PlaneShift

Crystal Space Conference
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Luca Pancallo

(Talad)

Agenda

- ➢ About PlaneShift
- ➢ Structure and team organization
- ➢ Results achieved
- ➢ Architecture
- ➢ Future Plans
- ➢ Demo, Q&A

History of PlaneShift

➢ The idea of an online world started back in 1992, from the lack of good online games.

➢ The main problem was the lack of graphical clients.

History of PlaneShift

➢ The project was commercial due to some "possible" contracts with the largest phone company in Italy.

➢ Server and client were quite developed managing concurrent users, stats, skills, combat.

PlaneShift today

➢ Project restarted in Autumn 2000
➢ An online 3D multiplayer roleplaying game
➢ A virtual world where people can "live" on-line
➢ A set of unique storyline, rules, places

PlaneShift today (cont.)

➢ The <u>first</u> free and open source 3d MMORPG project

➢ Created to meet commercial quality standards

➢ Aims to be "the linux of online games"

➢ Client and server available for Linux, Windows and MacOSX

PlaneShift today (cont.)

➢ Feature-wise PS is modeled after typical commercial MMORPGs:
- ✓ EverQuest
- ✓ World of Warcraft
- ✓ Dark Age of Camelot

➢ Roleplay and background are the first priorities of team leaders
- ✓ No commercial MMORPGs are satisfying to "pen and paper" players yet.
- ✓ Lack of RolePlay consistency to the world, lack of realism, and not much flexibility in actions players can take result in lack of immersion. Level after level, monster after monster.
- ✓ Monthly payments pressure people to "get their money's worth" instead of enjoying the world.

Atomic Blue

➢ In December 2004 we founded a <u>Non-Profit Organization</u> called <u>Atomic Blue</u>.

➢ The NPO has been created:
  ➢ To better protect our work
  ➢ To be a real legal entity that can hold copyrights
  ➢ To be able to sign real contracts with members, hosters, sponsors
  ➢ To be able to gain/use money and goods (hosting hardware, buy software, etc…)

➢ NPO aims to:
  ➢ foster the growth of a community of developers skilled in developing multiplayer online role playing games;
  ➢ to encourage the development of a large community of players
  ➢ to promote the development and growth of a virtual world

Licenses

➢ Two licenses in effect on PlaneShift the game.

  ✓ The software code, known as the PlaneShift engine, is publicly available on SourceForge and released under the GPL. Anyone can download, build and modify all our software.
  ✓ The content (art assets, music, data, combat scripts, quest dialog, etc.) is proprietary to the non-profit organization formed to protect PlaneShift—Atomic Blue (www.atomicblue.org).

➢ In theory, the PlaneShift Engine could be used to make another MMORPG unrelated to the PS project.
  ✓ Other free projects are using certain sections of our code, while building their own engines. This is perfectly fine since their projects are also GPL.

➢ In practice, we encourage developers to gather under PlaneShift organization, to make an high quality free MMORPG a reality, instead of splitting strength on similar projects with big chances to fail.

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Structure and team organization

➢ About 10 'core' developers, plus around 50 people who have contributed for a week or a few months.

  ➢ A community of developers is dedicated to testing PlaneShift on different hardware and different linux distributions.

  ➢ External groups of "modders" have created dedicated web sites with new "skins" or small enhancements (new client commands, logs, shortcuts)

➢ Project is divided into 7 sub teams :

  ✓ Engine (server and client, including Crystal Space)
  ✓ 3d (character models, animations, items, effects)
  ✓ 2d (concept art, textures, user interface, web site)
  ✓ Sound (music, sound effects, ambience)
  ✓ Rules (combat, magic, progression, balancing)
  ✓ Settings (background stories, NPC dialogues, books, description of places and items)
  ✓ Press Relations (advertising, events, press contacts)

Structure and team organization

➢ A distributed team

Structure and team organization

➢ While this is a hobby, most of the developers are computing professionals:

   ✓ Strive to get only talented and special people.

   ✓ Age of developers ranges from 18 to 45.

   ✓ Average is about 24-28.

   ✓ A selection is made on all potential contributors with practical tests. Only a successful test and few useful deliverables admit you to the internal team.

➢ More Structured than Most Open Source projects :

   ✓ Team agrees on high-level (written) plans for each new phase.

   ✓ Design documents are required on major features.

   ✓ Test case documents written for each available feature.

   ✓ Review and approval process for art and content assets (sounds/models/drawings).

   ✓ Weekly status meetings.

   ✓ 3 web sites with well-developed custom applications for managing internal tasks and content creation.

