

Games and Gamification in Computer Science?

A few personal experiences

Prof. Walter Kriha

Computer Science and Media Faculty

HdM Stuttgart

www.kriha.org

Agenda

Games at HdM: Gamification of Computer Science?

People

Technology

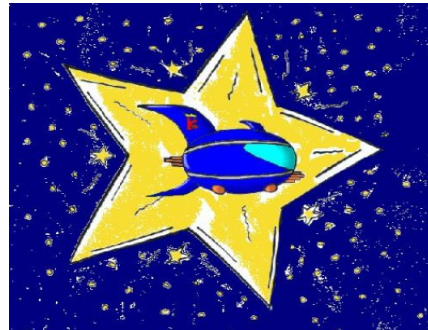
Beyond Games

A Warning

Games Days and Game Development at HdM



04: first Games Day
(where are the media in CS?)



04: "Karl der Raumschiff"



06: Adventure >50 Dev.



11: 3D character



15: Prof. 3D-VR Game



15: VR/LeapMotion/Browser/Mobile Games

More: <https://www.hdm-stuttgart.de/mi/projekte>

Things we learned (from our students)

It is OK to play computer games! Frequently the very best students are deep into games and game development because of the complexity. Gamers think outside mainstream and find surprising solutions.

The motivation behind games is unbelievable. (Even for math and security)

Game development is an exercise in holism: Performance, Security, Scalability, User Experience, Content Design, Artwork etc.

Game development is cutting edge technology which leads to new inventions. It spreads to new devices immediately (e.g. smart watches)

Game development is interdisciplinary at its core. Many disciplines need to contribute.

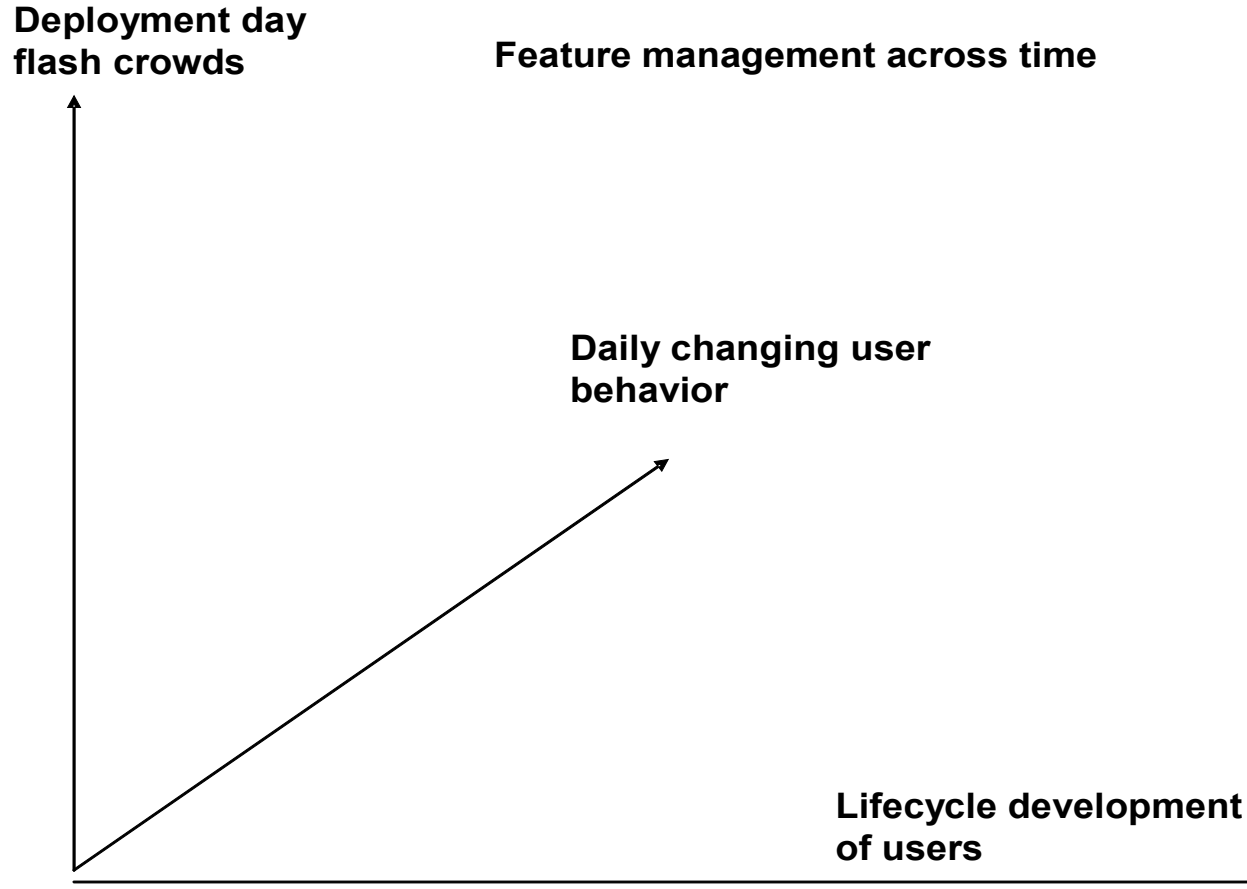
Game development fits perfectly into a CS curriculum

