

20 Years of Eurobattle.net: A Retrospective on the PvPGN Server and Its Open Source Ecosystem

Presented by Klemen / cen1

What is eurobattle.net?

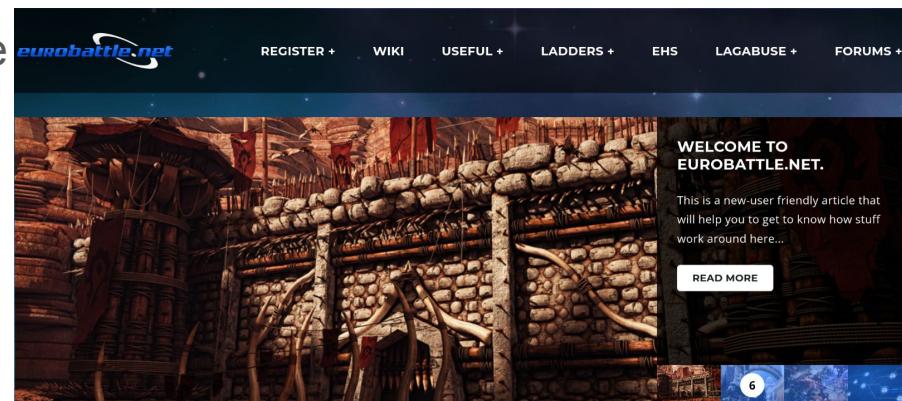
- Unofficial **Warcraft III** multiplayer server.
- Established as a Polish community in 2003, running on FreeBSD 5.
- Early years: Mostly Melee ladder and Custom Map games.
- After **2005** dominated by **DotA Allstars** (**Defense of the Ancients**) games.
- Primarily European player base and some smaller communities around the globe.



2003 - w3.xpam.de



Forum logo
since 2006



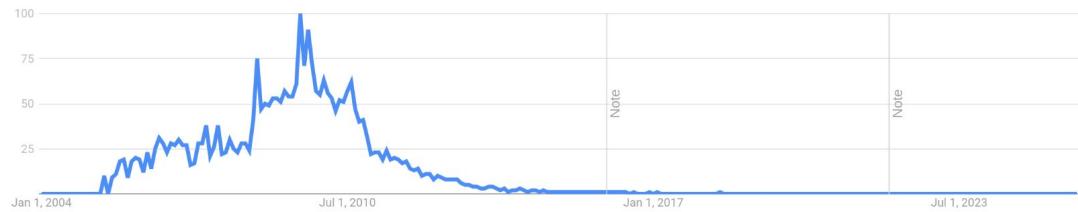
Current website

Trends

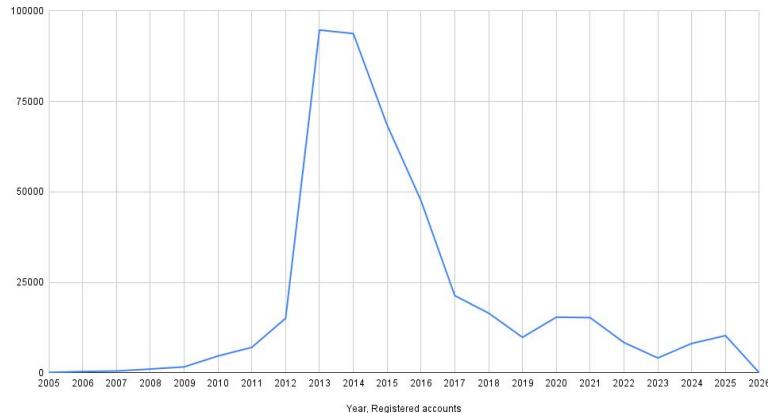
Google trends

Interest over time [?](#)

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Account registrations over the years

