The Future of Games

Introduction

- Lots of things are changing in the games industry

- We're going to talk about a few of them
  - Hardware trends
  - Software trends
  - Game design trends
  - Business model trends

Hardware Trends

More cores for all platforms

- Multithreaded, job-based game architecture is increasingly important
    - Burst processing
    - ECS!
- Increase in functional programming models to solve some multithreaded issues
    - Map-Reduce
    - Immutable data

Heterogeneous parallel programming

- GPUs are different from CPUs
  - Local memory (VRAM)
  - Different instruction set
  - Highly parallel
  - Throughput optimised
    - Batch up computations, submit to GPU, get results later
- Increasingly suitable for applications other than rendering
  - Physics
  - Machine learning
- CPUs are latency optimised
  - Designed for frequent branching
  - Computation results are available "immediately"

Cloud

- Computation as a service
- Lowers the barriers to online services
    - Great for small developers
- Scalability
    - Can spin up new servers to handle load on the service
- Pay as you go
- Popular platforms
    - Amazon Web Services (AWS)
    - Microsoft Azure
    - Google Cloud Platform (GCP)
        - Google App Engine
- Increasingly used for hosting dedicated game servers

Mobile

- Mobile hardware is getting close in performance to current consoles
- Already past the last generation of consoles
- Some new input mechanics
  - Touch screen
  - Accelerometer
  - GPS (Ingress - Pokemon Go, Harry Potter)
  - No D-pad on an iPhone
- Examples:
  - iPhone
  - iPad
  - 3DS

Controllers

- Wiimote
- PS Move
- Xbox Kinect – oh dear
- Wii U gamepad – oh dear
- Nintendo Switch - Labo
- VR controllers
- Haptic controllers
- Companion apps
    - Touchscreen
    - Accelerometer
    - GPS
    - Camera

Stereoscopic 3D

- Nintendo 3DS – but is it on the way out?
- More games support 3D – but still nowhere near all
- Consoles are capable of making games in 3D, but graphics horsepower isn't really there

VR and AR

- Oculus Rift
- HTC Vive
- PSVR
- Google Glass
- HoloLens
- Magic Leap

Longshots

- Recent things – how did they pan out?

  - Valve's console – failure!
  - Ouya: Android console – failure!
  - Big support on Kickstarter

  - OnLive / Playstation Now – success!
  - AppleTV as a console – working!
  - Google TV – failure!

- Another longshot
  - Death of the console industry, or one of its players

Software Trends

Rendering

- Lighting models
  - Physics-based lighting now common
  - Real-time raytracing – Nvidia RTX
- Quantitative improvements – "4K ready"
- Procedural content

Physics

- Finite element methods
  - Destructible worlds
  - Very few games have pursued the "construction physics" approach of Red Faction: Guerilla
  - Crackdown 3 maybe
  - Soft bodies
  - Fluids
- Continuous collision detection
- Quantitative improvements

Animation

- Parametric blending – Uncharted 4
- Improvements in motion capture - Hellblade
- Facial animation
    - Automatic phoneme detection
- Autonomous control
    - Natural motion
    - Motion planning

Artificial Intelligence

- Machine learning
- Planning
  - Motion
  - Navigation
  - Action
  - Less scripting, more 'brain'

Game Design Trends

Casual games

- Social gaming
  - Facebook gaming
  - Play with friends
  - Strange relationship with the rest of the games industry
- Mobile
  - Instant-on, bite-sized gaming
  - Play in a few minutes
    - On transit, waiting in line, etc
  - Input differences dramatically influence game design
    - Candy Crush, Angry Birds, etc.
  - Board game ports have been successful on the iPad

Telemetry and Metrics

- Publishers and developers can get data on what players are doing
    - Either in development, or after launch
    - Focus development effort on things players do most or where they get stuck
    - Release new versions or updates based on telemetry data

- Vital for some business models like social and free-to-play

Compulsion loops

- "Kompu Gacha" – banned in Japan in 2012

- The dark side of telemetry and metrics

- If you optimise for certain metrics, you can get games that do well at those metrics, but very little else

- Loot boxes – a good or bad thing? In some European countries, possibly an illegal thing?

