bph-site

A modern puzzlehunt framework

Background

gph-site
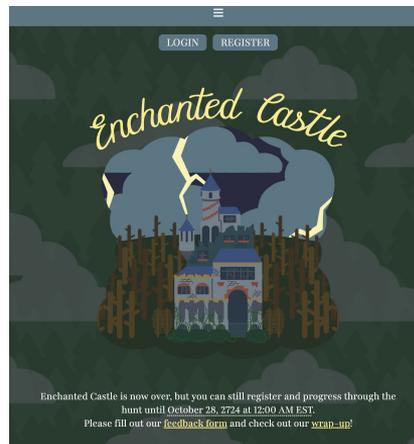
Galactic Puzzlehunt
2017, 2018, 2019, 2020, 2022, 2023, 2024
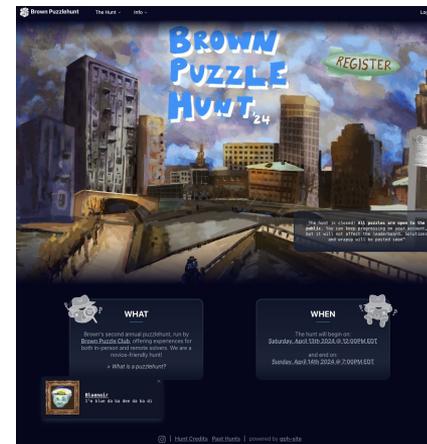

Teammate Hunt
2020, 2021, 2025

Enchanted Castle Puzzlehunt
2024

Brown Puzzlehunt
2023, 2024

DP Puzzlehunt 2020
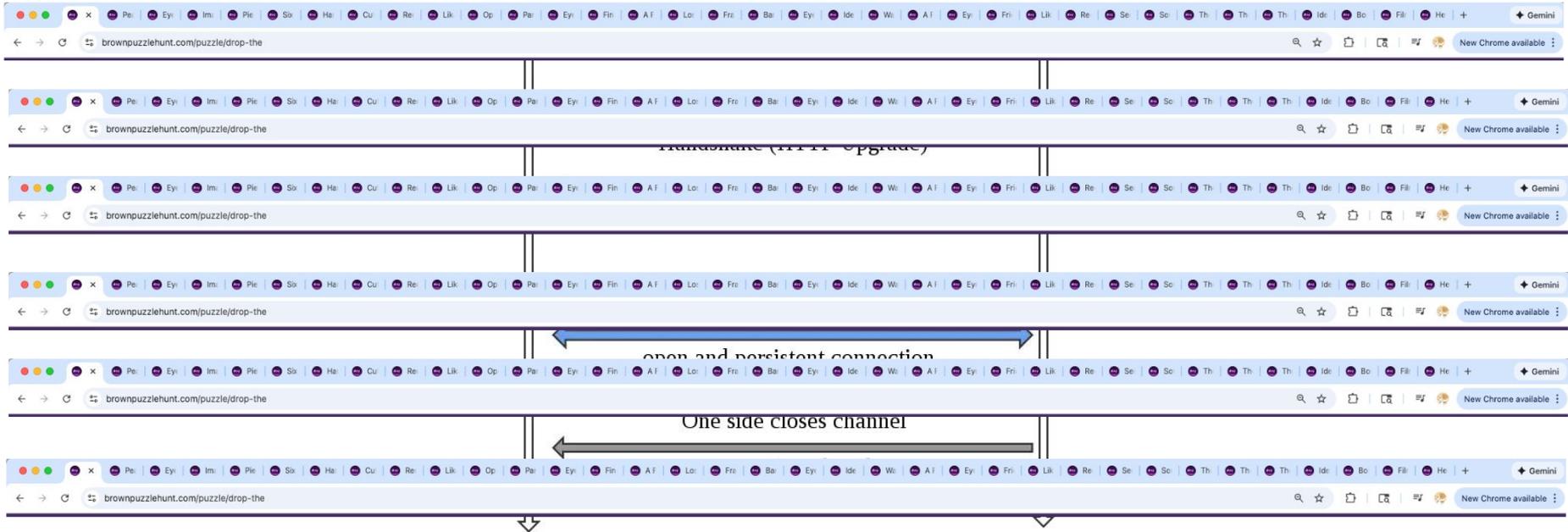
Vehemhunt 2024

Shardhunt 2023

Grand Hunt Digital 2024

Silph Puzzlehunt 2025

MIT Mystery Hunt
2023, 2024

Huntinality
2021, 2022, 2023

Singapore Hunt
2022, 2023, 2024

Websockets (Django Channels)

