

Quake III Arena Bot

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Contents

- Introduction
- Requirements
- Bot architecture
- Subsystems
- Conclusion



All about
what makes
my clock tick.



Introduction

Who am I ?

What game
do I play ?



Introduction

- Quake 1 (Omicron bot)
- Quake 2 (Gladiator bot)
- Quake 3 Arena



- Introduction
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What do we
need?
Guns, lots
of guns!



Requirements

- Hard to distinguish from human player
- Same game rules apply to bots and humans
- Not allowed to cheat
- Different bot characters
- Play team games
- Resource efficient (CPU & memory)
- Commercial quality code
- Easy extendable/modifiable architecture and implementation



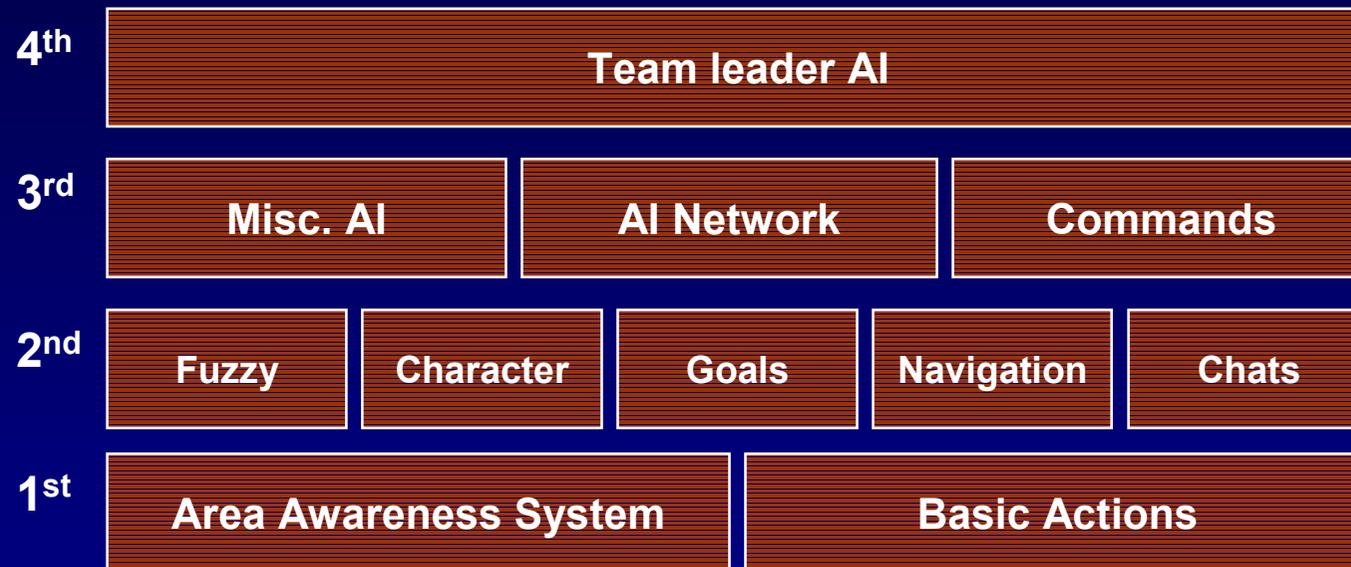
- Introduction
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Hey now!
I'm more
than just
bones!