Structure and team organization

➢ Success factors:
  ✓ Defined structure and roles, clear and shared objectives
  ✓ A friendly and open community of developers, always eager to help
  ✓ Continuous development 24/7 thanks to a world-wide spread team
 ✓ Strive for quality and results

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Results Achieved

- ➢ About 250,000 registered accounts on the last PlaneShift version.
- ➢ Still in beta, but already playable, you can enjoy many weeks of play. These are the main features:
  - ✓ Combat with server managed creatures
  - ✓ Magic system with visual 3d effects
  - ✓ Quests and small puzzles
  - ✓ Character progression through a modern skill system
  - ✓ Crafting and trades system to enable players' created items
  - ✓ A rich set of features for Game Masters
  - ✓ Artifical Intelligence quite simple, but working.
  - ✓ Player duels, wars and guilds.
- ➢ The engine is extensively using our own scripting language to simplify creation and maintenance of game logic and rules.
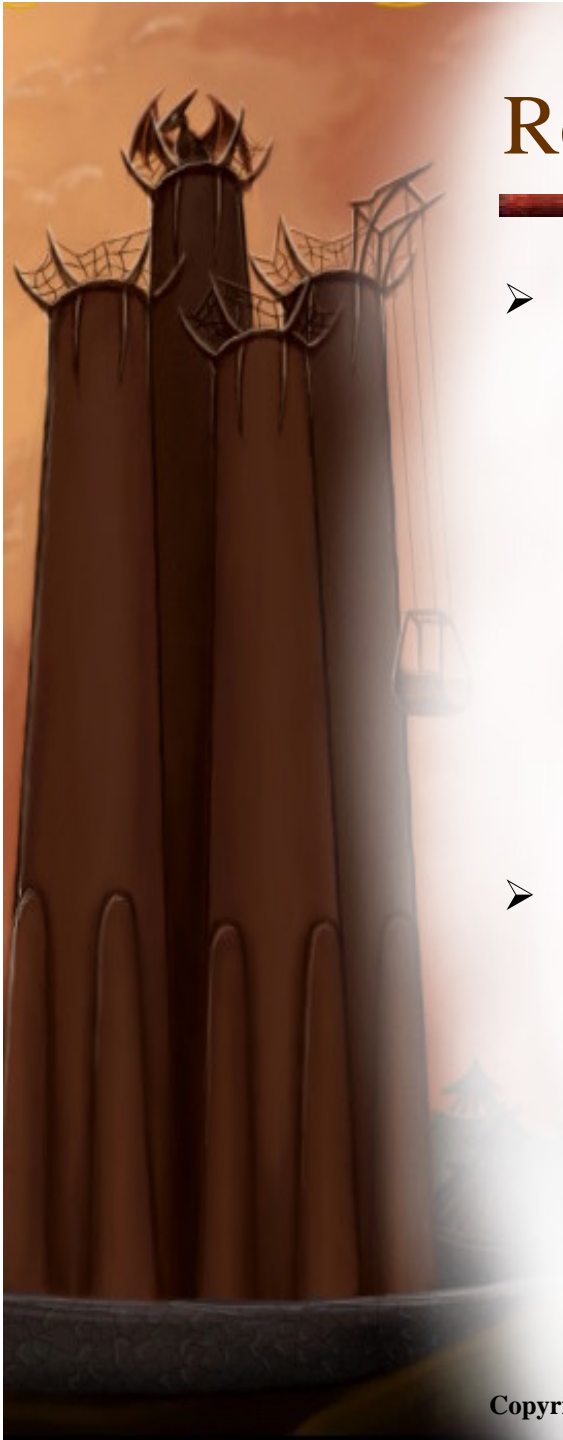
Results Achieved (cont.)

➢ Areas that need major improvement at the moment are:

  ➢ Larger usage of shaders and other advanced rendering techniques like shadows, bump mapping, normal maps.

  ➢ Better management of memory and textures

  ➢ Larger use of particle system

➢ Content that has to be expanded:

  ✓ More spells

  ✓ More quests and NPC dialogues

  ✓ Different types of monsters with better AI

  ✓ Additional unique objects to find

 ✓ Crafting extended to all arts

Numbers of the last release

➢ The creation of Crystal Blue required:

