Cyber Surge

Evan Sparano, Ignacio Moreno, Samuel Cheng, Bo Moon

Contemporary RTS Games

Plenty of real-time strategy (RTS) games are available for PC, but how about mobile?

Answer: Just a few

How long does an RTS game last?

RTS games typically take over 20 minutes per game, which isn't appropriate for mobile devices.

Expect CyberSurge games to last under five minutes. Play on the can or on the go!

CyberSurge

CyberSurge is a minimalist, cross-platform, mobile RTS game.

It can be played on iPhones and Android devices

Major Features

- Simple gameplay
- Single player vs. AI
- Multiplayer
- Leaderboard and account management

1) Simple gameplay

- Intuitive controls
- Few gameplay elements
- Combat triangle
- Pathfinding/flocking

Base: Destroy the enemy's to win. Generates gold and can spawn Units.

Turret: Begins as neutral, but can be captured by attacking it. Generates gold for the owner and attacks the enemy.

Units
Tap the Base to spend gold and spawn Units. To move Units, tap to select a group or drag over Units to form a new group, then tap again.

Infantry: Average speed, range, power, and health.

Raider: Fast and short-ranged, but weak power and low health.

Sniper: Slow, long-ranged. Strong but low health.

2) Single player vs. AI

- Map selection
  - Currently 5 maps
- AI difficulty

3) Multiplayer

- Ranked or unranked matches
  - Account required for ranked matches
- Play ranked to climb the leaderboard

4) Leaderboard and Accounts

- Register accounts and login
- Leaderboard shows top players by Elo score
- See your own Elo and rank if logged in.

# Demo Time!

Implementation Details

- Written in ActionScript 3 (AS3), PHP, MySQL
- Graphics acceleration with Starling framework (used in Angry Birds!)

AI

- Builds units to counter the enemy's army
- Captures nearby turrets
- Groups units together
- Difficulties:
  - Easy: No grouping, randomly builds, gold penalty
  - Normal: Smaller penalty, groups units by type
  - Hard: Prefers raiders early, snipers/infantry later; no penalty

Pathfinding

- A* pathfinding
- Easy map editor
- "Data" + skin
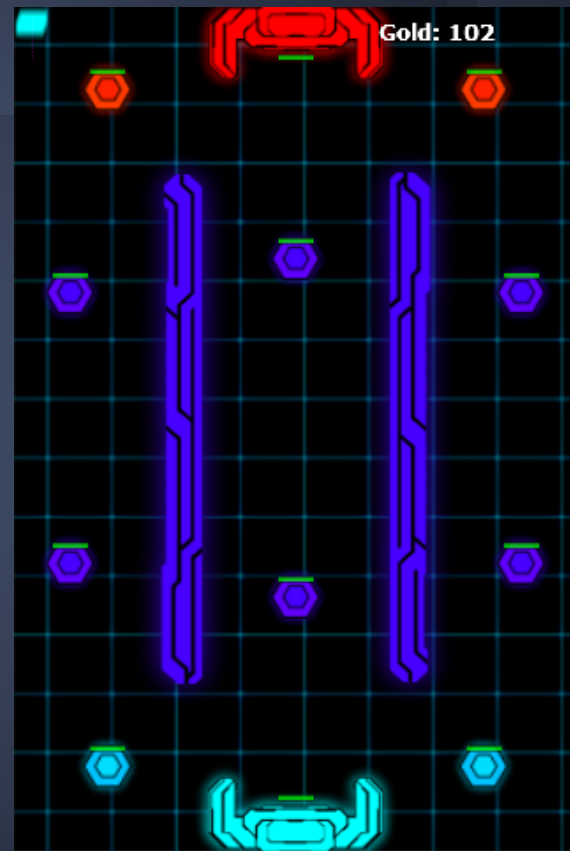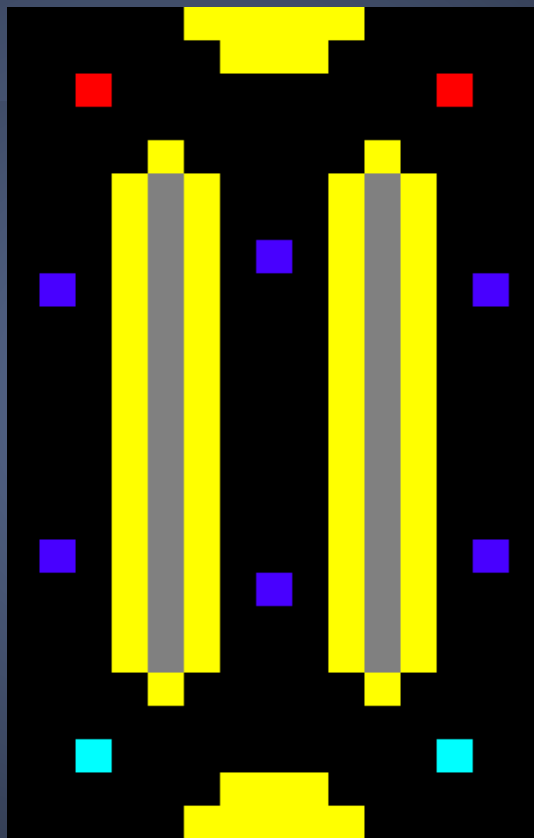
Flocking

- Simple O(N^2) N-Body
- Boid behavior:
  - Attraction, repulsion, velocity of neighbors
- Repulsion from enemies, obstacles

Multiplayer

- Adobe Cirrus for P2P connection
- reyco1 Multiuser Library for Flash API
- Matchmaking: Matched with first opponent in waiting room
- Syncing protocol:
  - Player represents only his/her own state
  - Signals contain "op codes" followed by data
  - Receive signals to simulate opponent
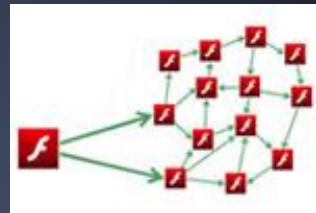
| OP_MOVE | unit_id | x | y |

Database

In order to access the multiplayer ranked feature, players are required to create an account.

- Amazon Relational Database (RDS) for mySQL tables
- Secure database even if hijacked, sanitize inputs
- Cpanel to host PHP scripts

PHP Scripts

- Handles account creation, email verification, login
- Updates Elo scores after ranked matches
- see update on each visit to leaderboard

Elo Ranking System

- Invented as a better chess rating system
- A player 100 points higher should win 64% of games.
- "K-factor" determines rate of point gain/loss
  - Tradeoff between response to changes in player's performance level and overemphasis of recent games

Rank	Username	Elo
1.	rts3	1032
2.	rts4	1000
3.	rts5	1000
4.	rts6	1000
5.	rts7	1000
6.	rts8	1000
7.	rts99	1000
8.	rts2	992
9.	champ	991
10.	rts1	990
9.	champ	991

Back

Challenges

- Performance on mobile devices
  - 60 FPS on old devices?
  - Simulation speed independent of frame rate
  - Optimization + memory management with Adobe Scout profiler
- Syncing multiplayer
  - Tradeoff between messages sent and performance

Follow-ups

- Chat
- Map-editor
  - Create, share, download + rate maps
- Test scalability