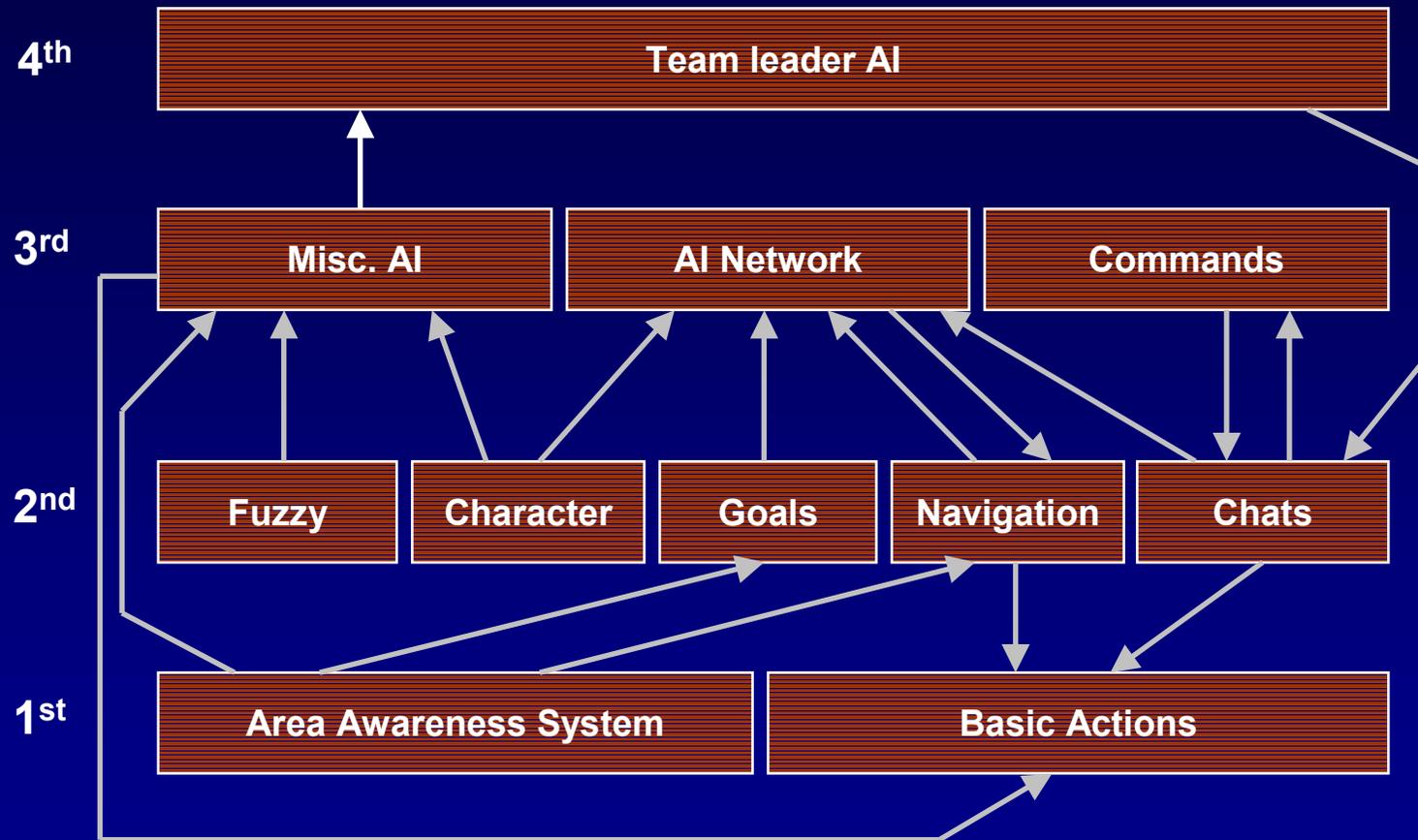


Bot architecture



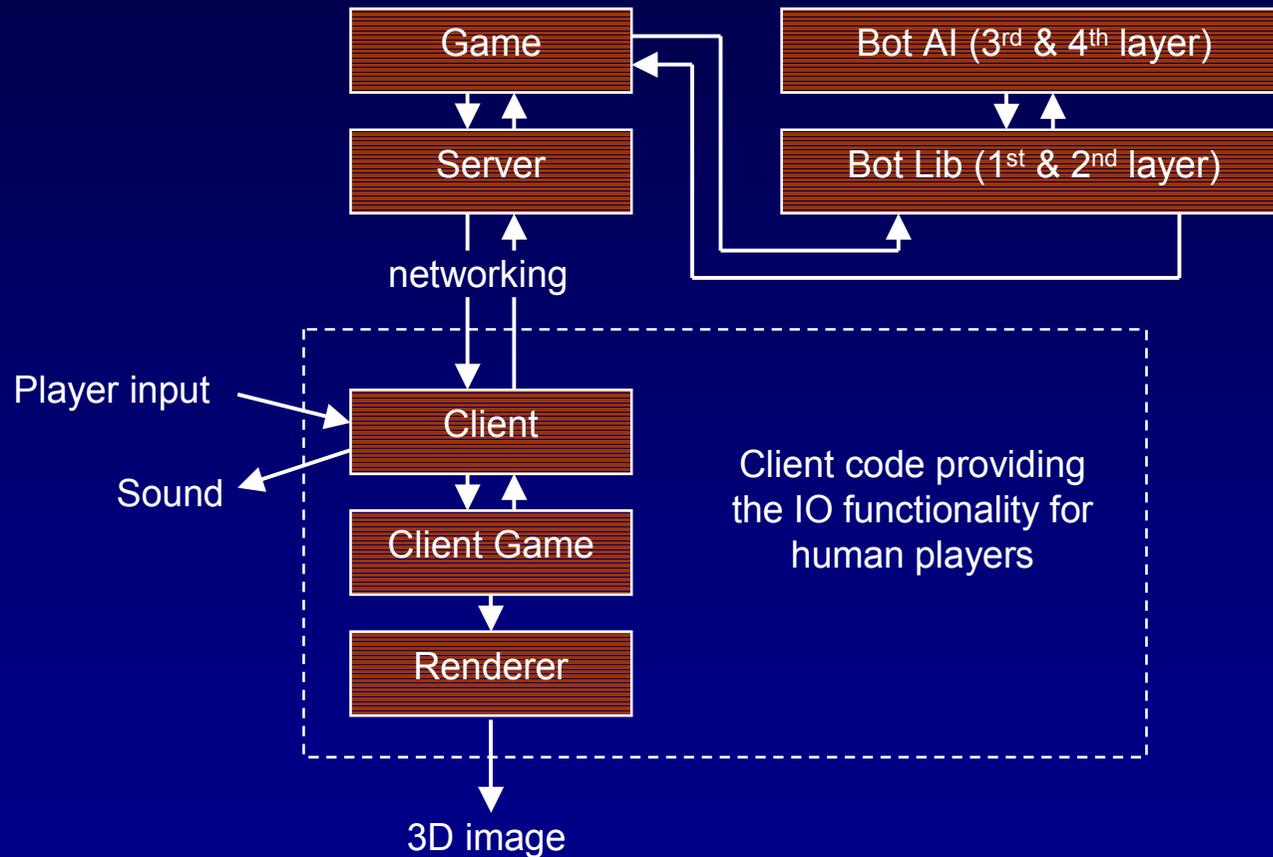
Bot architecture

(information flow)

