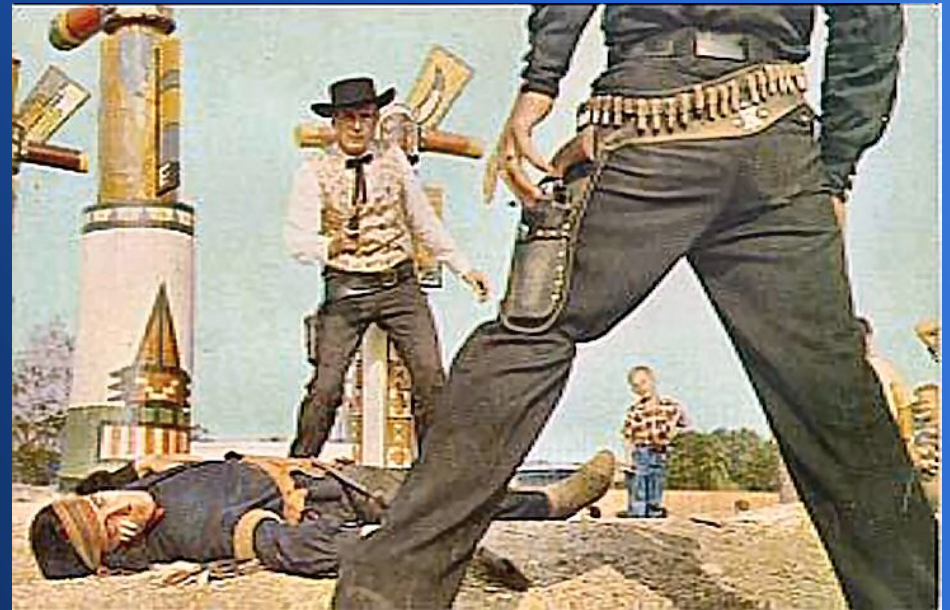 - Those players are seen as more "successful"

Design Baggage 3: Classes and Levels

- The same "fundamental 4"

- If boring, why do it at all?

  - Content limiter

  - Easy carrot

- What do we do instead?

Design baggage 4: Competitive Play

- Comes from single player games
  - RPGs were solo experiences
  - FPS are head on competitive
- Ironicly NOT a DnD thing
  - Perfect positive sum game

Design Baggage 4:
Physical Space

- Paradigm of independent physical areas forced by architecture

- Initial exploration is fun

- Repeated "fed ex questing" is not

End Part 2

Questions?

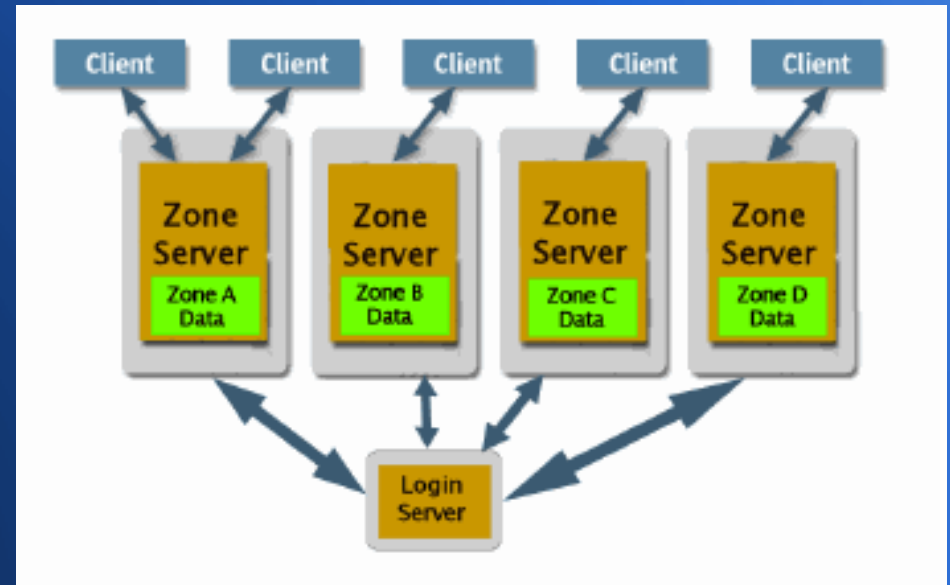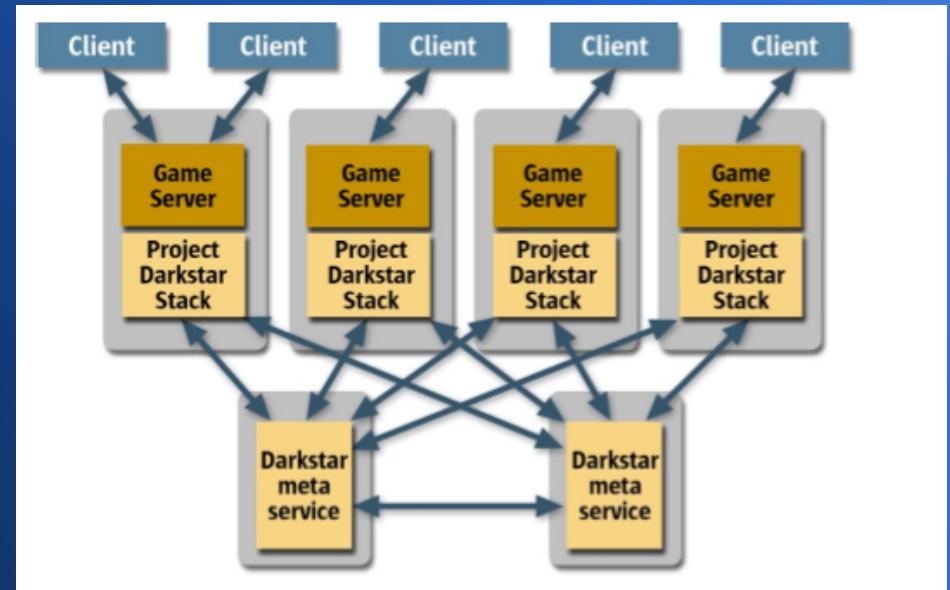# Part 3: Current Issues and Disruptors