People – Players, Cheaters, Hackers...

- 1. User/Feature Management**
- 2. Security: Fighting cheaters and bots**
- 3. Community Management**

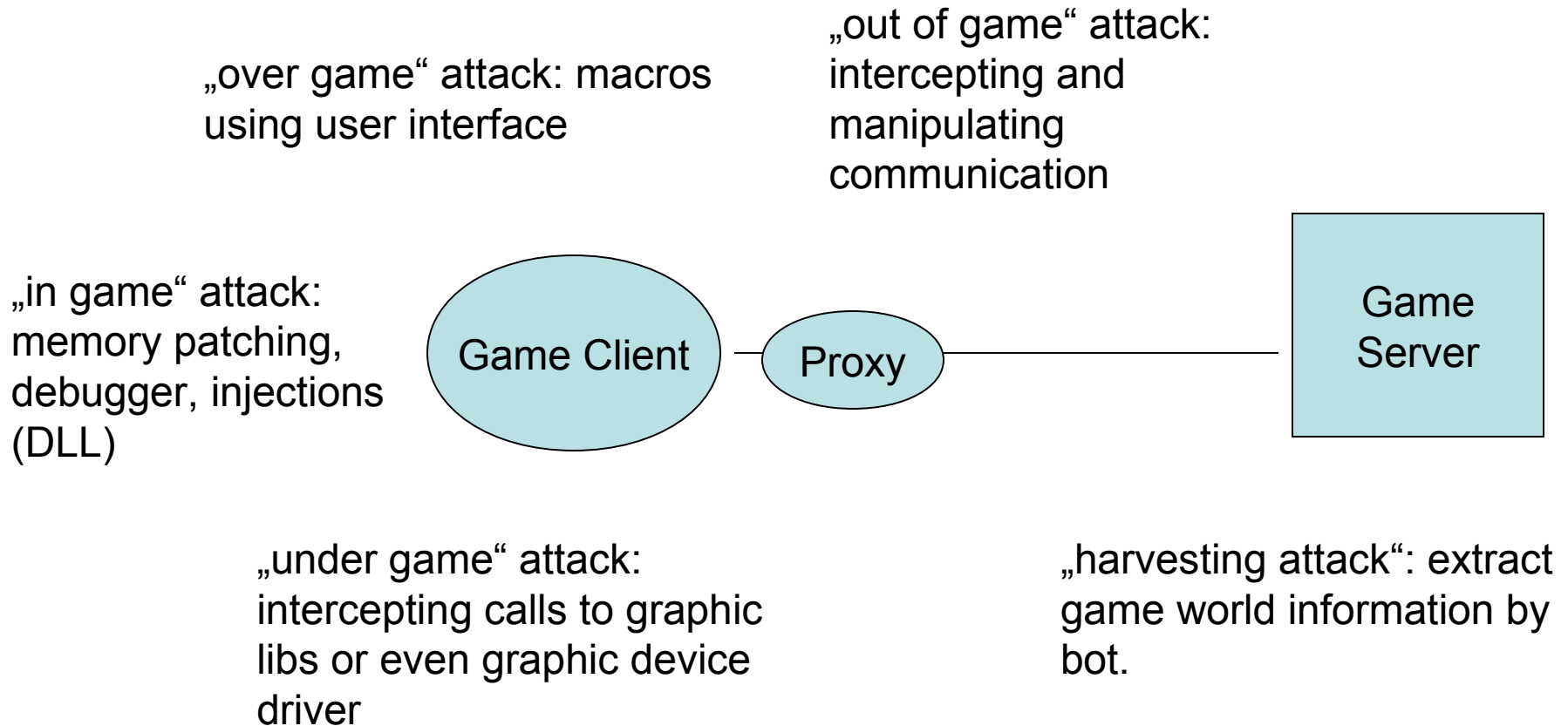
Game development means driving hardware at the edge. In the past, games have pushed the envelope regarding user numbers and performance.