Handshake (HTTP upgrade)

open and persistent connection

One side closes channel

`gph-site` often crashes

Galactic Puzzlehunt 2022

Website issues

Our website had much more substantial performance issues than in the past. Despite considerable effort throughout the hunt, we were unable to figure out exactly what was causing the issues, although we made a number of changes to help address them, including:
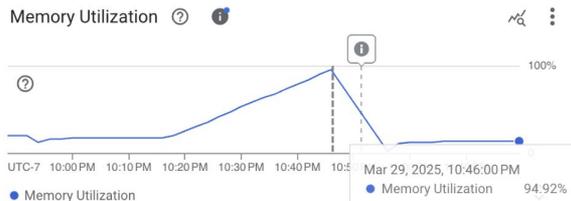
– Upgrading the VM

– There was a bug in our nginx configuration, which caused Django 500 errors to be redirected back to Django as a new request and serve a 404, and could have exacerbated things for a while. We eventually told nginx to serve a static 500 page

– We moved Changes and intense Make Your Own Puzzle Hunt subpuzzles off to separate VMs, so they wouldn't be impacted by the slowdown

  – These were easy, since they were stateless

  – Speedy Crosswording couldn't be easily moved due to loop state

– Upgrading nginx to resolve some websockets/SSL bug

– Logging request times in nginx

– Autokicking the server whenever bad things started to happen as judged by request times
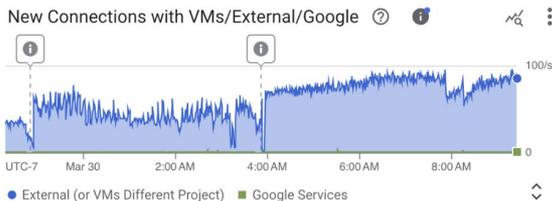
Teammate Hunt 2025

WEBSOCKETS?

At 10.48pm PDT on Saturday March 29th, one day after the hunt started, Alex was awoken by a call reporting that the hunt site was hard down.

Alex could not ssh into the production instance and went to check on the VM in GCP.

Memory Utilization

Mar 29, 2025, 10:46:00 PM
● Memory Utilization   94.92%

● Memory Utilization

UTC-7 10:00 PM 10:10 PM 10:20 PM 10:30 PM 10:40 PM 10:5...   100%

For some reason, the server had rapidly started consuming memory. With no time to debug or even ability to access the production VM, the VM was power cycled. The site was back and debugging was deferred in the name of sleep. Alex was woken up 2-3 more times that night anyway - sometimes with reports of "websocket issues" - and the VM was sometimes restarted before the site went down. A small number of observations were performed. namely one or two uvicorn workers would have some combination of high CPU or memory usage, but it was late and preventing the site from going down was the priority.

In the morning - logs and stats were examined. At least partially because of the tropish nature of websockets issues in online puzzlehunts, when the reported symptom was "websockets are slow / broken", and the "quick fix" of restarting the server worked, we started looking into websockets.

New Connections with VMs/External/Google

● External (or VMs Different Project)   ■ Google Services

UTC-7 Mar 30 2:00 AM 4:00 AM 6:00 AM 8:00 AM   100/s   0

We noticed that each time the server was restarted overnight, the number of connections per second experienced a sharp step increase. Inspired by this observation, we found that our client websocket code, upon loss of connection, would retry *every 1 second indefinitely*. The theory was that the many tabs open in the many browsers were all attempting to make websocket connections. We implemented exponential backoff and a max retry limit on the client — though users would need to refresh to get the updates. We hoped this would mark the end of these infra issues, though in the back of our mind we knew that these connection rates should not be high enough to cause any real issues.