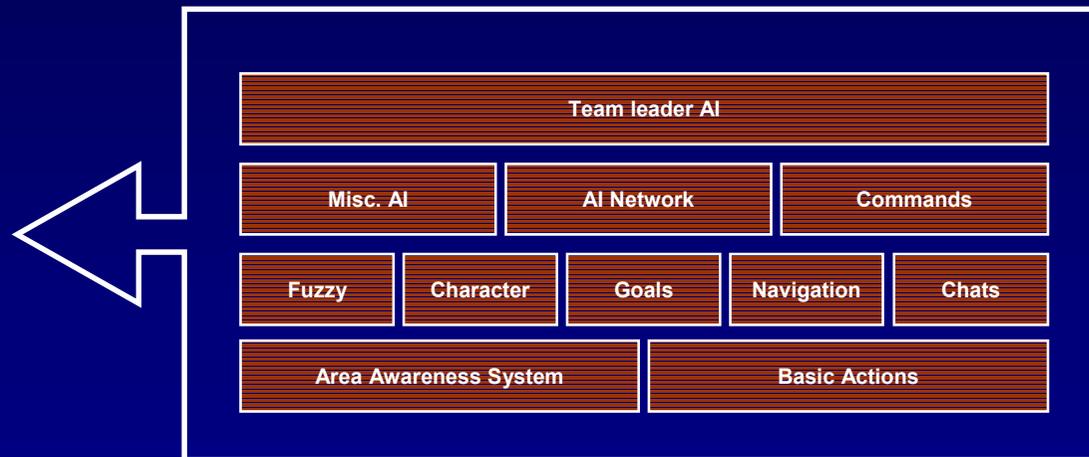


Bot architecture

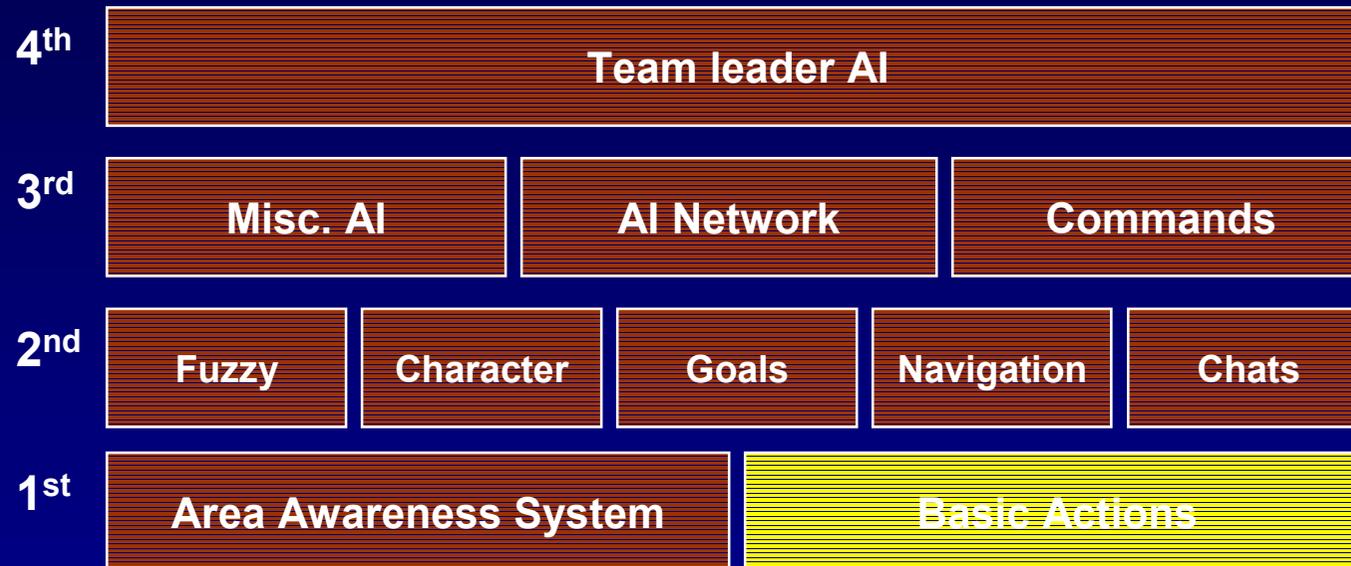
(integration with game engine)



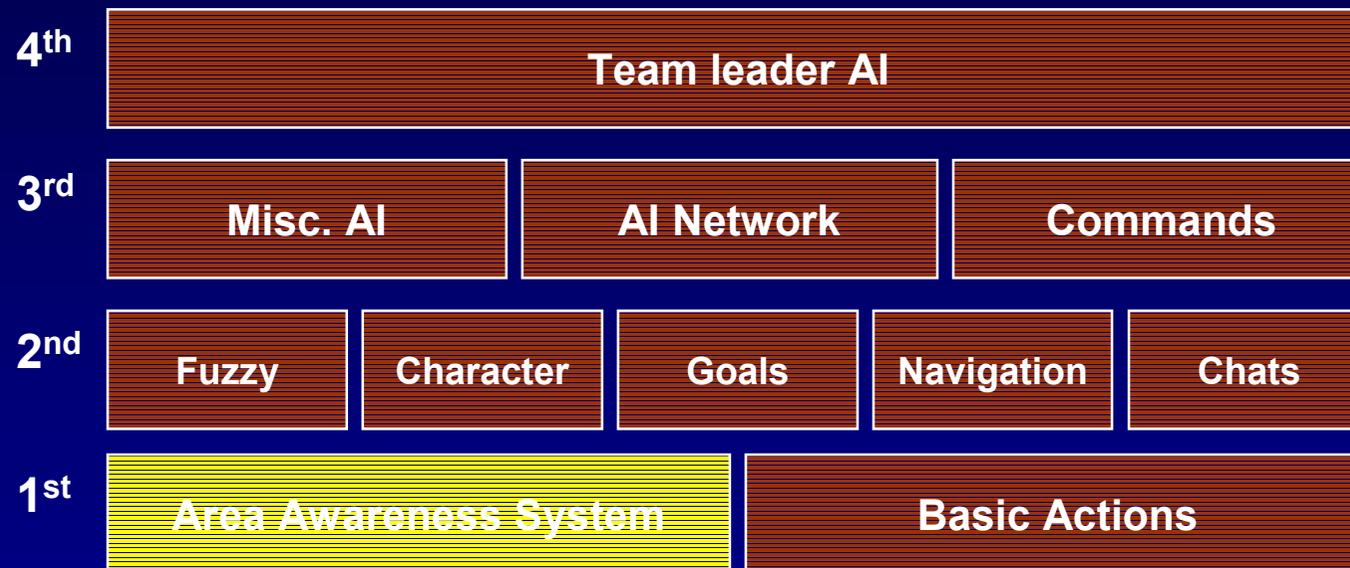
- Introduction
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- **Subsystems**
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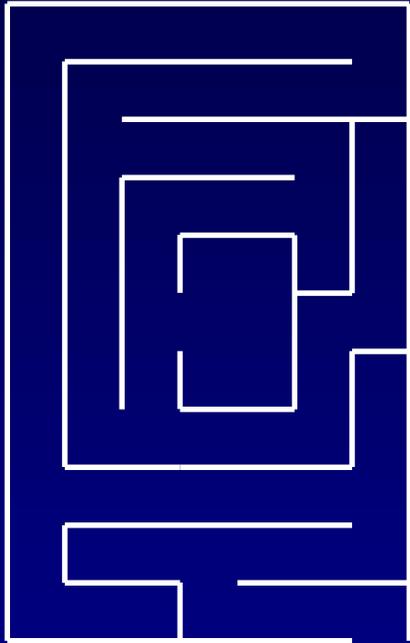
Basic Actions