The seeds of change

Issue: Boredom

- The soul of entertainment is new experience

- Reaching the end of incremental improvements

    - Static worlds

    - Fixed quests

    - The Grind

Issue: Reliability and Scalability

- Result of assigning CPU to zones

- Bad failure modes

  – Rollbacks

  – Lock out

- Fire marshall limit

Disruptor: Project Darkstar

- New model for MMO architecture
    - Assigns CPU to users not data
    - Fault tolerant
    - Reliable
    - Generally scalable

Exploits inherent dynamic parallelism

- MMOs are naturally parallel
    - Typical MMO scene

Whats really going on here?

- 6 players in view

- Three distinct groups...

Whats really going on here?

- Two are interacting with a merchant

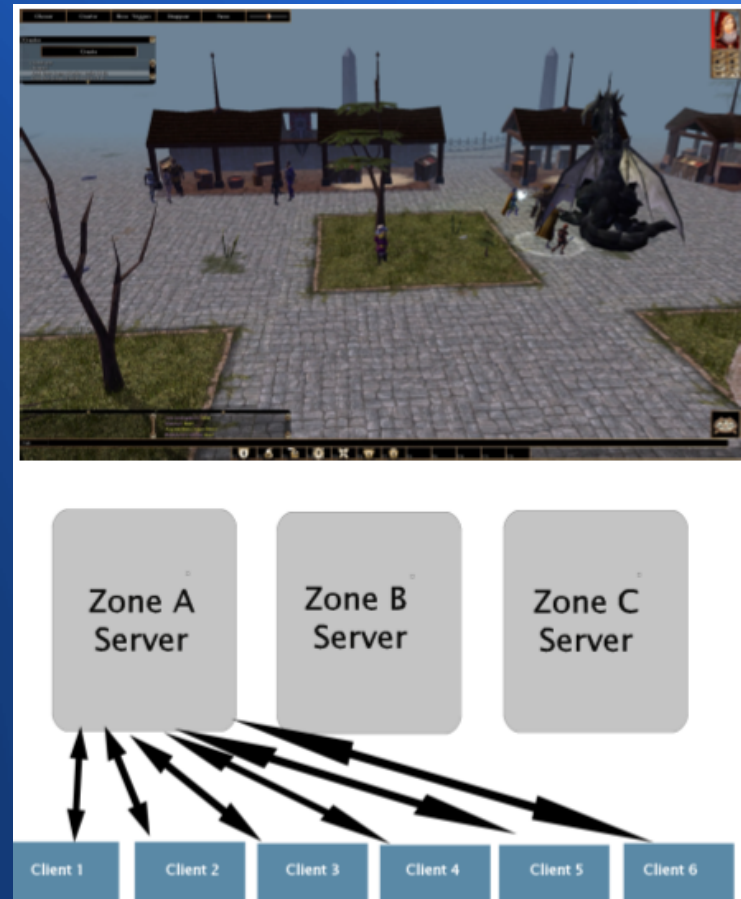- One is "talking" with a non-player character

Whats really going on here?