Crowd Control : Load Balancing by Feature Management



From Andreas Stiegler, MMOG infrastructures

Security: Fighting Cheaters and Bots



Memory inspection, API control by game situation, delayed control of client game state and finally game masters are only some of the tools used by game companies to protect the game (and their income)

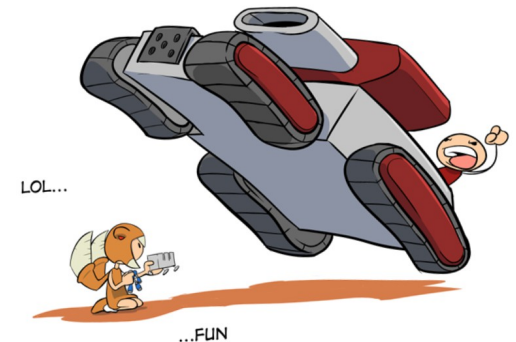
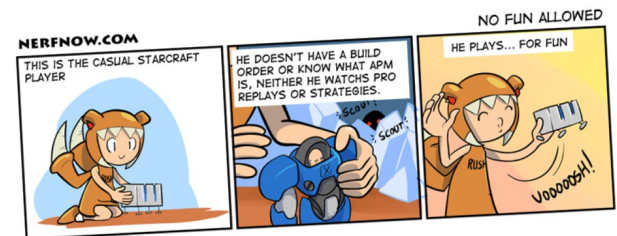
Community Management

Games are often defined as “successful” by having a strong community over many years, rather having an initial monetary success (StarCraft, Counter Strike, ...)

Game Developers did soon start to care for their community and try to find ways how to interact with their fan base efficiently. (“Pro Gamers”, Game Masters, Community Driven Content, Add-ons, ...)

Failing to manage user emotions can result in serious technical or financial problems

Online interaction is – for most games – far more important than press recognition. Especially in the age of “MMOisation”.