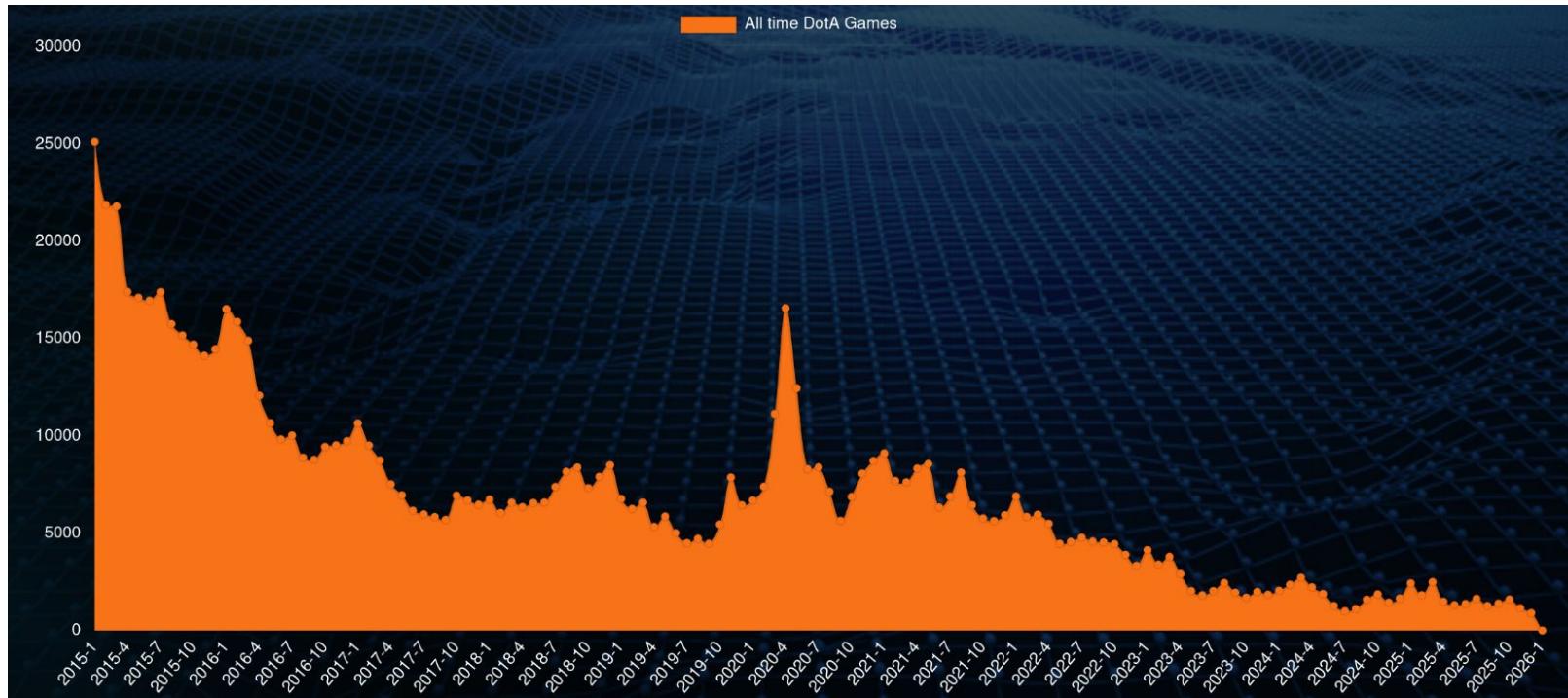


Best years: 4000-5000 online users at peak hours (Europe TZ - evenings).