gph-site often crashes

Galactic Puzzlehunt 2023
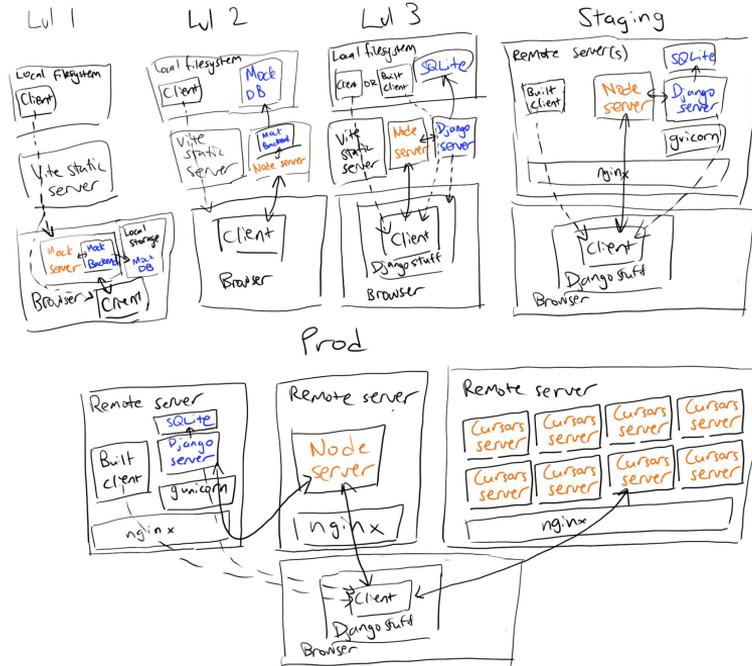
"The advantage of this setup was performance. After our experiences with Django Channels in previous years, we were particularly wary of using Django Channels in any large capacity. (In fact, **we still don't have a definitive answer to what went wrong last year**…)"

BROWN
PUZZLE
HUNT '24

REGISTER

Bluenoir
It's been a long day, I'm grabbing Baja's for dinner

The hunt is closed! **All puzzles are open to the public.** You can keep progressing on your account, but it will not affect the leaderboard. Solutions and wrapup will be posted soon™
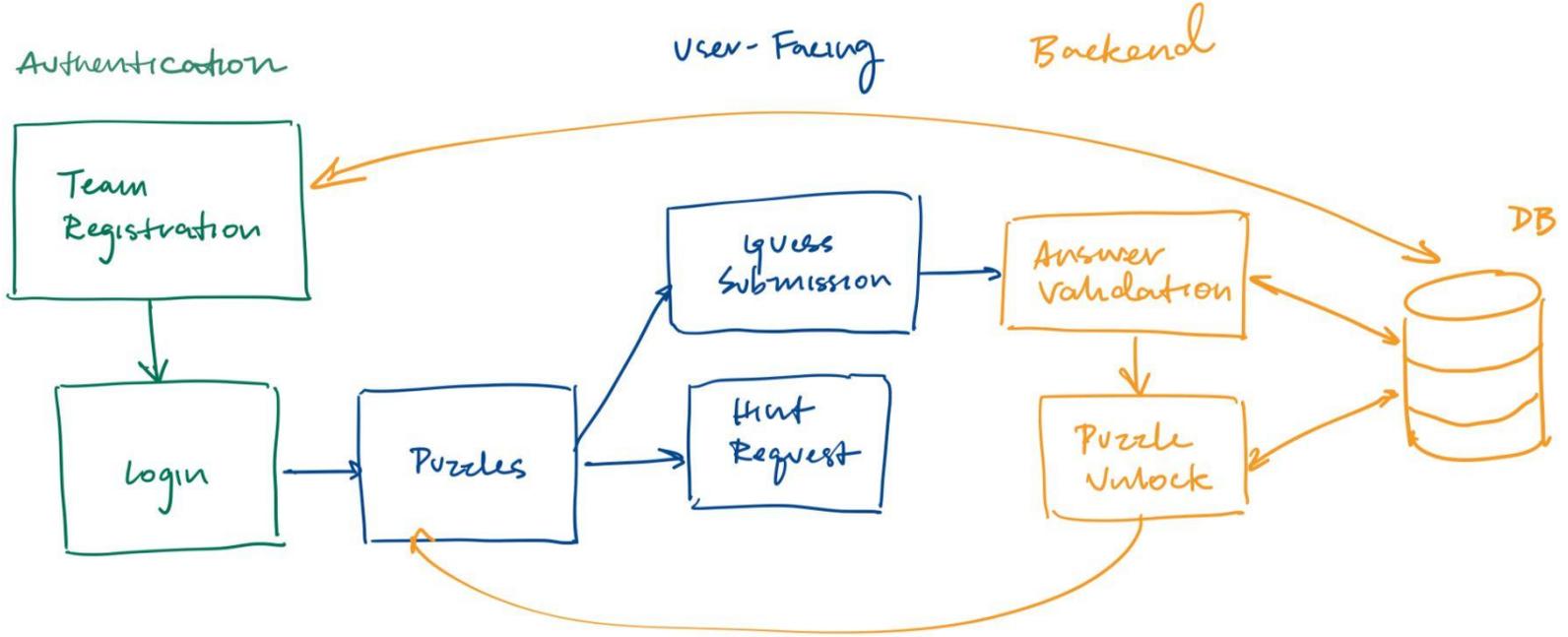
Problem