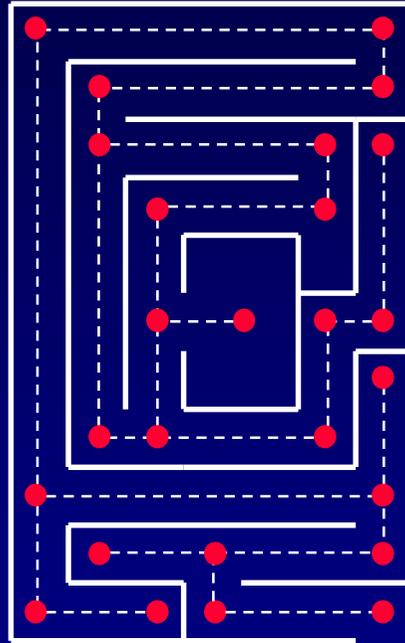
Area Awareness System



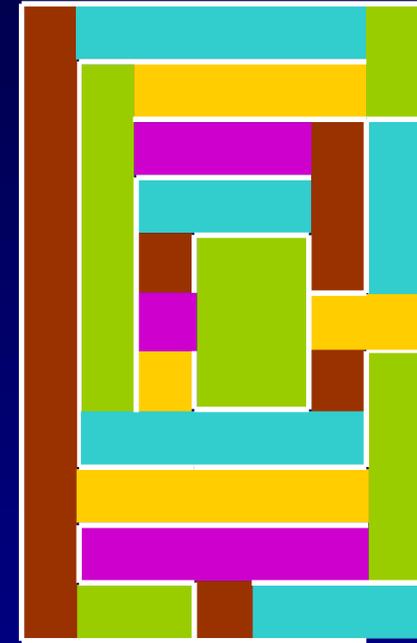
Area Awareness System



Maze



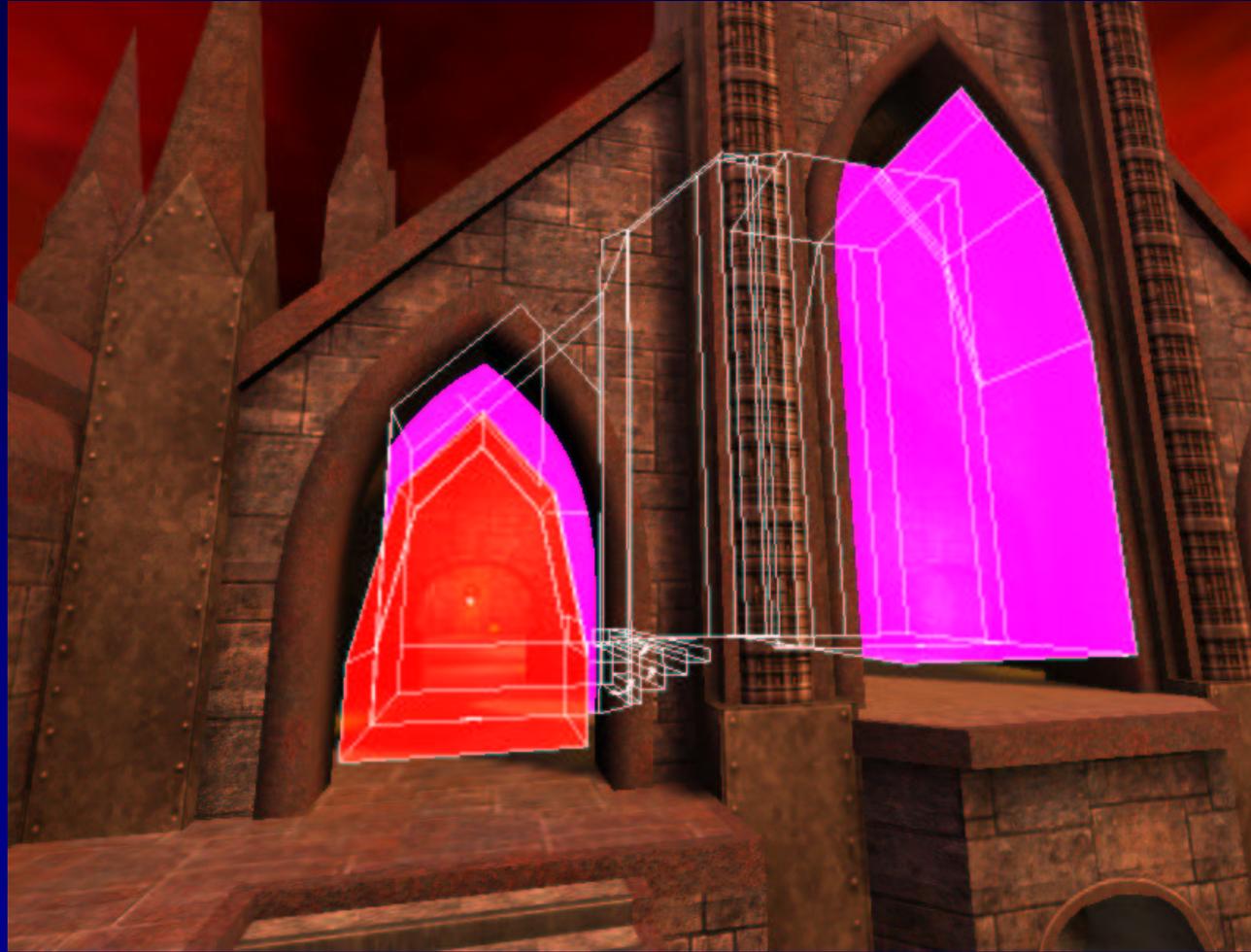
Waypoint system



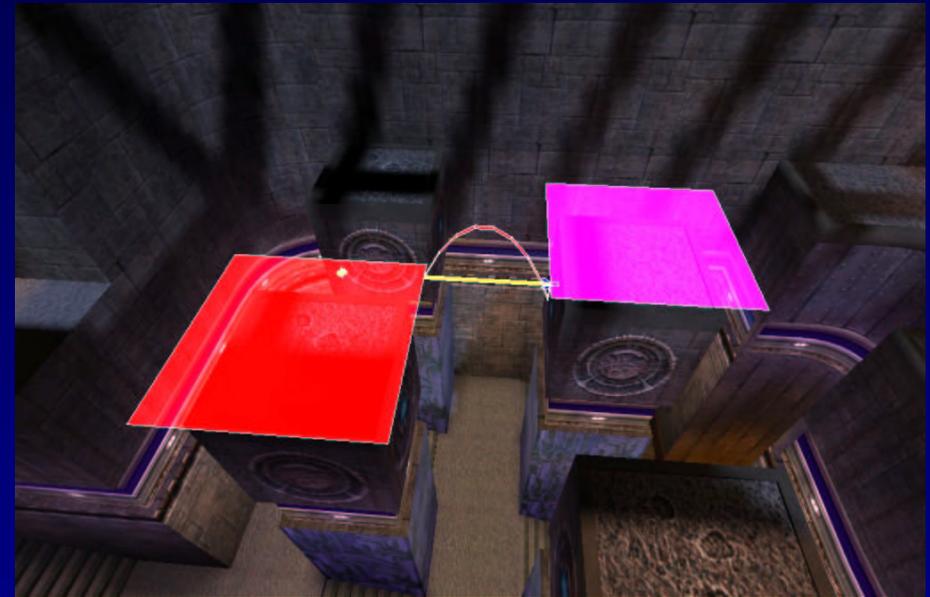
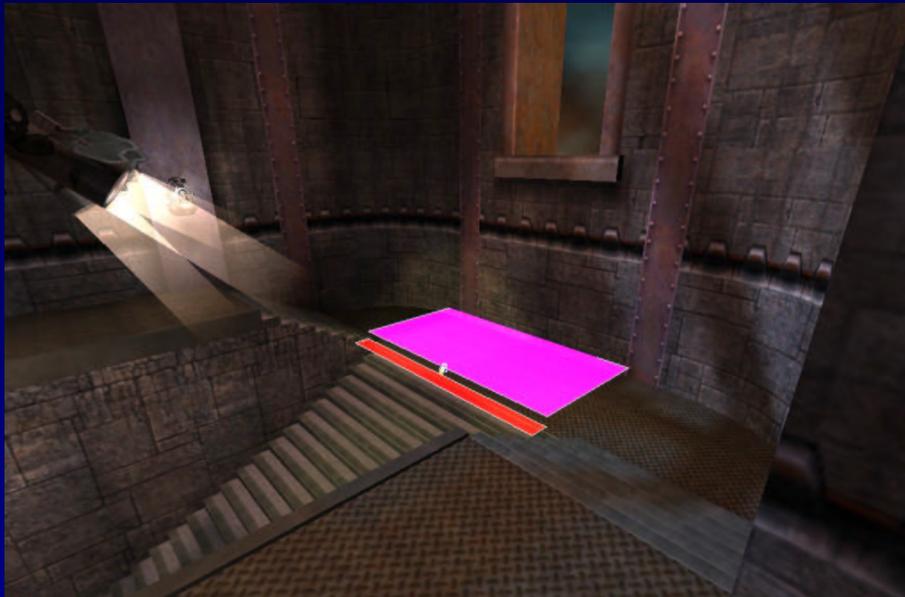
AAS



