ALBION ONLINE: A CROSS-PLATFORM MMO

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ABOUT ALBION ONLINE



EUROPI

What is Albion Online?

Albion Online is a modern interpretation of EVE Online with the skill based combat from League of Legends



ABOUT ALBION ONLINE

- Sandbox MMORPG
- Cross-Platform (Windows/OSX/Linux/Android/iOS)
- One World (no "Shards" or "Servers", not even for different platforms)

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- 4 years in the making
- Currently in Closed Beta w/ 100.000+ "founding" players
- "Release" in Q4/2016

MIDDLEWARE SELECTION

- Engine Selection: Unity
 - powerful, accessible
 - Cross-Platform was a "target of opportunity"
- Database Selection: Cassandra, Postgres
 - One world → need a very scalable database, NoSQL
 - still use SQL for query-heavy problems
- Networking Middleware: Photon
 - UDP (reliable/unreliable), TCP
 - can use C# on server (like in Unity!)
 - works with all Unity platforms

🚭 unity





CASSANDRA

- NoSQL Database
- Originally developed by Facebook
- Open Source (Apache-License)
- written in Java
- Concept: everything is a hash table
- in-memory (as much as possible)
- optimized for high throughput
- scales horizontally (just add servers)
- redundant (no single point of failure)
- CQL: SQL-like language (w/ massive restrictions it's NoSQL)



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CONSEQUENCES

- Server needs to work without Unity
- Ideally, client works without Unity, too!
 - think: tools, stress-test-bots!
- Use Unity only as rendering front-end
- cannot rely on Unity features for basic functions!

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- levels / game objects
- collision
- pathfinding

SEPARATION



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SERVER FARM



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SERVER FARM

- game world split into unique "clusters" of ~ 1 $\rm km^2$
 - current world: ~600, next world: x2
 - distributed among game servers
 - player changes servers when travelling
 - handoff done through database (even on same server)
- World Server
 - responsible for everything "global"
 - guilds, parties, coordination of guild battles etc.



GAME SERVER – THREADING MODEL



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GAME SERVER – INTEREST MANAGEMENT



 Players should only "see" (networkwise) what's on their screen

- important to reduce traffic...
- ... and prevent cheating!
- Needs to be efficient!
 - ~500 mobs / cluster
 - > 10.000 game objects (e.g. trees)
 - up to 300 players

GAME SERVER – INTEREST MANAGEMENT



ObjectNoved()
ObjectDestroyed()

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• EventFired()

GAME SERVER – INTEREST MANAGEMENT



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Object (non-ground) tile

Level consists of "tiles" (Unity prefabs)

Tile has 3d collider (for mouse picking + ground height definition)

2d collision is painted per tile (blocks movement / blocks shots / blocks placement etc.) Ground tile





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CHARACTER RENDERING

- Character + Equipment gets baked into one mesh (= 1 draw call!)
- parts of character mesh hidden depending on equipment
- Only one material for character + all equipment items
- Limit number of characters drawn (esp. on mobile)







- .NET code is very accessible for analysis
 - camera hacks (minior problem because of interest management)
 - found internal tools, cheats in code (not working on live)
- extracted data from client
 - maps, player rankings... lead to cool community projects!
- Users built bots directly into client $\boldsymbol{\boldsymbol{\Im}}$
 - Difficult to prevent
- Obfuscation helps, but not much
- We are doing more integrity checks now!
- Future: Unity IL2CPP ?

Albion Online Assist









Thank you!

Questions / Comments?

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