1. Websockets, when coupled with the main application, are a major source of hunt crashes

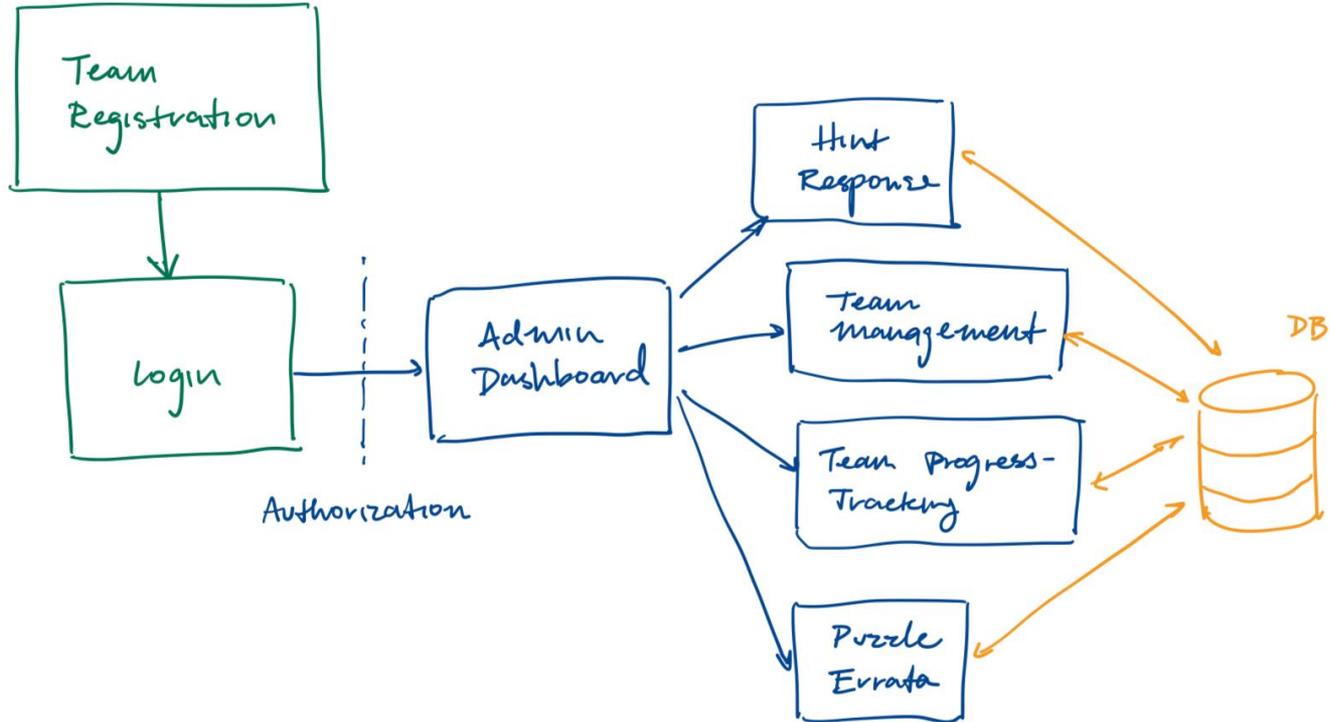2. Hunts compensate for this fact by overprovisioning resources