Area Awareness System



Area Awareness System

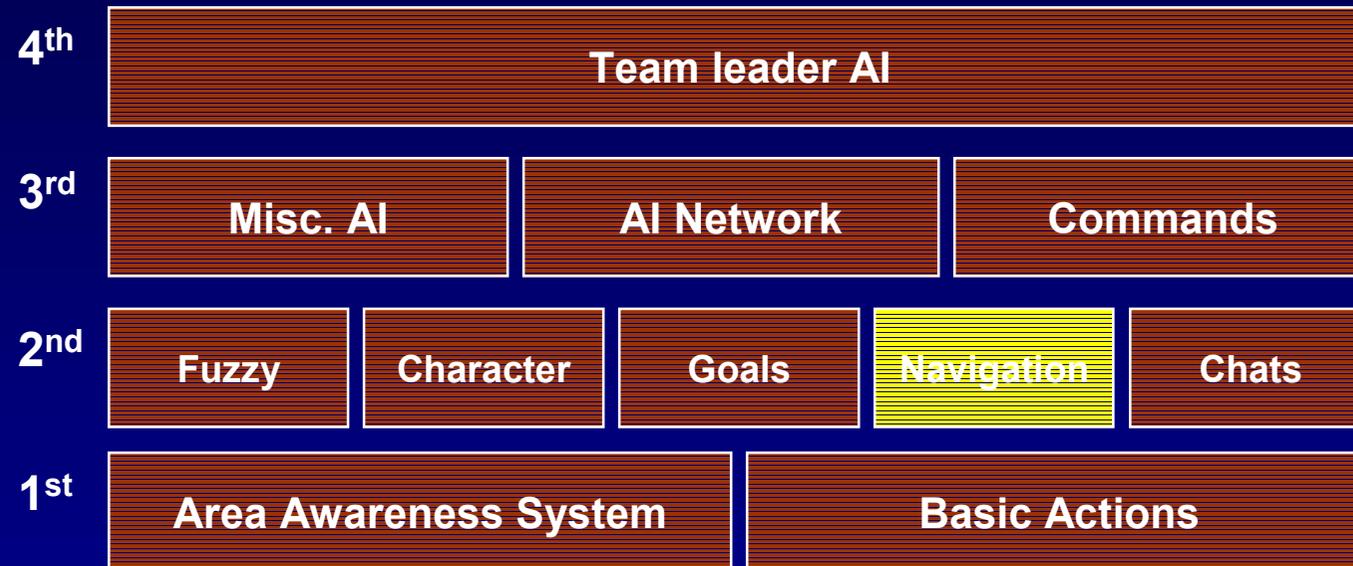


Area Awareness System

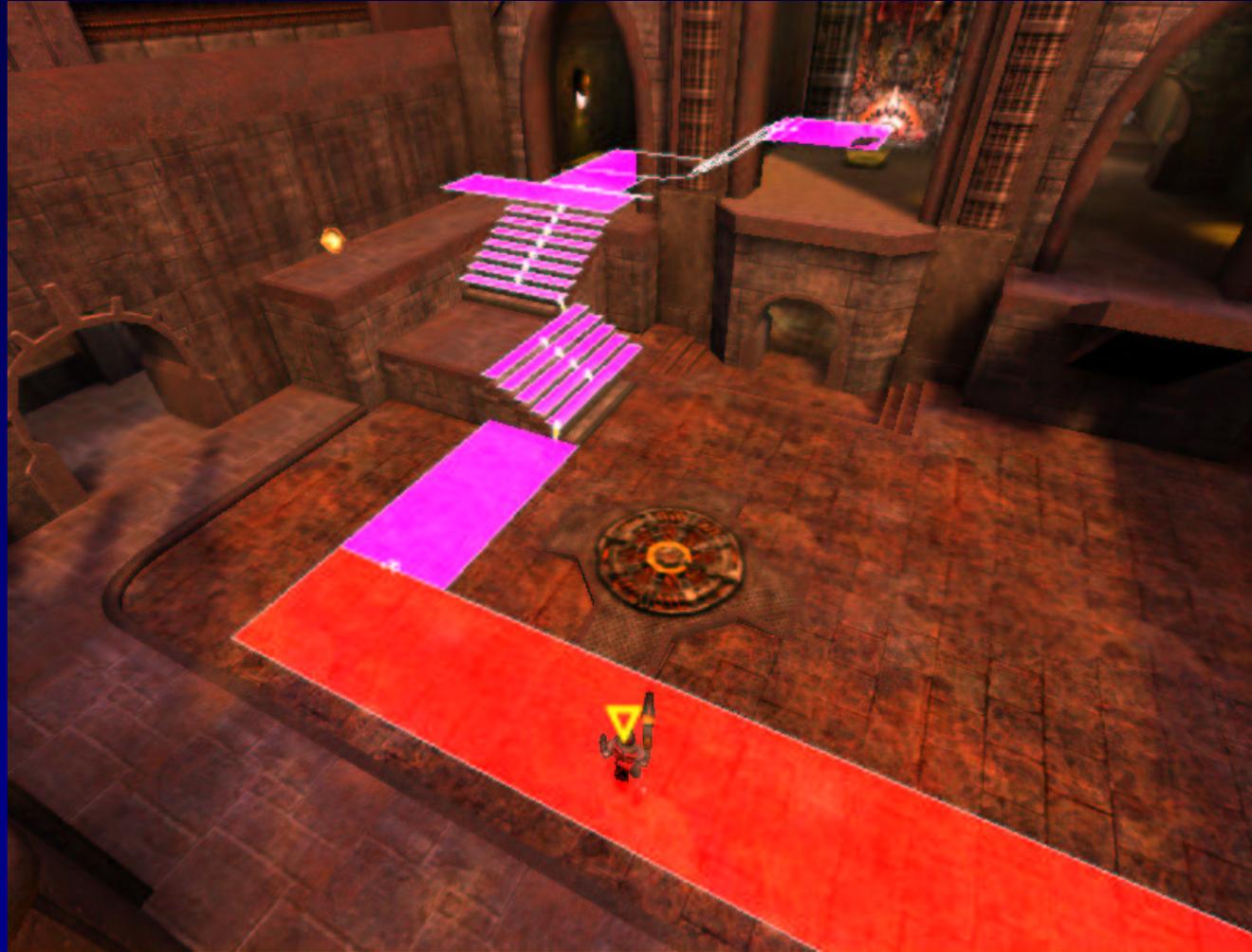
- Quake3 maps much more complex than maze
- Multi-level routing algorithm
- Areas grouped in clusters.