User-generated content

- Photo modes, video capture
    - Important enough that current-gen consoles have intrinsic support for it
    - Photos actually look good enough to be worth sharing ;)
- SteamWorks: end-to-end support for creating and distributing mods and assets
    - Can actually make money from it
- Level editors, sometimes even on console games
    - Halo Forge, DOOM SnapMap
- Super Mario Maker, Little Big Planet
- Keeps players coming back without ongoing cost to developer

Remasters and spiritual successors

- Remasters from earlier console generations (sometimes much earlier) are popular
- Needs skilled conversion work – BluePoint Games
- Often 'just' a visual upgrade – people want the game to feel the same, but to look modern

- Spiritual successors – devs who worked on one IP make something very similar
- Pillars Of Eternity, Yooka-Laylee, Bioshock, Axiom Verge, Obduction, Mighty No. 9
- Reliant on nostalgia and/or disdain for modern design
- Often crowdfunded
- Can self-limit potential market
- Might just crash and burn

(ironically, movie tie-in games have somewhat died out)

Business Model Trends

Crowdfunding / transparent development

- A few high-profile games on Kickstarter
  - Elite: Dangerous
  - We Happy Few
  - Star Citizen
  - Prison Architect
    Pillars Of Eternity
- Steam Greenlight / Early Access
- Early access means you are at least guaranteed to get some kind of game to play immediately
- Customers want to influence design, want transparency
- Unreal Tournament – development halted (thanks Fortnite)

Hits-driven business

- More money going to top titles, less to everyone else
- Games have always been this way, but the gap is getting wider
  - Mobile changed this only temporarily
  - The same may happen with VR
- The top titles are probably happy with this, but over the long term it may not be great for the industry
  - Film has smaller "Indie" successes, but they're rare in games
- It's not all doom and gloom though
  - Cheap/free engines lower the barrier to entry for the small guy
  - Easy access to large distribution channels (App Store etc)
  - Crowdfunding

Battle for the living room

- Netflix on console – sure, but TVs often integrate it too. Lots of buzz around Bandersnatch.
- AppleTV as a console – not a major player?
- Google Chromecast – Android games
- Valve's console – didn't take off

- This is first generation where we've had ".5" consoles
- Designed to promote 4K visuals
- Games must use extra power strictly for visuals, not gameplay
- Can make users of the ".0" hardware feel inferior
- Reviewers will be encouraged to concentrate on the X / Pro versions

Free to play

- AEM
  - Acquire, Engage, Monetize
- Advertisement-funded
- Microtransactions
  - Free for the main game, but pay for extras
- Pay to progress
  - Or at least to progress quickly
- Pay to win
  - Pay for better gear than other players
  - Once the economy of the game is ruined, start up a new server
  - More common in Asia

Subscriptions

- Holy Grail for publishers
  - Predictable long term income

- MMOs on PC have been doing this for a long time
  - e.g. World of Warcraft

- Hardware platforms
  - Xbox Live Gold
  - PlayStation Plus
  - Users can play multiplayer, get free games
  - Recoups the cost of running servers

Content monetization

- Paid DLC
- Paid virtual swag
    - Skins
    - Hats
    - Taunt animations
    - If you buy a taunt animation and kill me and I see it, that means the animation must exist on my machine too ;)
- Small amounts from many players add up
- DLC isn't free to develop

- Taking a cut of player transactions

Digital distribution

- Tower Records has gone out of business
  - Music sales have mostly moved online
    - Amazon
    - iTunes
    - Apple Music

- Blockbuster has gone out of business
  - DVD sales and rentals have mostly moved online
    - Amazon
    - iTunes
    - Netflix

- GameStop is going out of business...?
  - Game "first sales" have mostly moved online

Not yet...

- GameStop is still a big player in the games industry
- Publishers want to move to online, but don't want to upset GameStop, Walmart, etc

- Advantages to digital
  - Lower cost of goods (basically free to distribute online)
  - Stops used game sales – which is where a lot of store revenue is
  - Low-friction purchasing

- Some clear successes already
  - iTunes App Store
  - Steam, especially its compulsive promotions

Mobile

- Very good device penetration
  - Don't need a console when you already have a phone
- Cheaper games
  - Price point seems to be $0.99 or free
- Much harder to market games
  - Can't pay for shelf space

- iPhone vs DS, PSP, Vita

Rise and fall of Zynga

- Social Game Developer
  - Primarily Facebook games
  - Free to play with microtransactions
  - Strong focus on telemetry
- Very successful IPO
  - Social was the new moneymaker
- Facebook rule changes have hurt Zynga
  - Can't spam friends as much as before
- Zynga's business is still hits-based
  - Farmville was huge
  - Cityville less so
  - Farmville 2 was a mild success
- Huge (75%) drop in stock price in 2012
- CEO named one of the worst CEOs of 2012

E-Sports

- Rapidly growing business
- 2015 revenue:
    - Asia $321 million
    - US $224 million
    - Europe $172 million
    - Rest of world $29 million