Key insights

1. Other than websockets, most puzzlehunt functions are not stateful

Team User Flow

Authentication | User-Facing | Backend

Team Registration → Login → Puzzles → Guess Submission → Answer Validation → DB

Puzzles → Hint Request

Answer Validation → Puzzle Unlock → DB

Admin User Flow

Authentication

Team Registration

↓

Login

--- Authorization ---

Admin Dashboard

Hint Response

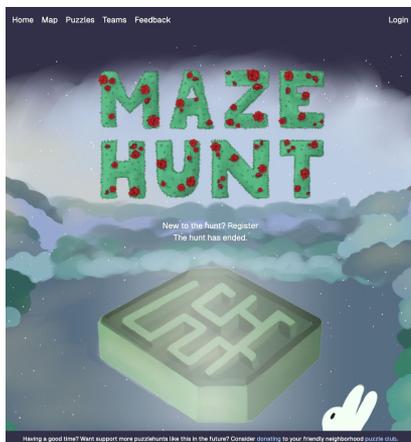Team Management

Team Progress-Tracking

Puzzle Errata

DB

Key insights

1. Other than websockets, most puzzlehunt functions are not stateful

2. Puzzlehunts experience burst loads and require high scalability
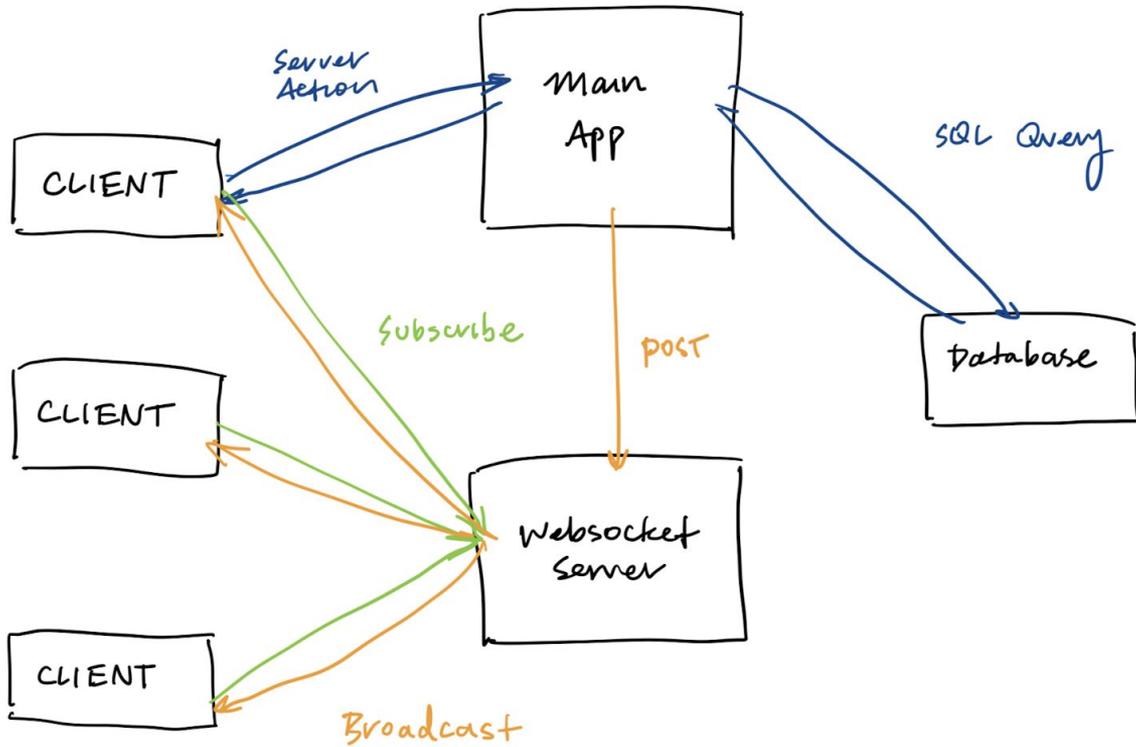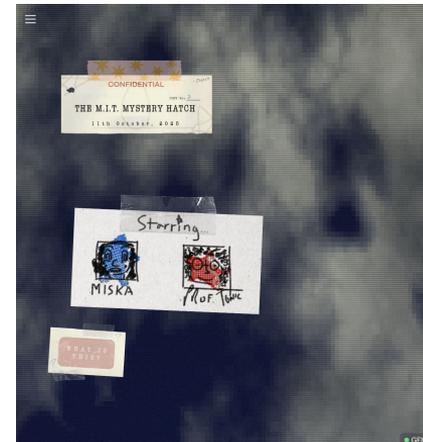
bph-site