Today: 200-300

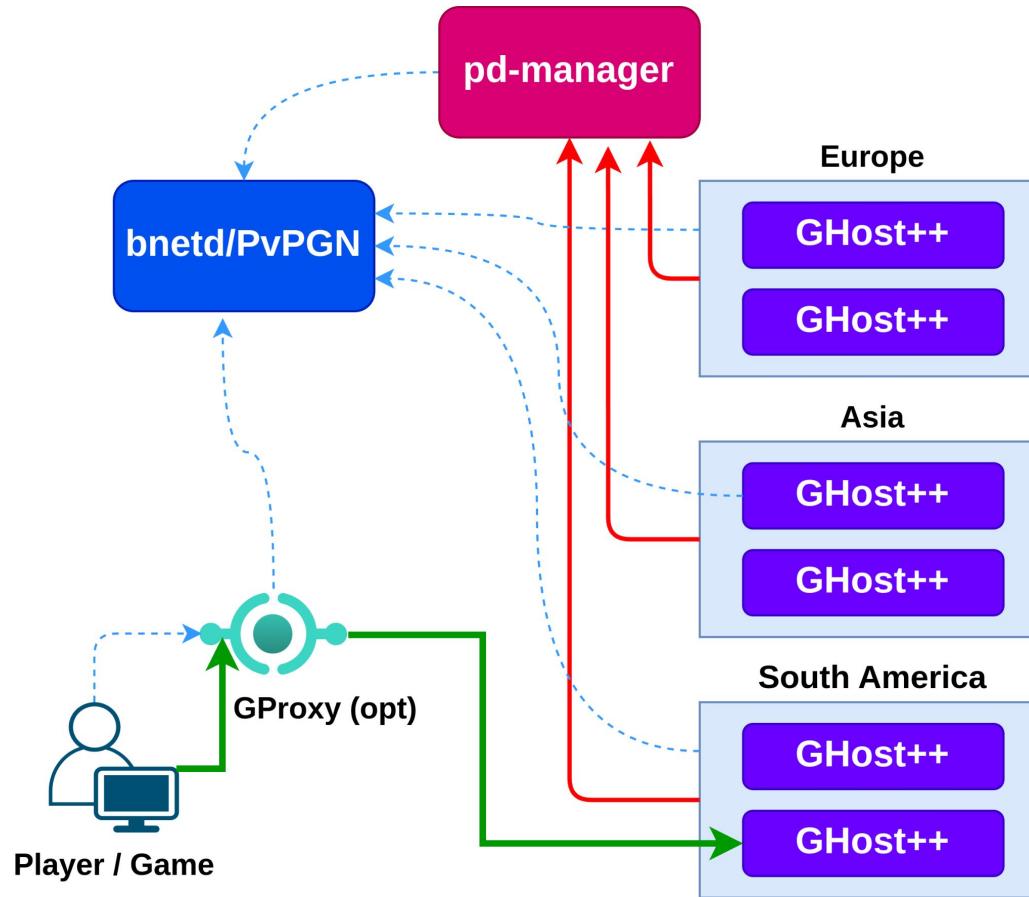
Stats

DotA League - dota.eurobattle.net, games per month



We lost data pre-2015 because someone accidentally did a thing

Tech stack



- Reverse engineered implementation of battle.net v1 server protocol.
- Released in 1998 with StarCraft support.
- Later Diablo I, II, Starcraft, Warcraft II, III.
- **The BNED Project** sued and taken down by Blizzard (case: Blizzard v. Bnetd*)
- Forked as **PvPGN**: Player vs Player Gaming Network.
- Added Westwood Online support (C&C games).
- GPLv2, C/C++ (lot's of C style C++).

Jun 03, 2002 - 01:36 PM

Project Page :: Mailing Lists :: Files :: CVS

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The BNED Project
Building the game servers of tomorrow

Main Menu

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The BNED Project

The bnetd project is a collaboration focusing on development of a server that attempts to emulate Blizzard's Battle.net gaming server. The bnetd project is run by volunteers and is neither supported by nor affiliated with Blizzard Entertainment.

A major part of the effort is supporting most of the battle.net compatible games. Currently it supports Diablo 1, Starcraft, Warcraft 2 BNE, and some of the Diablo 2 connections. The server may eventually support some non-Blizzard clients as well, but no work is currently being done in that area. Certain software in addition to the bnetd server should also be considered part of the bnetd project. This includes BNS (Bnetd Selector), bncat (a text-based chat client), the BNI utilities, and brtrackd (BNNet TRACKing Daemon). All the software is licensed under the [GNU GPL](#). The bnetd team also produces documentation for these programs and the battle.net protocol.

You will still need your original copy of a Blizzard game in order to connect to the bnetd server. The bnetd project does not condone the use of illegally duplicated games being used to play on bnetd servers.

You can find the latest news, mailing lists, discussion forums, server lists and current file releases at this site.

--BNED Project Members

Survey: Poll
Which do you think is better, the Diablo series or Dungeon Siege?
- Dungeon Siege, its newer & more advanced
- Dungeon Siege, because lawsuits suck!
- Diablo Series, its a classic
- None, I don't play either
[[Results](#) | [Polls](#)]

Donations
Make a donation to the BNED legal defense fund by clicking on the PayPal logo below.



BNED Project website in 2002

* <https://slashdot.org/index2.pl?fhfilter=bnetd> ; Lawmeme archived article: <https://tinyurl.com/lawmeme-bnetd>

battle.net v1 protocol

- Unencrypted.
- Today: WireShark + bnetp filter
<https://github.com/diegonc/packet-bnetp>
- Community documentation:
<https://bnetdocs.org>
- **SID** sub-protocol: account, auth, chat, clans, game discovery.
- **W3GS** sub-protocol: lobby and gameplay traffic.