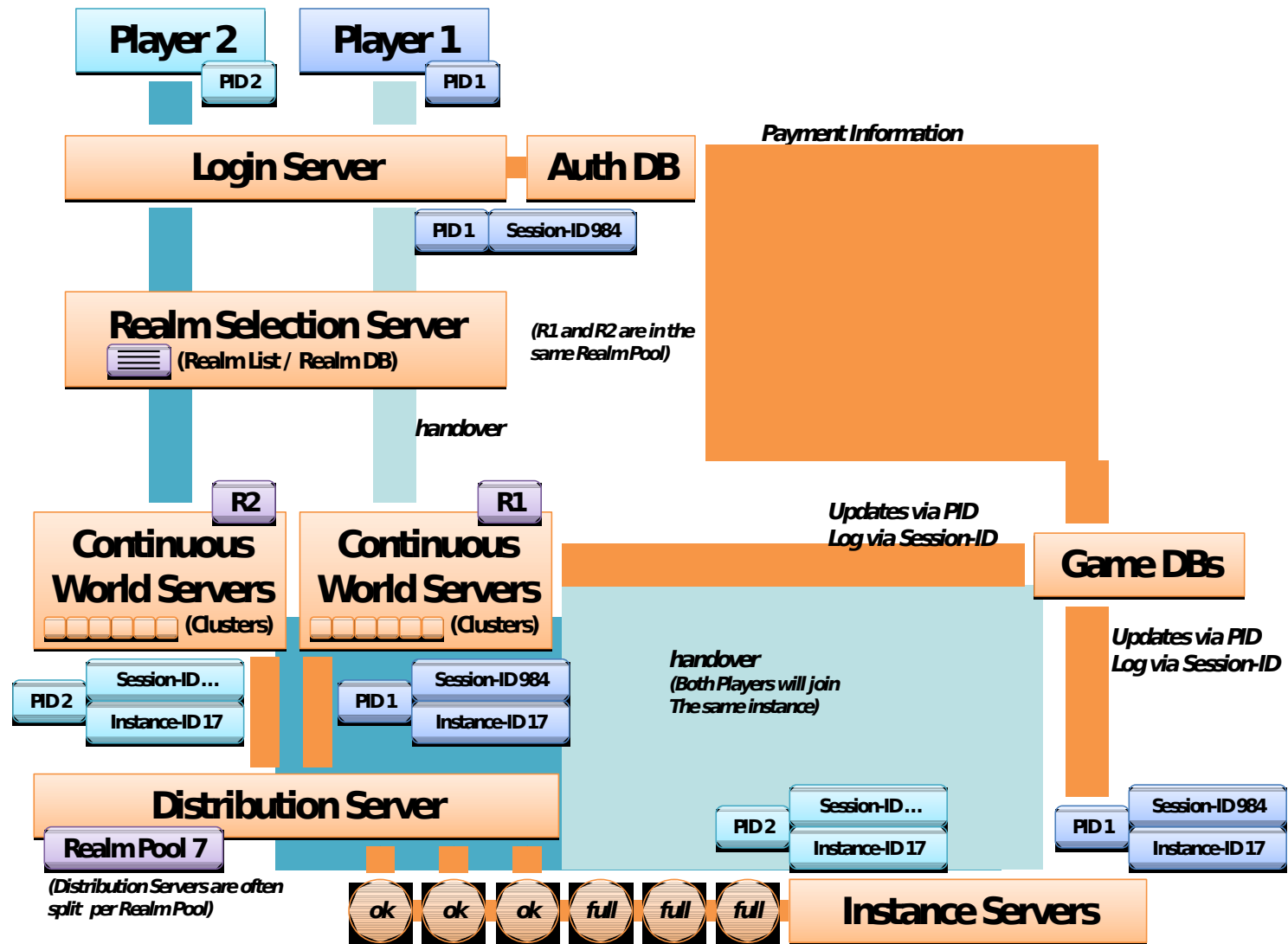


Technology – Need for Speed!

1. **Sharding**
2. **Write intensive storage concepts**

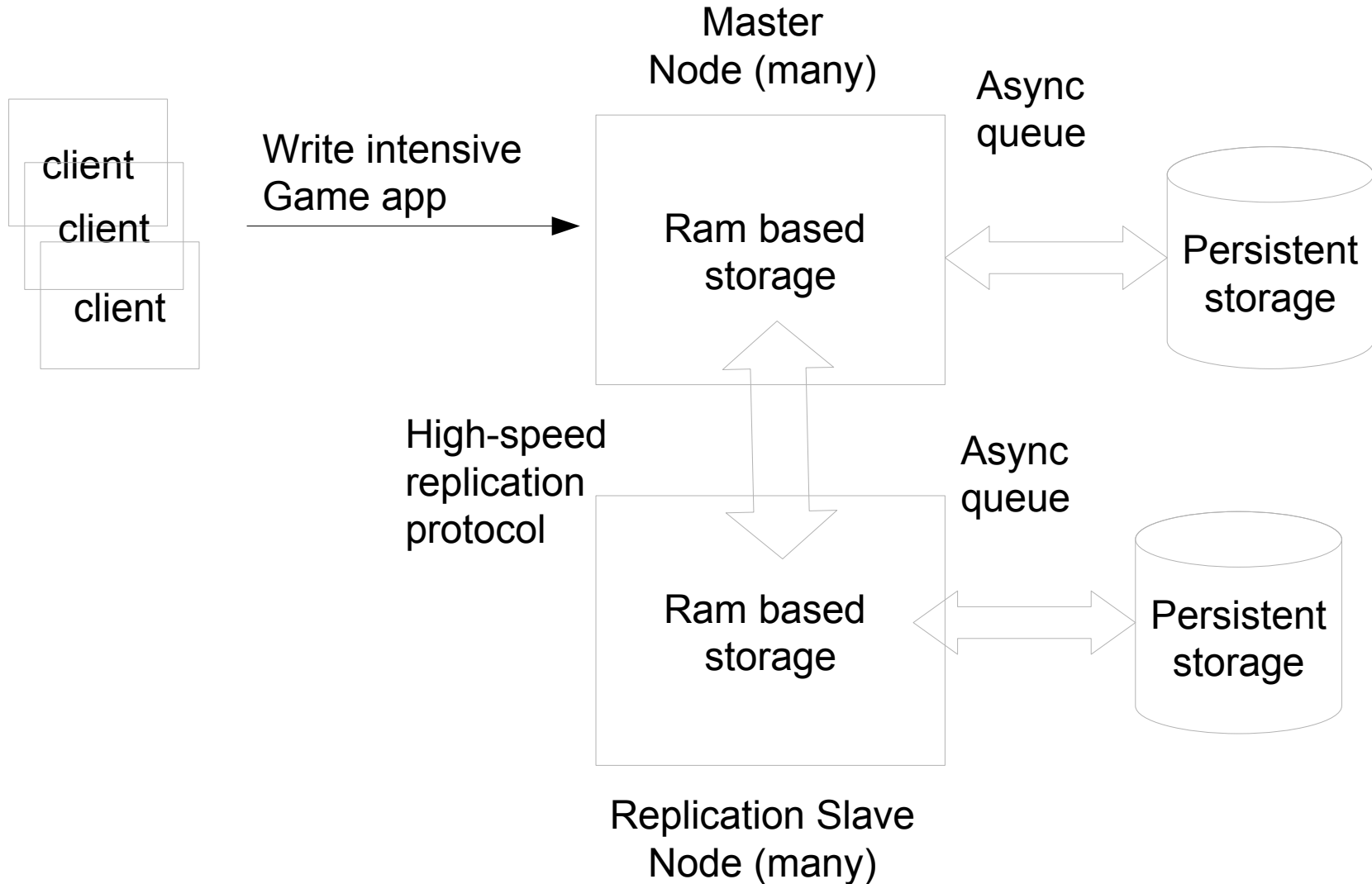
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Performance by Sharding Content and Gameplay