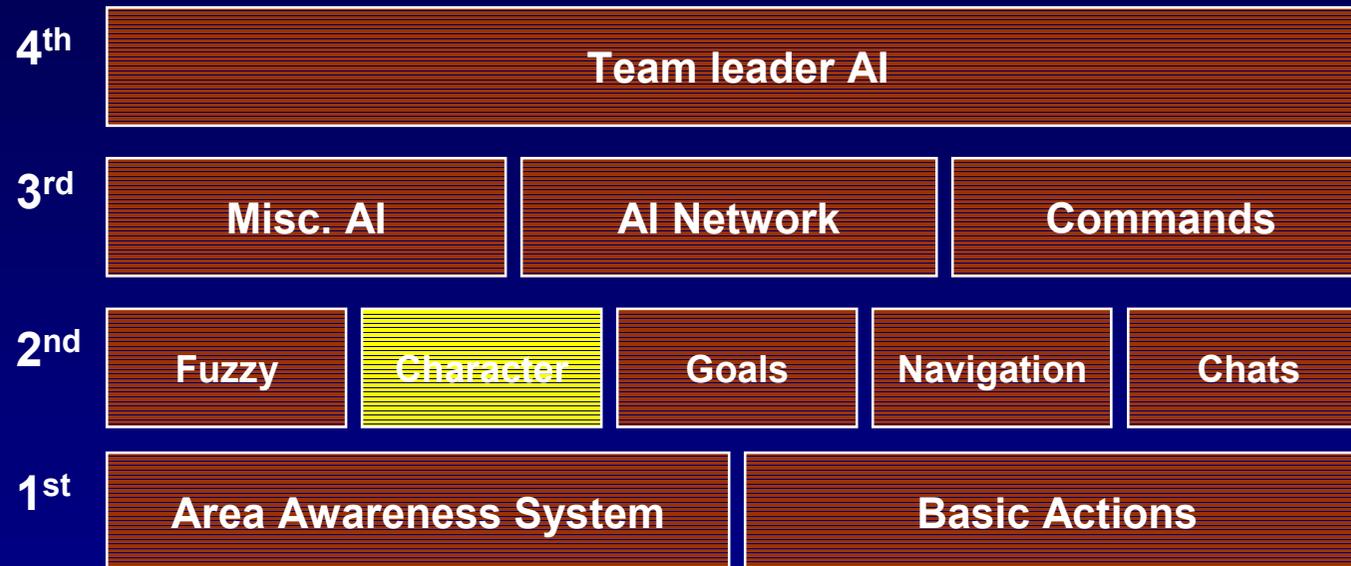
Navigation



Navigation



Bot Characters



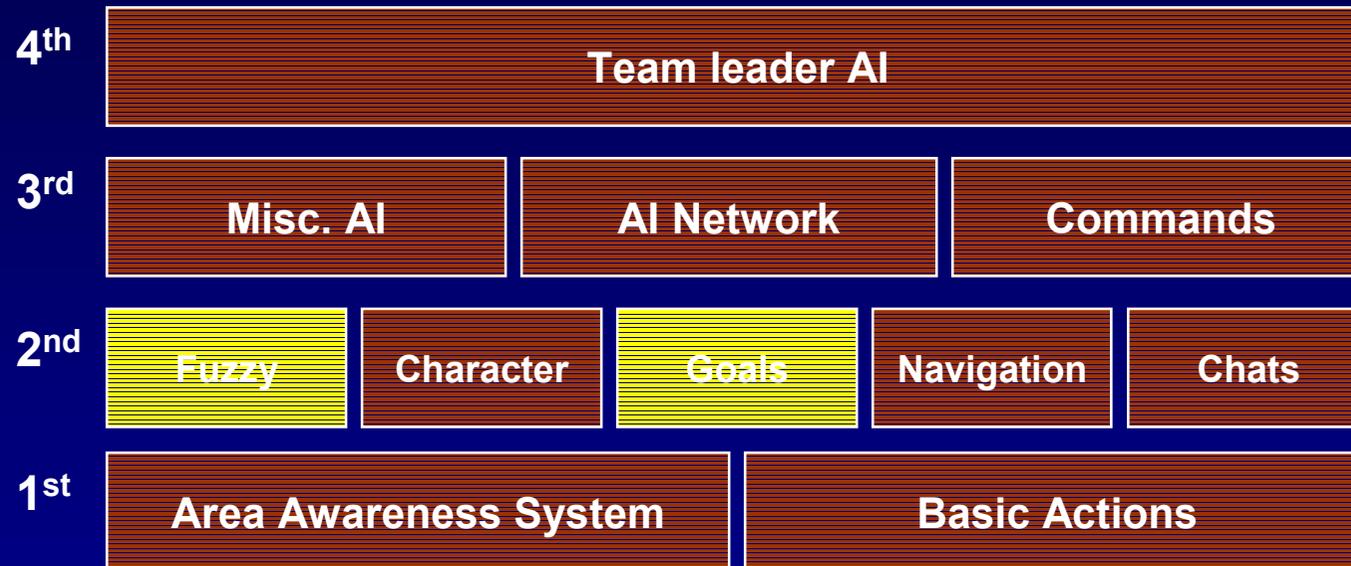
Bot Characters

(characteristics)

Name	Name of the bot.
Gender	Gender of the bot (male, female, it – mechanical creature).
Attack skill	How skilled the bot is when attacking.
Weapon weights	File with weapon selection fuzzy logic.
View factor	Scale factor for difference between current and ideal view angle to view angle change.
View max change	Maximum view angle change per second.
Reaction time	Reaction time in seconds.
Aim accuracy	Accuracy when aiming, a value between 0 and 1 for each weapon.
Aim skill	Skill when aiming, a value between 0 and 1 for each weapon.
Chats	File with individual bot chatter.
Characters per minute	How fast the bot types.
Chat tendencies	Tendencies to use specific chats when things happen.
Croucher	Tendency to crouch.
Jumper	Tendency to jump.
Walker	Tendency to walk instead of run.
Weapon jumper	Tendency to rocket jump.
Item weights	File with item goal selection fuzzy logic.
Aggression	Aggression of the bot.
Self preservation	Self preservation of the bot.
Vengefulness	How likely the bot is to take revenge.
Camper	Tendency to camp.
Easy fragger	Tendency to go for cheap kills.
Alertness	How alert the bot is.
Fire throttle	Tendency to fire continuously instead of pausing between shots.