Puzzlethon
2024, 2025

Brown Puzzlehunt
2025

Penchant Hunt
2025

M.I.T Mystery Hatch

>1.4k teams, ~7k individuals

Features

1. Authentication (JWT)
2. Authorization levels (user, testsolver, admin)
3. Answer submission & verification
4. Hinting system
5. Errata system
6. Leaderboard
7. Admin panel
8. Puzzle unlock graph

bph-site

bph_site_team

id	varchar(255) (!)
display_name	varchar(255) (!)
password	varchar(255) (!)
role	role (!)
members	text (!)
interaction_type	interaction_type (!)
create_time	timestamp with time zone (!)
finish_time	timestamp with time zone
num_community	varchar(31) (!)
phone_number	varchar(31) (!)
room_needed	boolean (!)
solving_location	varchar(255) (!)
wants_box	boolean
has_box	boolean (!)

bph_site_puzzle

id	varchar(255) (!)
name	varchar(255) (!)
answer	varchar(255) (!)

bph_site_guess

id	serial (!)
puzzle_id	varchar (!)
team_id	varchar (!)
guess	varchar(255) (!)
is_correct	boolean (!)
submit_time	timestamp with time zone (!)

bph_site_hint

id	serial (!)
puzzle_id	varchar (!)
team_id	varchar (!)
request	text (!)
request_time	timestamp with time zone (!)
claimer	varchar
claim_time	timestamp with time zone
response	text
response_time	timestamp with time zone
status	status (!)

bph-site

Hinting system

Hints

Filter hints...