From Andreas Stiegler, MMOG infrastructures

Scaling storage to hundreds of million of players: Zynga (Farmville) Membase architecture



After Amar Arsikere, Zynga

Beyond Games

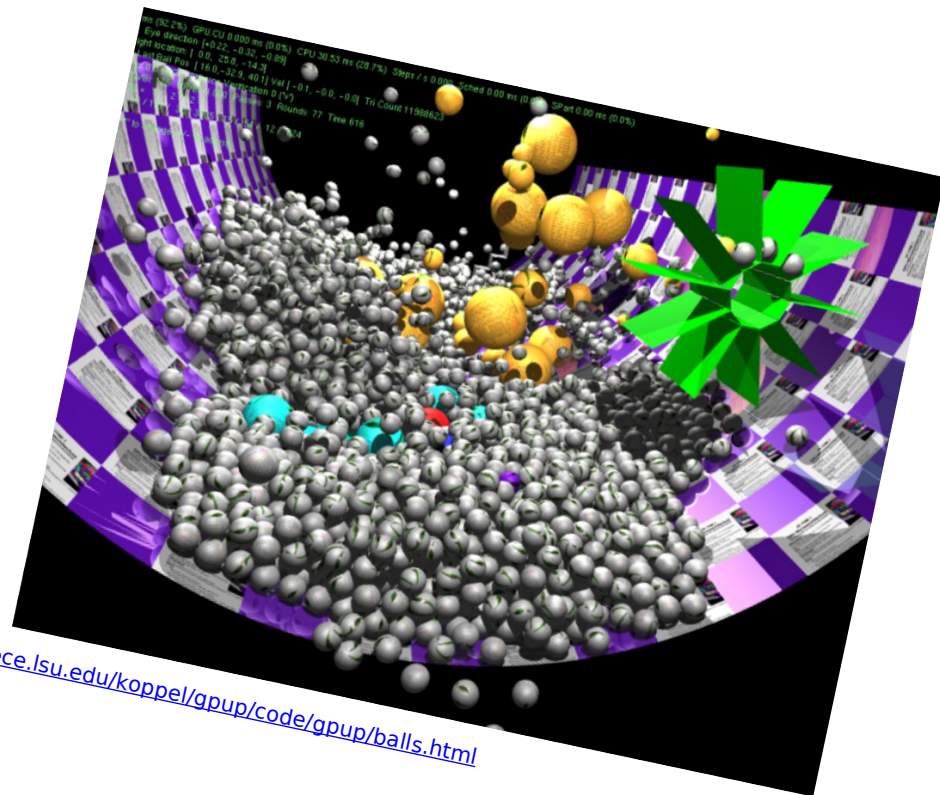
- 1. GPU processing and sensors**
- 2. WoW Studying Viral Distribution**
- 3. Games in Health**
- 4. Smart City – a “serious game”**