Goal Selection



Goal Selection



Fuzzy weight = 0.8



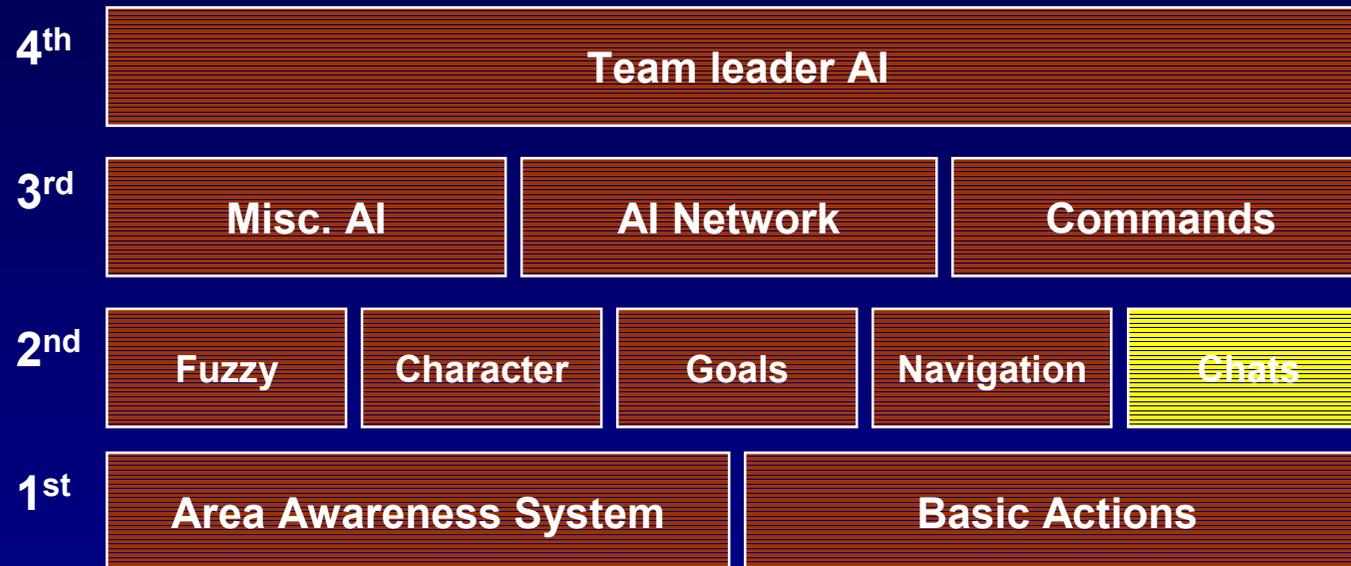
Fuzzy weight = 0.7



Fuzzy weight = 0.5



Communication with chats



Communication with chats

- Generating chat messages
- Interpreting chat messages
- Synonyms
- Match templates



Communication with chats

(match templates)

<variable> get the <variable>

Grunt get the rocket launcher.

Grunt rocket launcher.



Communication with chats

(Eliza chats)

MrElusive: this game is fun!

Bot: are we having fun?

MrElusive: I like to shoot things.

Bot: I like to shoot things too.

MrElusive: I'm going to shoot you.

Bot: I don't believe you are going to shoot me.

MrElusive: just wait and see!

Bot: don't wait.

MrElusive: you are history when I find you

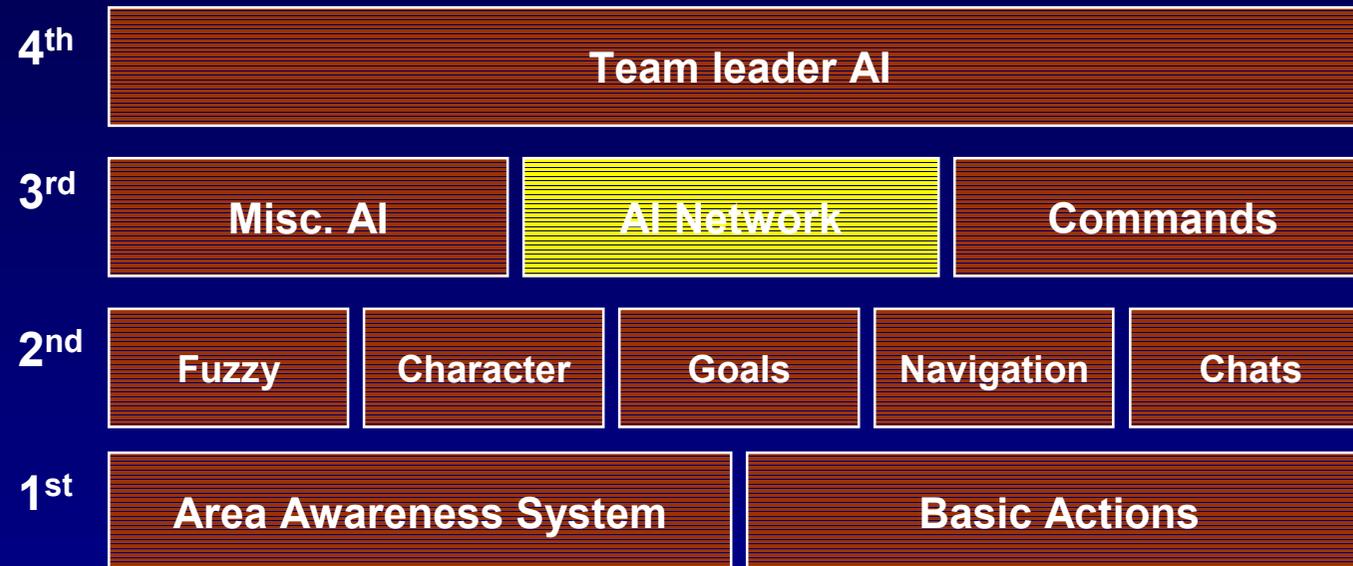
Bot: maybe I'm history when you find me, and maybe not.

MrElusive: be afraid.