- ✓ about 50 millions characters written in chat
- ✓ 4.200.000 web pages hit on main web site and forums
- ✓ 300.000 downloads for a total of 30.000 Gb
- ✓ 110.000 forums messages
- ✓ 48.000 hours of missed sleep
- ✓ 10.172 changes to the source code
- ✓ 1.143 fixed bugs
- ✓ 652 days
- ✓ 180 prospects which didn't pass out admission test
- ✓ 90 alpha testers
- ✓ A virtual team of about 40 people distributed in 25 countries
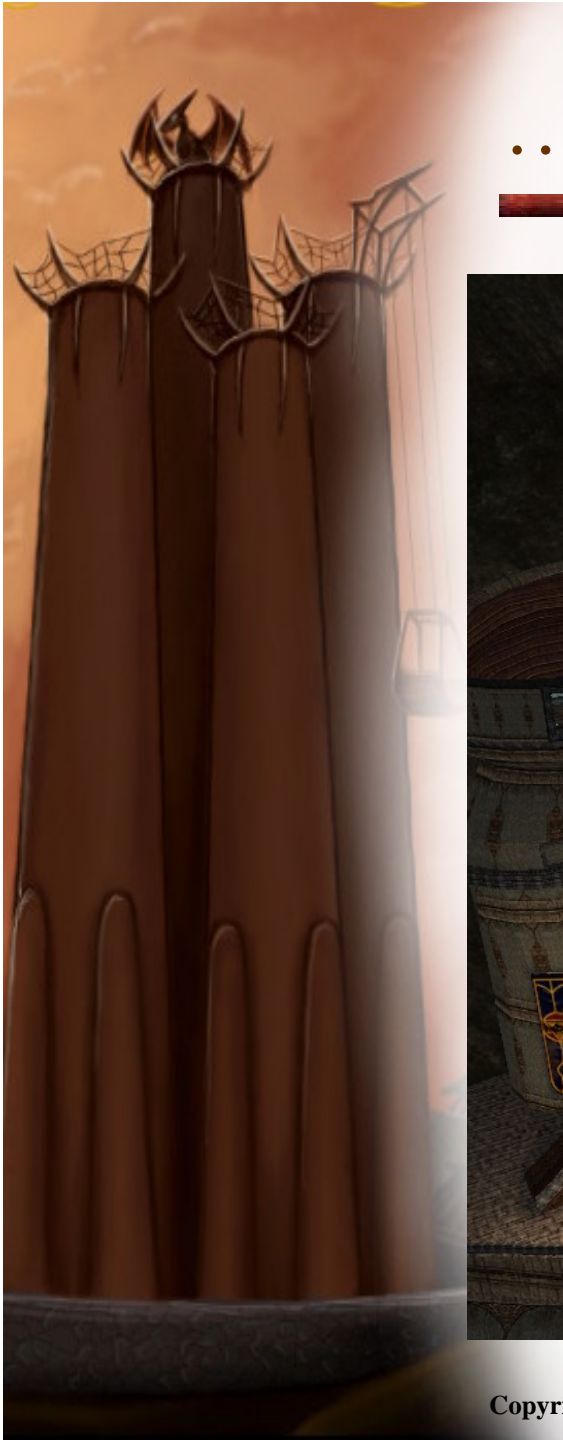- ✓ 5 dedicated server

The power of Crystal Space!