Hopeful parents

Tournament prizes
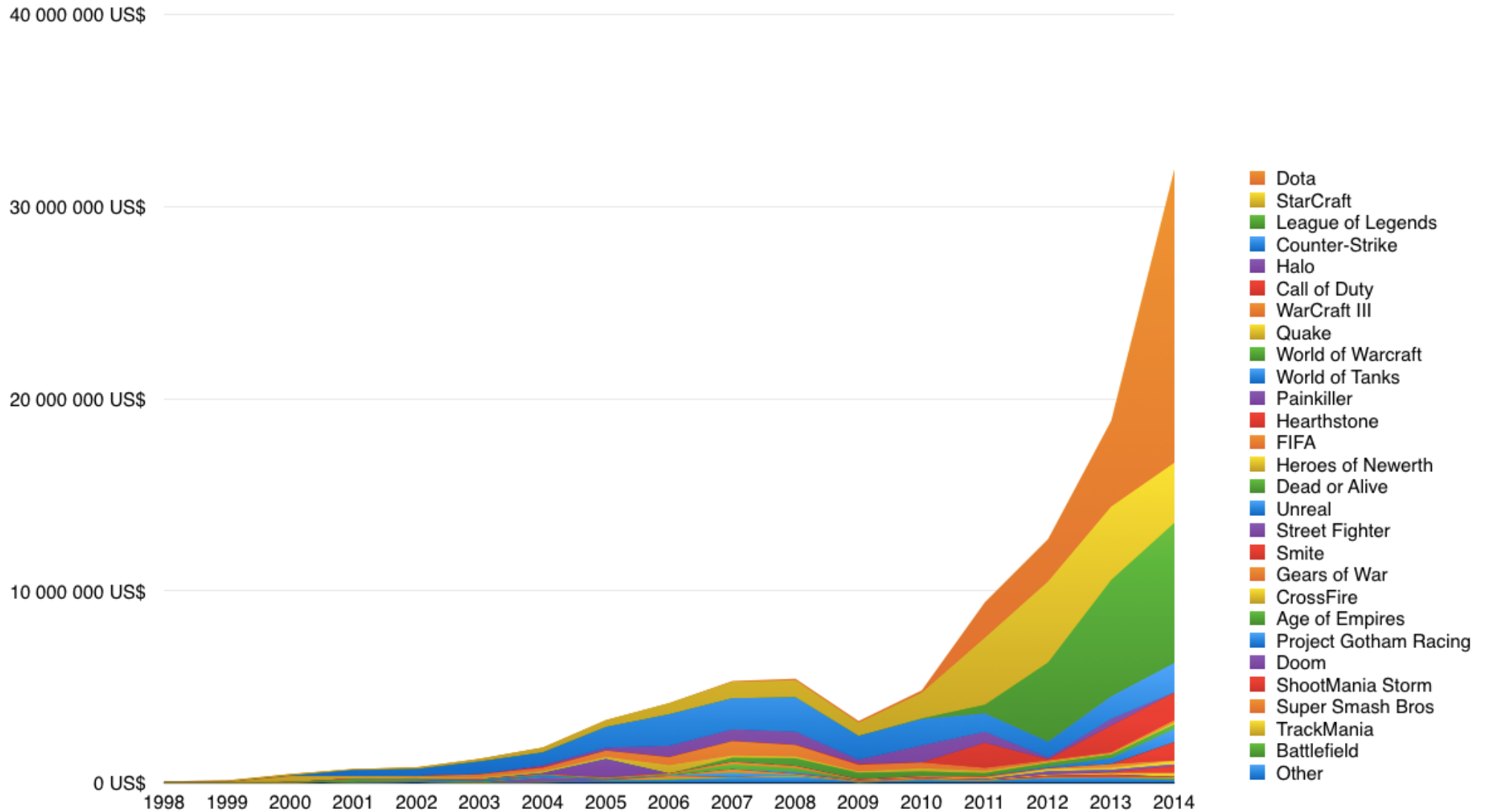
Game Voyeurism

- Free marketing
- Twitch TV
    - Games are starting to offer Twitch integration
    - Rise Of The Tomb Raider allows Twitch viewers to select between difficulty mods for the streaming player
- YouTube
    - YouTube personalities are sometimes trusted more than mainstream reviewers - "no filter"
    - Getting your game mentioned by Yogscast or PewDiePie can spike sales

Summary

- Lots of stuff happening in the industry

- Some trends are very clear:
    - Multiprocessor hardware
    - Digital distribution

- Some less clear, susceptible to laws / player takeup:
    - Social games
    - VR / AR