- Three are fighting the dragon
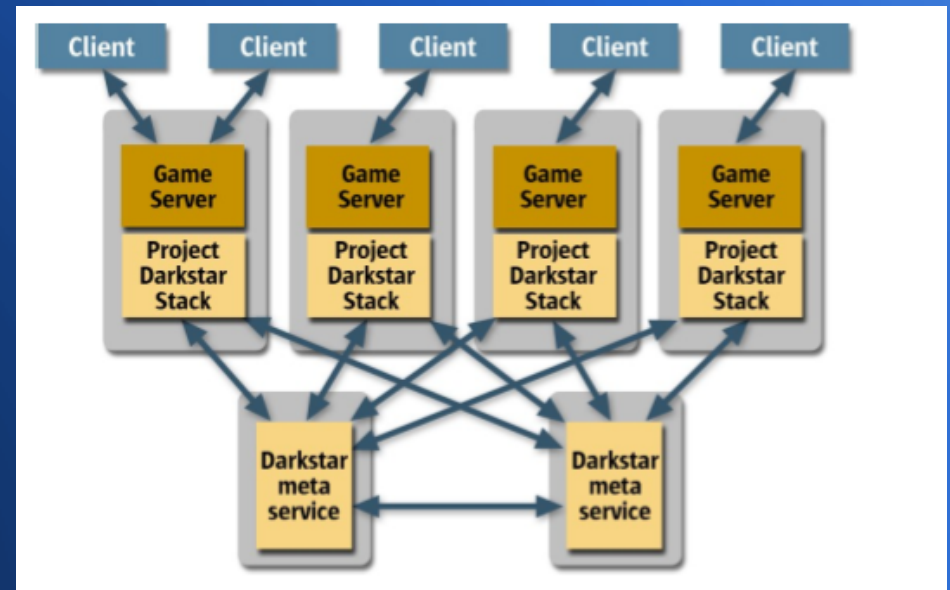
In the Zoned Architecture

- All happens in one zone

- All needs to happen on one server

- If that server dies, all state is lost

Darkstar Architecture

- Spreads clients across processing nodes

- Brings data to them

- If node fails, another takes over

Darkstar processing supported by Darkstar Data Store

- Low latency, high availability, enterprise grade data base
  - Transactional
  - Not relational
- Race proof
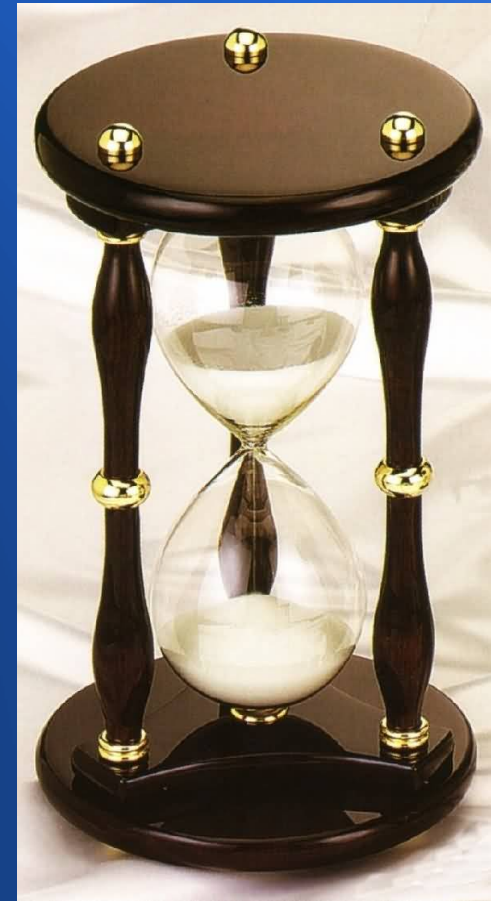 - Virtual single threaded programming model

Impact

- Dynamic, changing, persistent worlds

- Worlds not shackled to the Zone model

- World size and shape limited only by data, not CPU

Issue: Time Investment

- The grind requires a lot of time

- Have to keep up with friends or get left behind

- Long play time commitment
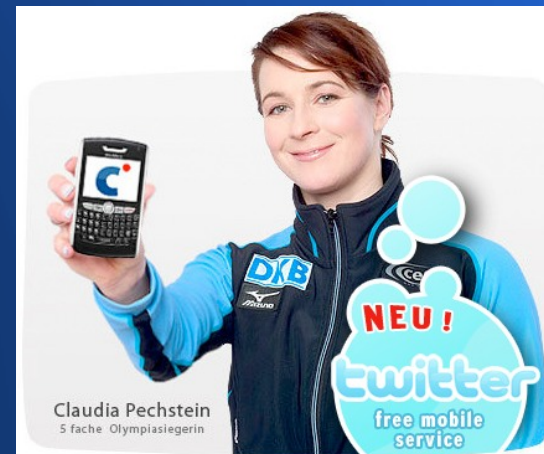 - Many hours at a session

Disruptor: Casual Games

- Low commitment
  - Easy learning curve
  - Short game sessions
- Highly successful with the mass market

Disruptor: Social Sites

- Facebook, Twitter etc

- Also low commitment

- Build very active communities

- Successfully reach out to mobile

Impact

- Redefinition of "online environment"

    – Defined socially, not spatially

    – About relationships, not competition

- "Jeff Kesselman's Theorem (c1980):

A MUD universe is all about psychology. After all, there IS no physicality. It's all psych and group dynamics.

Example: CampFU

- Combines social web site with cooperative casual gameplay

- Persistent identity across entire site

What do YOU think is next?

Questions, Comments and Snide Remarks