➤ Ok, [here is](#) a nice guide that shows what **players** were able to do with Crystal Space.
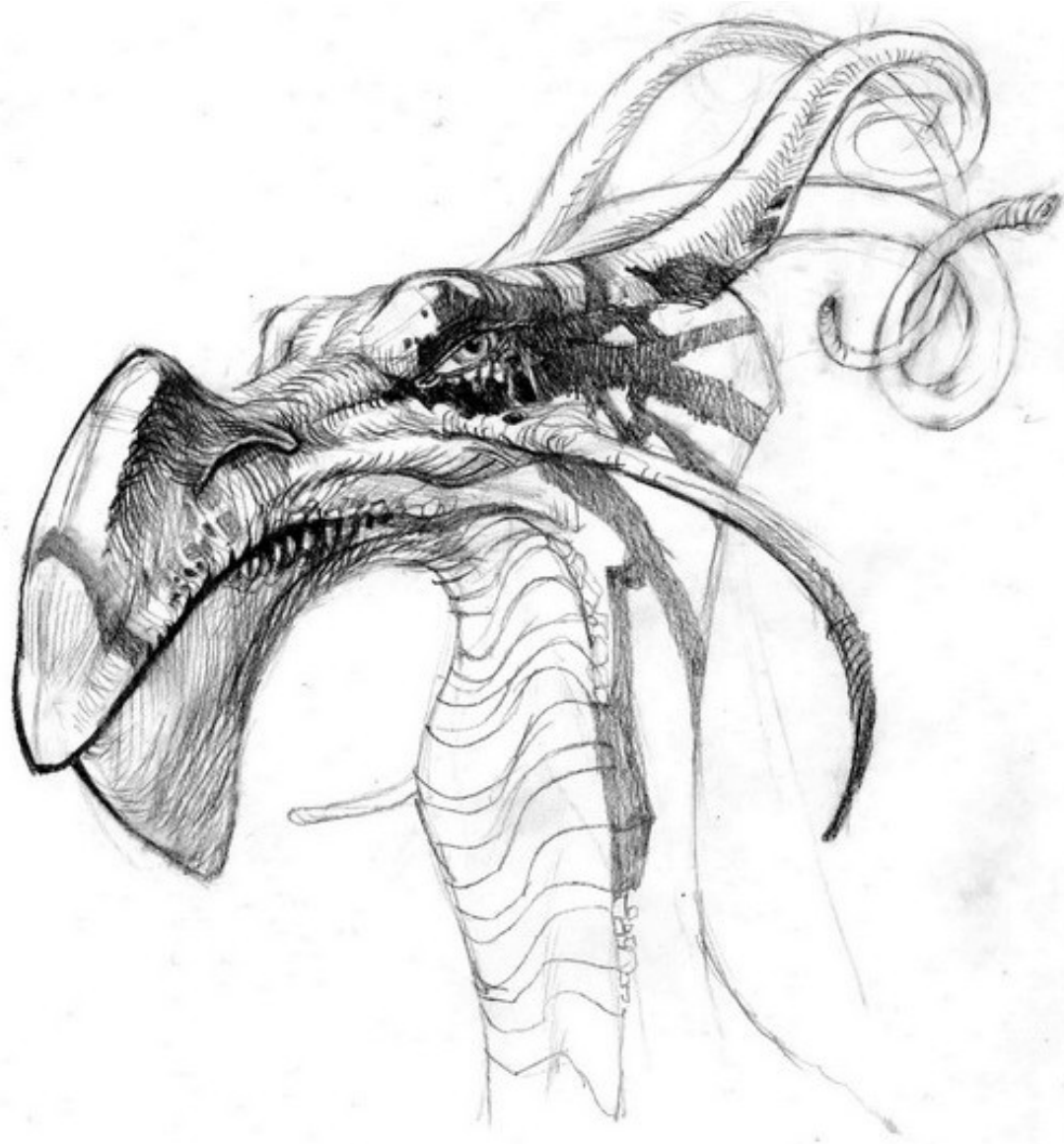
From art …
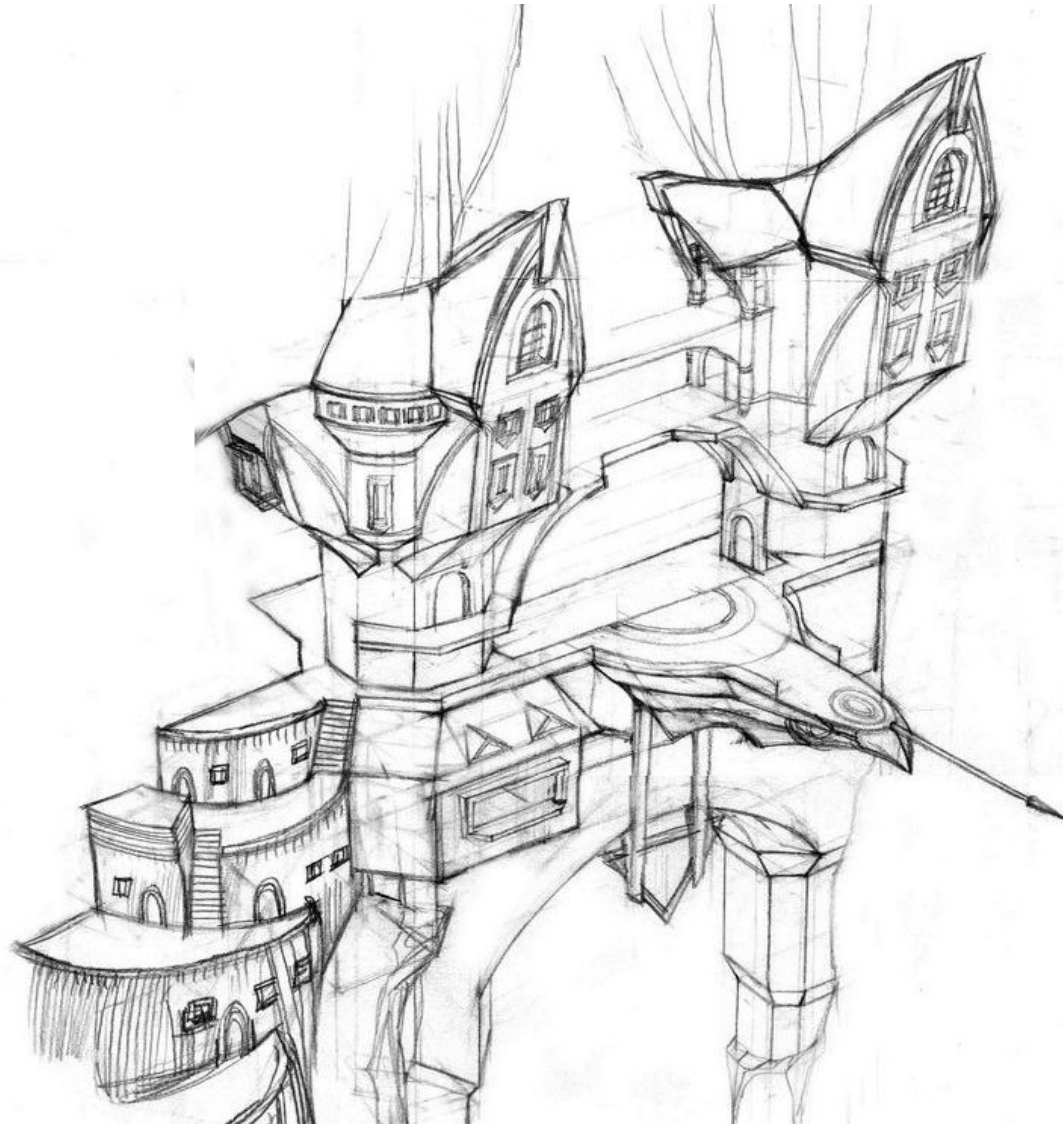
… to 3D

Pterosaur close-up made by the amazing Alexei "Inca"