S>C 0x04 W3GS_SLOTINFOJOIN

Transport Layer: Transmission Control Protocol (TCP)
Application Layer: Warcraft III In-Game Messages (W3GS)

Message Id: 0x04
Message Name: W3GS_SLOTINFOJOIN

Direction: Server to Client

Used By:
Warcraft III Reign of Chaos Warcraft III The Frozen Throne

Message Format:
(does not include protocol header)

```
(UINT16) Length of Slot data
(UINT8) Number of slots
(UINT8) [] Slot data
(UINT32) Random seed
(UINT8) Game type
(UINT8) Number of player slots without observers
(UINT8) Player number
(UINT16) AF_INET (2)
(UINT16) Port
(UINT32) External IP
(UINT32) Unknown (0)
(UINT32) Unknown (0)

For each slot:
(UINT8) Player number
(UINT8) Download status
(UINT8) Slot status
(UINT8) Computer status
(UINT8) Team
(UINT8) Color
(UINT8) Race
(UINT8) Computer type
(UINT8) Handicap
```

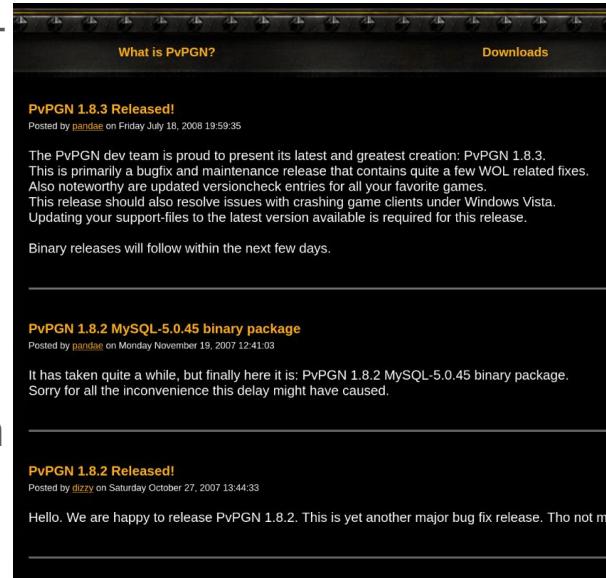
Remarks

This is sent to tell the client about the game slots, upon entry of the lobby.

Example of a packet documentation

PvPGN fork history

- PvPGN project hosting moved to BerliOS code platform - pvpn.berlios.de
- Development stopped around 2011, final version 1.99-SVN available on GH:
<https://github.com/d1zzy/pvpn>
- In 2012 Forked as “PvPGN Pro”
<https://github.com/pvpn/pvpn-server>
- Code, CMake, JSON config, LUA plugin support.
- Development stopped in 2021. Probably the best version to host today but perhaps a bit less stable (some new bugs introduced, lack of unit tests).



Landing page on BerliOS

<https://github.com/eurobattle/pvpgn>

- Eurobattle uses 1.99-SVN with some additional patches.
- Command flooding prevention/rate limiting.

- Minor code fixes for latest compilers and C/C++ standards.
- Muted user allowlist: if a player is punished with a mute they are still allowed to whisper to certain system bot accounts.

Why was GHost++ needed?

Problems with traditional hosting on battle.net

- Players are game hosts - latency varies.
- Demand for competitive DotA.
- Game lists, player stats, ladders..
- “Username spoofing” problem - players using fake names in game lobbies.

What is GHost++?

- GHost (Game Host) ++ (C++)
- Bot simulating a player that can create a game lobby and act as the game host.
- Typically deployed on dedicated servers or a VPS.
- Players interact through chat ([!map <map name>](#), [!pub <game name>](#), [!ping...](#)).
- Can capture game events (Hero kills, winners..) and store them in a database.
- Native support for DotA stats and a generic W3MMD standard.

- Solution to username spoofing: demand player to send [/w <botname> sc](#), GHost can then verify with PvPGN in which game the “whisperer” is currently located ([/where <whisperer>](#)). Location mismatch == kick.