ID	Puzzle	Team	Request	Time	Status
1279	Aha Erlebnis	Cheatahs	Can you please give us a hint of how to start this META? I'm a bit embarrassed to admit that I'm actual...	4/25, 11:57 AM	Answered
1278	The Guard and The...	hi, it's just me	I'd like to ask if I got the idea right for the verses: Verse 1 refers to the NATIONAL SECURITY puzzle. T...	4/25, 11:52 AM	Answered
1277	Constellation	Alteleid	we only have slight understanding on the relation between the two pictures, but not exact. here is our...	4/25, 11:35 AM	Answered
1276	Cutting Room Floor	希望404	Hello, we think the answers to these questions can be divided into "fruits or vegetables" and "six-lette...	4/25, 11:31 AM	Answered
1275	International Neig...	Chasemad5's Solo ...	Ok, so... is it like Fainter -> Painter -> Paster -> Pastor -> Vaster -> Rasta? I'm still confused about Ras...	4/25, 11:26 AM	Answered
1274	Constellation	2muchexposition	Thank you for all your help so far! Sending this in case I get in one more Horror solve before this hunt ...	4/25, 11:22 AM	Answered
1273	Secret Ingredient	Alteleid	is this infinite craft? we actually found oasis and sand from these routes, but couldn't think of the final...	4/25, 11:21 AM	Answered
1272	Constellation	Team Peggle	Hello, Could we get a hint on this puzzle please? We think that this doesn't use the feeder answers, b...	4/25, 11:20 AM	Answered
1271	Balloon Animals	hi, it's just me	I've determined the following: - the feeders are directly related to the animals/entities: MICROGRAVI...	4/25, 10:59 AM	Answered
1270	Partaking in a Nont...	Team Conundrum	I think I have them matched up... But not sure where to go next with this.... Henriksson Ford Speven St...	4/25, 10:58 AM	Answered
1269	Watching Between...	meowzle	Hi there, Sheet for "Watching Between the Lines": https://docs.google.com/spreadsheets/d/1B5jQK2...	4/25, 10:53 AM	Answered
1268	The Guard and The...	Team Peggle	Hello, We believe we're supposed to be indexing into the name of the puzzle you get when you hover ...	4/25, 10:51 AM	Answered
1267	International Neig...	Chasemad5's Solo ...	Are the words FAINTER, PAINTER, and PRINTER, & PASTOR, VASTER, and RASTA correct for the wor...	4/25, 10:37 AM	Answered
1266	Watching Between...	何以为我	Hello. We found that all of the films is adapted from Shakespeare. And the number is a kind of book ci...	4/25, 10:37 AM	Answered
1265	Like Clockwork	Livin' Covida Loca	can we get some help on how to start this? we noticed our feeders are 6 letters, but there are 3 missi...	4/25, 10:35 AM	Answered
1264	Cutting Room Floor	Rüebli zum Znüüni	OK, I give up, i've seen too many inverse permutations at this point :) Fruits and veggies can clearly be...	4/25, 10:32 AM	Answered
1263	Aha Erlebnis	Maxwell Rose	Alright our generation are not the emoji experts so how are we doing with STARSTRUCK, YAWNING, ...	4/25, 10:29 AM	Answered
1262	Color Wheel	PokerFaz	https://docs.google.com/spreadsheets/d/14ElEVVmHs9kIKXPDrz1T0_G7Mjfg_8OV-9N4w8rIpiY/edit...	4/25, 10:27 AM	Answered
1261	Beads	Chasemad5's Solo ...	Is 'B' the first letter? EDIT: and/or is W the third letter?	4/25, 10:09 AM	Answered
1260	The Guard and The...	Alteleid	we got P and C for the first and last verse, but are stuck on how to extract on the remaining 3 verses (...	4/25, 10:08 AM	Answered
1259	Red Blue	onlycaptainplaysc...	Hello. We obtained two answers ABYSS and GATHERING STORM and also noticed that the sum of th...	4/25, 10:03 AM	Answered
1258	Identify the Piece	Maxwell Rose	What's a (10,8) way to say BEETHOVENSFIFTH that's not BEETHOVENSSYMPHONY?	4/25, 10:02 AM	Answered
1257	Ten Guards, Ten D...	The Overthinkers	Based on the logic of the green eyes problem, I would expect each guard to leave on day n+1, where ...	4/25, 10:01 AM	Answered
1256	Imagine	Alteleid	We have found this video. It is composed of parts where many people sing. I tried to distinguish these...	4/25, 9:59 AM	Answered

Hinting system

Hint #1279

Team: Cheatahs (cheatahs) 🔗
Puzzle: Aha Erlebnis 🔑 🔗
Claimer: Arnav
Status: Answered ⇅

Puzzle unlocked 4/23/25, 12:29 PM (204 days ago)
Hint requested 4/25/25, 11:57 AM (202 days ago)
Hint claimed 4/25/25, 11:57 AM (202 days ago)
Hint responded 4/25/25, 11:58 AM (202 days ago)

Cheatahs

Can you please give us a hint of how to start this META? I'm a bit embarrassed to admit that I'm actually a German native speaker - that should give me an advantage here - but somehow even after spending a considerable time staring at this puzzle, I can't figure out any connections between the feeder answers and German emotions. The "film" reference sent me down a rabbit hole of trying to associate this with "inside out"/"Alles steht Kopf" but that seems to be a dead end.

Arnav   Cancel

Combining the feeder answers and the emotions clued by the emojis should give you German emotions that don't have English counterparts. Admittedly this was written by non-German speakers so a couple of them might not be commonly used.

Follow-Up

[   ]

[Submit] [Cancel]

Team's Guesses

GEFÜHLPROOF   CORRECT   4/25/25, 12:09 PM