StoneBreaker Citadel
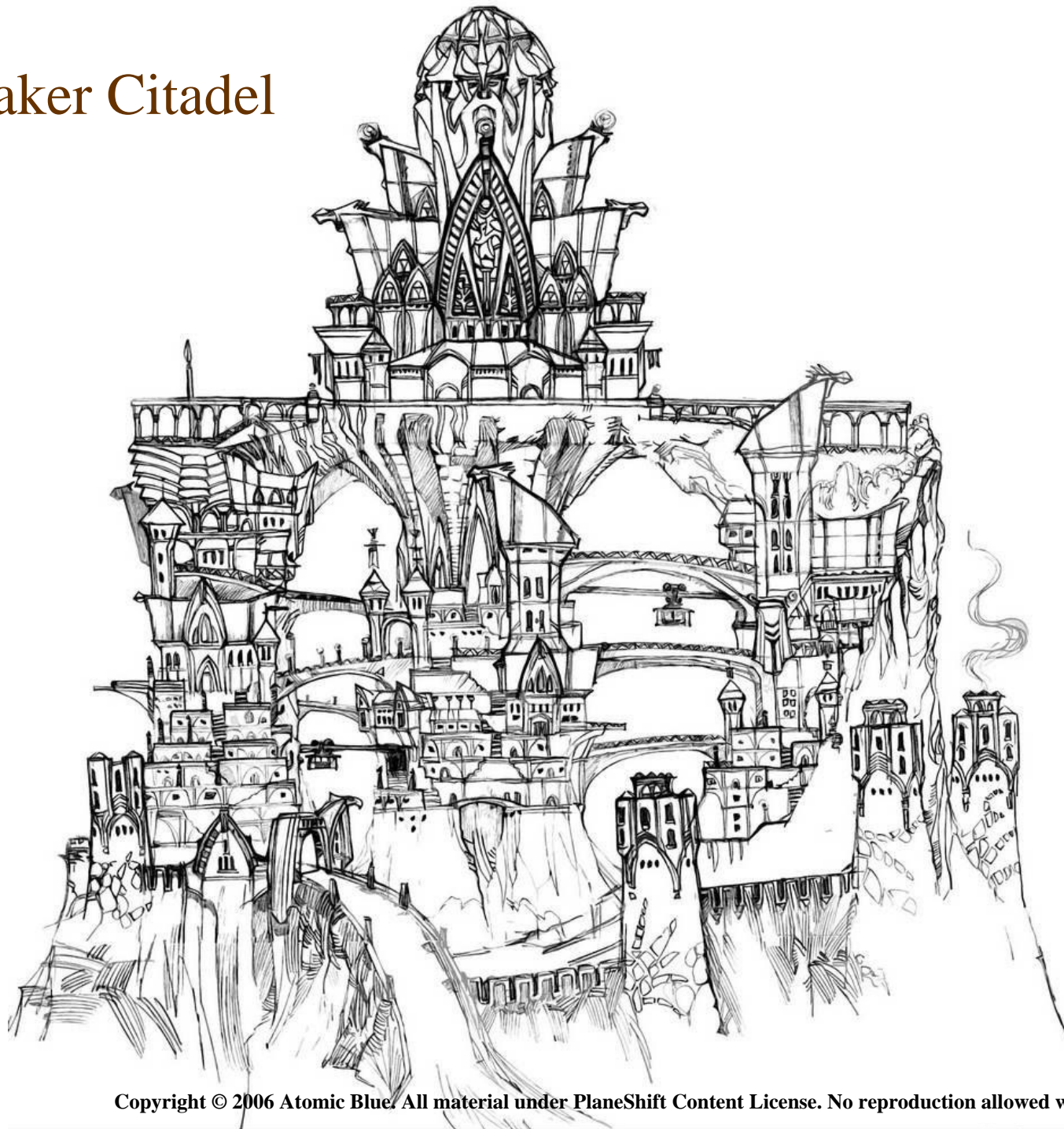
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Architecture - Overview
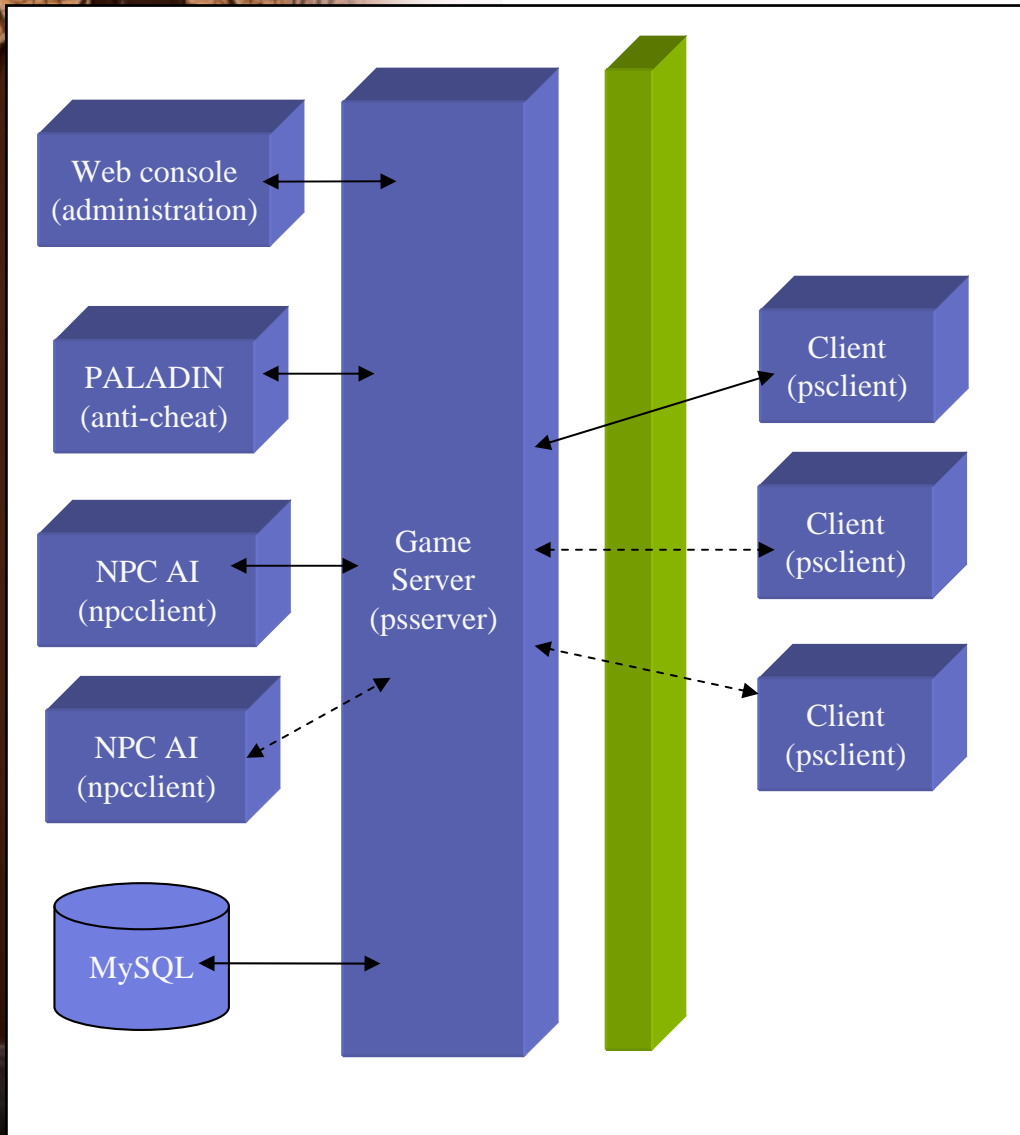
- Server and client developed in C++