GHost++ development history

- Ghost Pwner project written in VB.NET by MrJag.
- Ported to C++ in 2008 by Trevor Hogan
- Apache 2.0 license.
- GhostOne fork with Windows GUI wrapper by Psionic One.
- Development via forum.codelain.com, later ghostpp.com (both now defunct).
- Google code SVN code repo, precompiled dependency dll downloads available via forum.

GHost [Owners:MrJag,Netrunner] - Data Game Host BOT	
	GHost Development & Planning Direction and progression of GHost, please Do Not Post User Related Issue Here <i>Moderators: HearthCore, Varlock</i>
	GHost C++ Development & Planning <i>Moderators: HearthCore, Varlock</i>
	GHost Usage Problems In Battle.NET Post the problems you are having when running GHost on Battle.net <i>Moderators: HearthCore, Varlock</i>
	GHost Usage Problems In PVPGN Post the problems you are having when running GHost on PVPGN <i>Moderators: HearthCore, Varlock</i>
	GHost Resolved Problems [Read Only] Archive of previously resolved problems <i>Moderators: HearthCore, Varlock</i>

codelain forums ~2008

GHost++ dependencies

- **BNCSUtil** - <https://github.com/BNETDocs/bncsutil> C/C++ library implementing the logon sequence, co-maintained with BnetDocs.org
- **StormLib** - <https://github.com/ladislav-zezula/StormLib> C/C++ library to work with MPQ archives. Used to parse map metadata and create game lobby with correct number of slots, checksum etc.
- **Boost** (fs, asio, thread, date-time, regex), possible future work to replace with modern C++ alternatives.

pd-manager fork

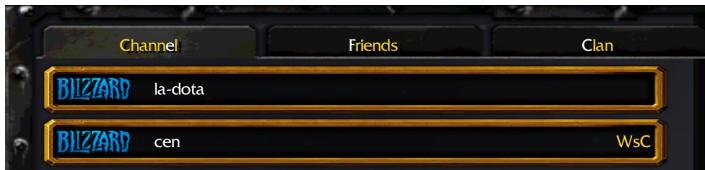
<https://github.com/cen1/pd-manager>

- Two GHost forks independently emerged within eurobattle community.
- pd-manager by playdota.eu DotA league (independent platform, later merged).



- **Problem:** a single GHost instance can only be in **one active lobby** at the same time.
- Once the game starts, a new lobby can be created but this is a bottleneck.

- **manager** - sits in a public channel, accepting player commands (!pub <gamename>)



- **ghost** - multiple instances connect to the manager via UDP protocol.
- manager delegates game creation to a free GHost instance.
- manages **state** (open lobbies, active games, stats collection, db storage).
- Multi-region support: player can request a GHost instance from certain location (Asia, South America, EU)
- PSR score, !balance(d) lobbies.
- Modern CMake, Conan v2, vcpkg support. Before: Makefile+Visual Studio 2008.sln
- Dockerfile/Compose support.

- The 2000s - age of dial up and early DSL.



- When a player loses connection mid-game, Warcraft III game client has a hard reconnection limit of **70 seconds**.

- “Game Proxy”, disconnection protection tool by Trevor Hogan, 2010.
- Client side binary, sits between Warcraft III client and GHost++.
- Additional GPS protocol layer between GProxy and GHost++.
- For every real action, we send predetermined **N** empty actions.

- When player loses connection, if GProxy doesn't receive a W3GS action for 60 seconds it will feed one of the available empty actions to the game client and keep it interested.

cen: This is a reliable game. Requesting GProxy++ disconnect protection from server...

LA02 has joined the game.

LA02: :: dota.eurobattle.net :: :: region: eu ::

LA02: -----

GProxy eurobattle fork

<https://github.com/cen1/gproxy>

- Automatically spoof-checks on lobby join (/w <hostbot> sc)

LA02: Spoof check by whispering bot with "sc" [/w lagabuse.com.02 sc]

You whisper to lagabuse.com.02: sc

cen: GProxy++ disconnect protection is ready (360 second buffer).

LA02: Spoof check accepted for [cen : server.eurobattle.net].

- Report W3 client version to GHost, enforce single version in lobby.

Some random stuff..

- Auto-login feature.
- Follow a friend into a lobby feature.
- Chat history (press UP/DOWN arrow keys to fill your chat box with your command history, terminal-like)

DEMO