GPUs: Massively Parallel Computations

Graphic Processing Units (GPUs) are becoming more and more programmable and thus increasingly important in other fields like science, healthcare and engineering. Their massively parallel architecture allows for an enormous performance boost in number crunching applications like:

- Visualization of radiological data
- Physical simulations
- Video encoding for infotainment
- Computer Vision
- Machine learning
- Other numerical calculations (matrix multiplication, fft,...)
- Gesture processing for multi-touch screens

Source: P. Bader, HdM



<http://www.ece.lsu.edu/koppel/gpup/code/gpup/balls.html>

WoW: Studying Viral Distribution

Initially a Bug in World of Warcraft caused a plague-like game mechanic to spread through the entire realm. This attracted the attention of epidemiologists and was used as a model for viral distribution

- Former points of interests were avoided by the population (traders, big cities, ...)
- Players now met at formerly forsaken places to avoid infection
- Some infected players tried to spread the disease for fun
- Diseased players were avoided

Recently a similar event was intentionally invoked and more data were collected.



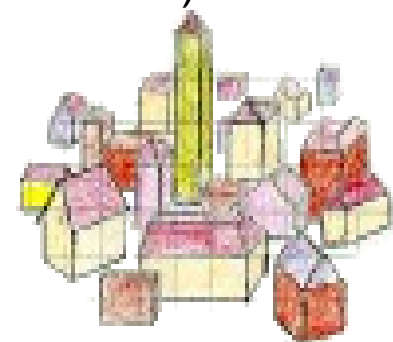
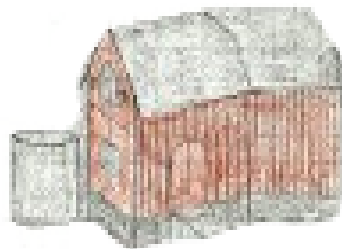
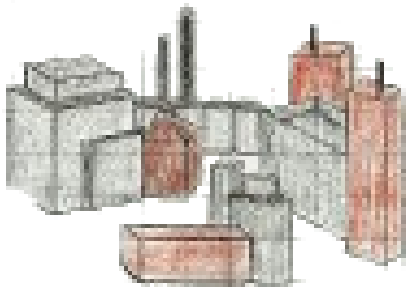
Source: A. Stiegler, HdM

Games in Health

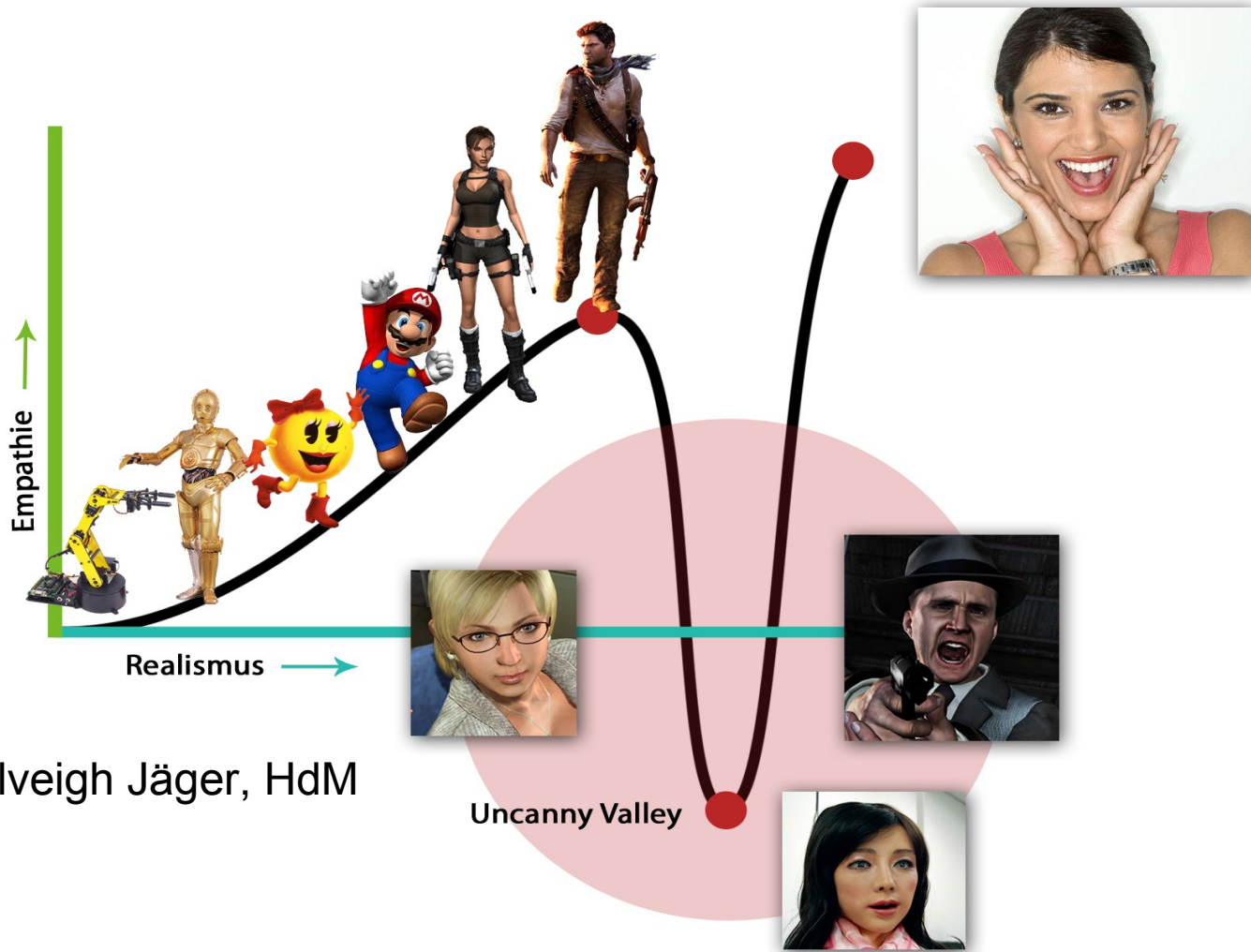
- Research on the development and therapeutic use of games in the treatment of autism in children
- Use of facial modelling software for autistic children
- Gamification in rehabilitation/sports
- Support in cancer treatment of children