- MySQL as database to manage all our game data.

- PSServer, a server process that listens for client requests and dispatches at different handlers; generates events and creates objects in game based on scripts.

- PALADIN is an separate anti-cheat process for CD, speed hacks, macros, bots, etc…

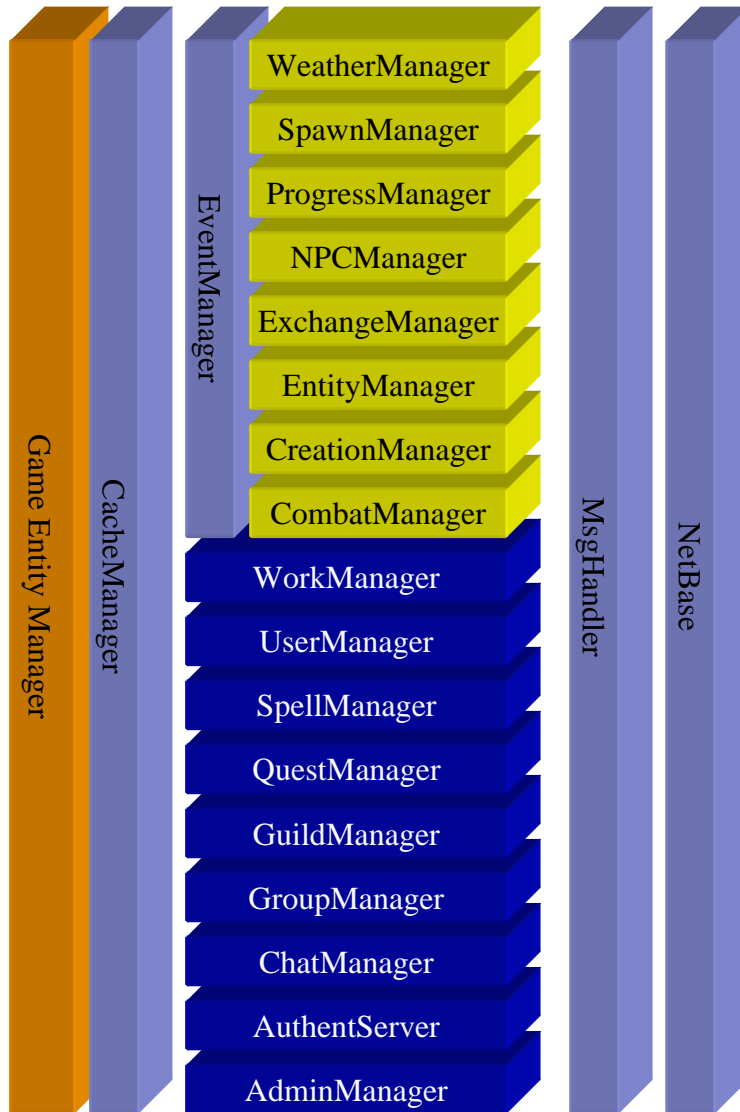- A web console in php allows the configuration of most of the game rules, npcs, dialogues, etc….