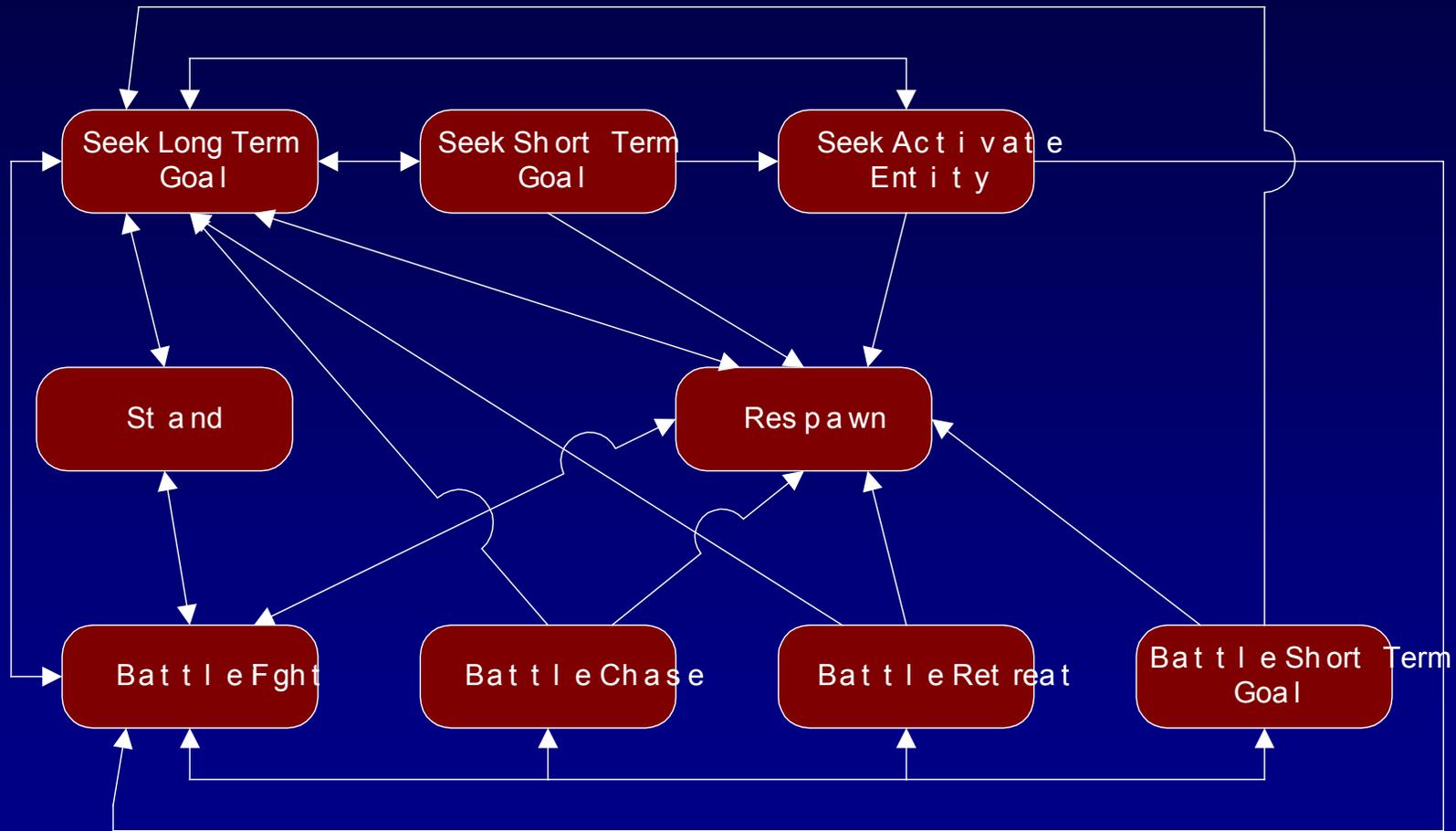
Bot: are you afraid of big, mean geoses?



AI Network



AI Network



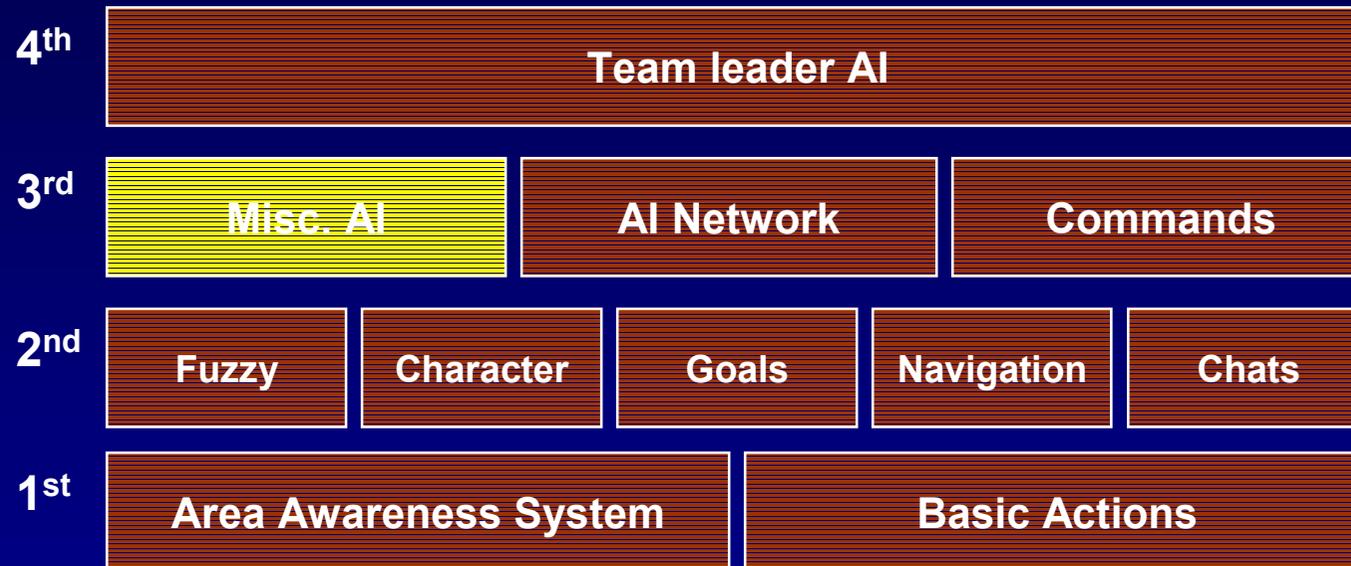
AI Network

(Seek LTG node example)

- Am I dead? If so go to 'respawn' node.
- Is there an enemy I want to fight with? If so go to the 'battle flight' node.
- If I reached my long term goal select new long term goal.
- If there is a short goal go to the 'seek short term goal' node.
- Predict obstacles that need to be handled (doors opened with buttons).
- Navigate towards long term goal.
- If I am blocked figure out how to deal with the obstacle.



Miscellaneous AI



Fighting behaviour

- Acquiring enemies (visibility/audibility)
- Selecting weapons (fuzzy logic)
- Aiming at the enemy
- Taking position and avoiding projectiles



Obstacles & Puzzles



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I rock!



Conclusion

- Fairly good artificial player
- Cannot be distinguished from human at first sight
- Same game rules apply and the bot does not cheat
- Versatile set of bot characters
- Plays team based game types
- Communicates with other players (bot/human)
- Resource efficient (AAS)
- Easy extendable/modifiable architecture and implementation. Several other games and mods use the bot AI base.



Future directions

- Better anticipation of enemies
- Environment analysis
- Planning



You're
saying
you can
improve
me?