„Smart City“ - Serious Game for eEnergy

- Bachelor software project, supposed to make the „Smart Grid“ topic accessible to the masses in a rather playful way.
- The player needs to make a village independent from large scale energy providers by using renewable and alternative energy concepts from the eEnergy research project by the german government. The concepts include mobile energy and intelligent energy grids. Next releases could tie in mobile devices, real hardware, real communities and even simulations of the grid.
- The game deals with revolutionary technology in its gameplay and uses top-of-the-line software technology to reach a large number of players:
 - It is browser based (platform independence)
 - It uses HTML 5 (no more flash as a game platform)
 - It uses SVG (besides PNG for better resource conservation)



A Warning - The “uncanny valley”



Source: Solveigh Jäger, HdM

The closer to reality the characters are, the more critical the brain gets! Is there a lesson for “serious games” behind?

Is Art the Answer?



<http://solveigh-jaeger.de/?portfolio=game-charakter-amelie>

November 23/24, 2015 – Games Day at HdM!

- The latest in Game Development from Industry Specialists (3-D Game Engines etc.)
- Live demonstrations of projects from our Games Institute
- Special Guests from the Game Industry
- Open discussions on game-related topics

Live stream and chat at <http://events.mi.hdm-stuttgart.de>

Register for the newsletter at: www.mi.hdm-stuttgart.de

Sources

- Andreas Stiegler, Doktorand, Communities, KI, Simulation, Sharding
- Christian Merz et.al. Smart City Game und Simulation (computer science and media, Hdm)
- Norman Pohl, Doktorand, BWelabs – virtual worlds for science
<http://www.rus.uni-stuttgart.de/projekte/bw-elabs/>
- Patrick Bader, Doktorand, GPU Processing, sensors
- Solveigh Jäger, Die Erfolgreiche Konstruktion von Spielfiguren für 3D- Spielwelten, Thesis 2011, HdM, <http://www.solgaya.com/Anderes/amelie/AmeliePromoVideo.mp4>
- Building a scalable game server, By Amar Arsikere, Zynga
- Andreas Stiegler, MMOG infrastructures (<http://www.hdm-stuttgart.de/~as147/mmo.pdf>)
- Die Stadt Noah, HdM, <http://www.kreativrauschen.de/projekte/die-stadt-noah/>
- Solveigh Jäger, Erfolgreiches Charakterdesign für Computer- und Videospiele, Ein medienpsychologischer Ansatz, Springer