Architecture (cont.)

➢ PlaneShift development has been done with a number of external tools, mainly Open Source. No one wants to "reinvent the wheel" and we decided to improve the wheels we found, making a real synergy between our project and others.

➢ The most important is surely Crystal Space 3D engine

➢ CEL: Entity layer, manages entities and properties, and some movement.

➢ CAL3D: powerful skeletal animation library for animation, morphing, blending.

➢ Blender: used only for "some" of our levels and objects modeling.

PS Server

- Game Entity Manager
- CacheManager
- EventManager
  - WeatherManager
  - SpawnManager
  - ProgressManager
  - NPCManager
  - ExchangeManager
  - EntityManager
  - CreationManager
  - CombatManager
- WorkManager
- UserManager
- SpellManager
- QuestManager
- GuildManager
- GroupManager
- ChatManager
- AuthentServer
- AdminManager
- MsgHandler
- NetBase

PS Client

- NetBase
- MsgHandler
- `ZoneHandler
- `ClientDR
- `ModeHandler
- `EffectManager
- `PAWS GUI
- SlotManager
- CmdUsers
- `CmdGuilds
- `CmdGroups
- `CmdAdmin
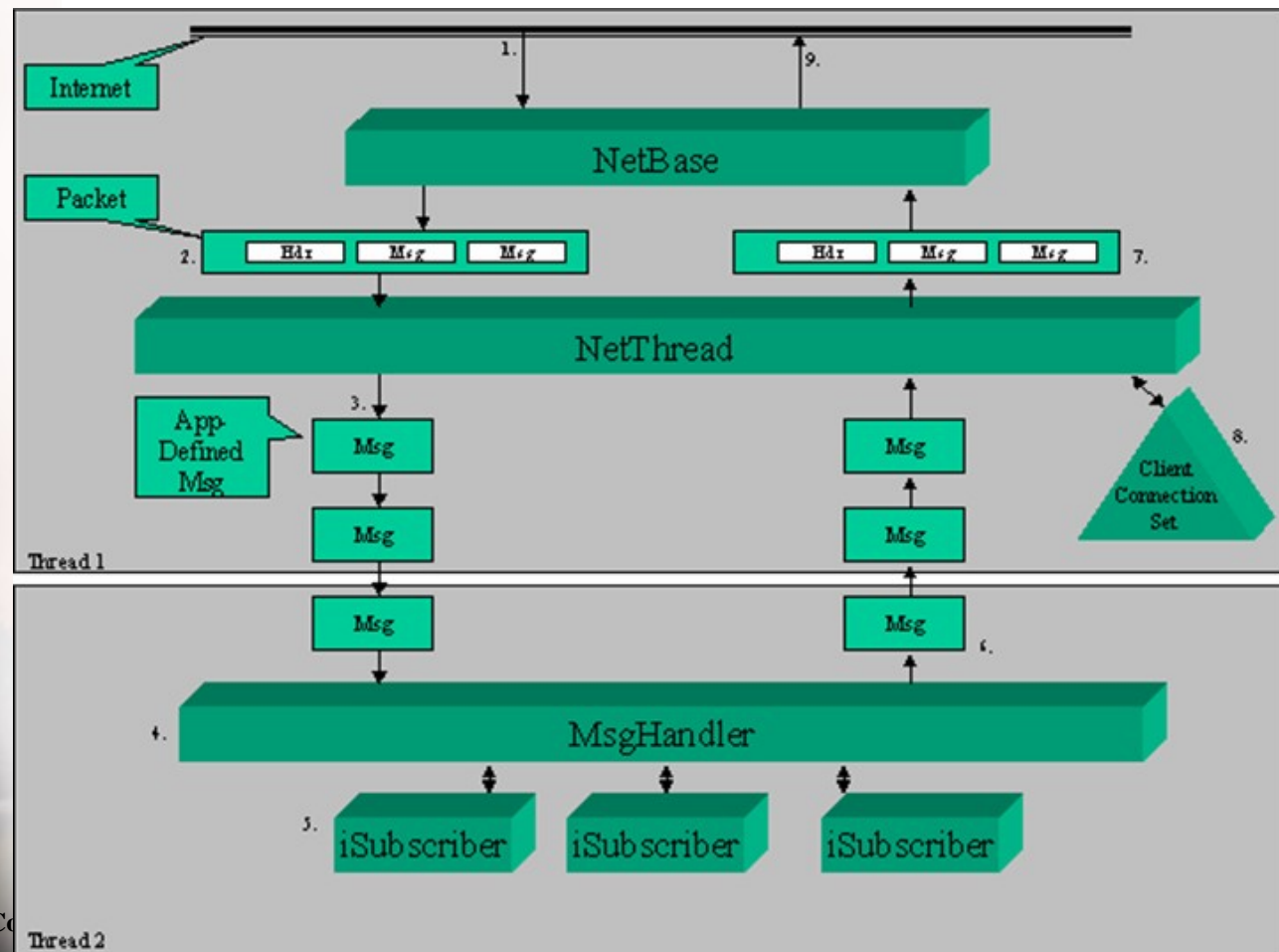- `AuthentClient
- Crystal Entity Layer
- Crystal Space 3D Engine

Architecture - Network messages

- Works on UDP to improve performances
- Dead Reckoning for server validation
- Guaranteed messages implemented on top of UDP

Architecture - Database structure

➢ DB Designer is a nice opensource free tool for your mysql database.

➢ We imported <u>our database</u> into it.

Architecture - multiple servers

➢ The original plan was to use multiple game servers to support a large user base (~5.000 online), but:

  ✓ Concurrent users are about 100-150

  ✓ The server code is performing better than expected. With 150 users online, the server's CPU is around 1% load.

```
planeshift@gandalf:~                                            _ □ X

12:44pm  up 73 days,  1:28,  1 user,  load average: 0.05, 0.01, 0.00
117 processes: 116 sleeping, 1 running, 0 zombie, 0 stopped
CPU states:  1.5% user,  1.7% system,  0.0% nice, 96.6% idle
Mem:  1033588K av, 1000392K used,  33196K free,      0K shrd,  40896K buff
Swap: 2096472K av,   80104K used, 2016368K free              167992K cached

  PID USER      PRI  NI  SIZE  RSS SHARE STAT %CPU %MEM    TIME COMMAND
20294 planeshi   15   0  1116 1116   840 R    1.9  0.1   0:00 top
  703 root        9   0  2380  788   740 S    0.5  0.0   0:10 httpd
10667 planeshi    9   0  551M 515M  9596 S    0.3 51.0   8:54 psnpcclient
18593 planeshi   10   0  9684 9420  5456 S    0.1  0.9  99:14 python
10632 planeshi    9   0  199M 199M  9524 S    0.1 19.7   0:39 psserver
    1 root        4   0   480  444   432 S    0.0  0.0   1:32 init
    2 root        9   0     0    0     0 SW   0.0  0.0   0:01 keventd
```

Server process takes 1% CPU – 20 times less than TOP itself

Architecture - Scripting

➢ Scripting language tailored on rpg needs

➢ Can use variables:

> *Damage = 3.4 * PowerLevel;*

➢ Is aware of our basic objects:

> *myvar1 = TargetAttackWeapon:StrMalus*
> *myvar2 = Attacker:DodgeValue*
> *myvar3 = Target:CombatStance*

➢ Code can get and set values on scripting variables

var_FinalDmg = calc_damage->GetVar("FinalDamage");

Architecture - Scripting (cont.)

We use scripting for generating and managing some in game events like item magical effects

```
<evt>
<int value="3*PowerLevel" save="Result">
<msg text="You gained $Result" in intelligence!" />
<evt>
```

Quests completion

```
<complete quest_id="Harnquist Ore" />
```

Money or item exchange

```
<money value="0,0,0,3" />
<offer><item id="23"/></offer>
```

Give experience, inflict damage, manage spell effects, and more.

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Future Plans

- ➢ Engine
  - ✓ Character customization with somatic traits (chin, nose, height, …)
  - ✓ Tribes (autonomous npcs that build villages)
  - ✓ Better interaction with the virtual world (puzzles, locks)
  - ✓ Addition of shaders to have more realistic effects, reflections, bump mapping, etc…

Future Plans

- ➢ Rules: Improve playability.
- ➢ Content:
  - ✓ The Winch area, Kran home town
  - ✓ Complete armor / clothes variation for all characters
  - ✓ More dungeons
  - ✓ More spells effects and particle effects

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Demo

Crystal Space Recommendations

- Add option to recalculate just one light
- Fix -lightqual option, is not working properly, we need a fast way to calculate lights as a preview
- Ability to disable completely a portal based on distance from camera
- Ability to disable rendering of object behind a portal, and place an imposter instead (still based on distance from camera)
- Best Practices and How To for common features like: rain, fire, sun effects, water, waterfalls, fog, grass, LOD
- We need a list of possible ways to implement shadows, starting from a simple gray circle under the char, up to real time shadows.
- Square shadows on meshes with alpha textures, any idea how to fix it?

Crystal Space Recommendations

➢ FIX the lighting calculation (lighter2?)


```
All  System  Chat  Tells  Guild  Group  Auction    Help
>Your current position is -214.03,23.18,160.15
angle: 347 in sector: hydlaa_plaza, region:
hydlaa_plaza

/screenshot
```

How to contribute

- Given the complexity of the project and the turnover of developers in the open source community, we are always searching new people to join our team.

- There are many areas of contribution: modeling, animation, music, networking, artificial intelligence, background stories, etc…

- If you have a passion for virtual online worlds and roleplaying game, PlaneShift is a nice way to use your sleepless nights.

- If you want PlaneShift to become bigger and better, help in its creation!

www.planeshift.it
info@planeshift.it