

An aerial photograph of a golf course. A specific green is circled in red in the upper left corner. The rest of the image shows various parts of the course, including fairways, roughs, and a water hazard in the lower half.

clippd

Your golf DNA.

Every player. Every shot. Understood.

Agenda

- Introduction to Clippd
- Data Architecture
- Why ClickHouse?
- Use Case #1 - Player Dashboard
- Use Case #2 - Player Heatmap

Golf is booming!

Golf is a “local” global sport

- +70 million golfers globally
- +25 million golfers in USA, 10 million in Japan & 6 million in Korea

Avid golfers dominate

- 19 million golfers avid golfers (play x25 year)
- They are addicted and spend +70% of the \$95bn market
- 55% of avid golfers have a GPS device

Golf is changing

- Off-course golf experiences (TopGolf, indoor simulators) are growing rapidly and bringing a whole new generation to golf
- 17,000 indoor simulators in Korea alone
- Junior golf in US has 60/40 boy girl split
- 25% of golfers in USA are millennials

This new generation of golfers expect a connected experience wherever and whenever they play the game.



The problem - so many devices that golfers can use, but no unifying software that brings all this data into one place

- Billions has been invested by companies developing brilliant golf tech
- Millions of golfers have smart watches from Garmin and others
- Golfers, desperate to get better, use these devices but aren't able to take advantage of all this data
- There is lots of information, but no insight

Confusion reigns!



1. Aggregate

All golf activity in one place

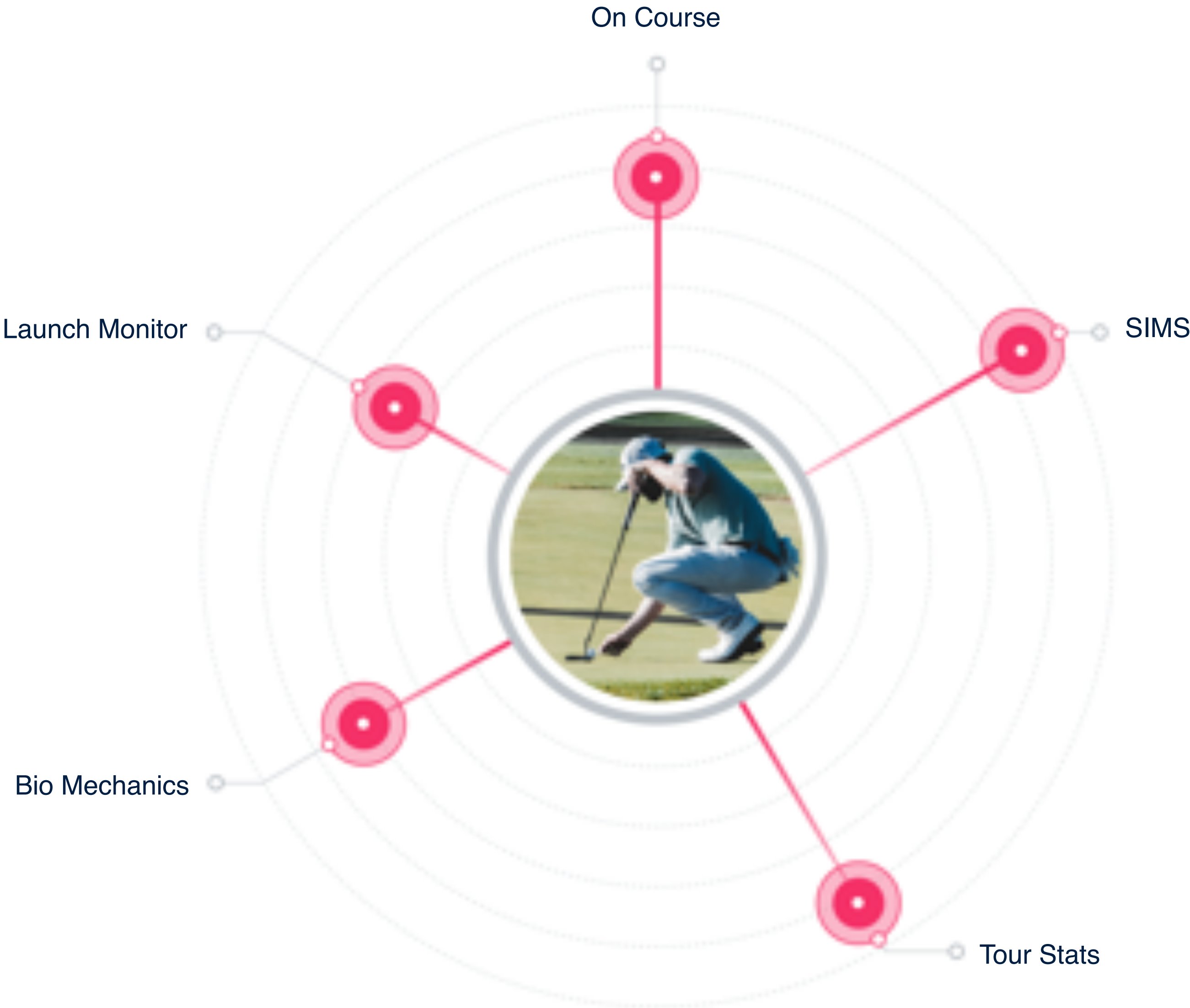
Clippd aggregates data sets from different technologies, agnostic to its origin:

- Launch monitor data
- On-course GPS
- Simulators
- Biomechanics
- Tour feed



Kevin Sprecher
Tour Coach & US Top 100 Teachers

Clippd will enable me to pull all of my players' data into one place. When you have players all around the world, it's hard to be everywhere all of the time, Clippd's going to allow us to do that.



2. Analyse

Understand a players’s
unique golf DNA

Clippd uses advanced data science to:

- Establish a new layer of intelligence
- Develop an objective understanding of what drives performance



Hugh Marr
European Tour Coach

Clippd objectifies something that has spent 400 years being ludicrously subjective. It tells you where a player needs to improve to hit it fewer times. In other words, growing and bettering the game.



A New Language of Performance

Clippd’s proprietary metrics

Shot Quality:

Objectively measures the quality of an individual shot – on course and off course. 100 represents the typical Tour standard, 200 represents “perfect”, such as a hole in one.

Player Quality:

Rolls up Shot Quality to present a single number that measures a player’s skill in each area of their game – off the tee, approach, around the green and putting.



3. Action

A clear path to performance gains

We provide a personalised roadmap to improvement by understanding:

- What is going well
- What to focus on
- Relative importance of each facet of your game



Tom Motley
PGA West Coach
of the Year

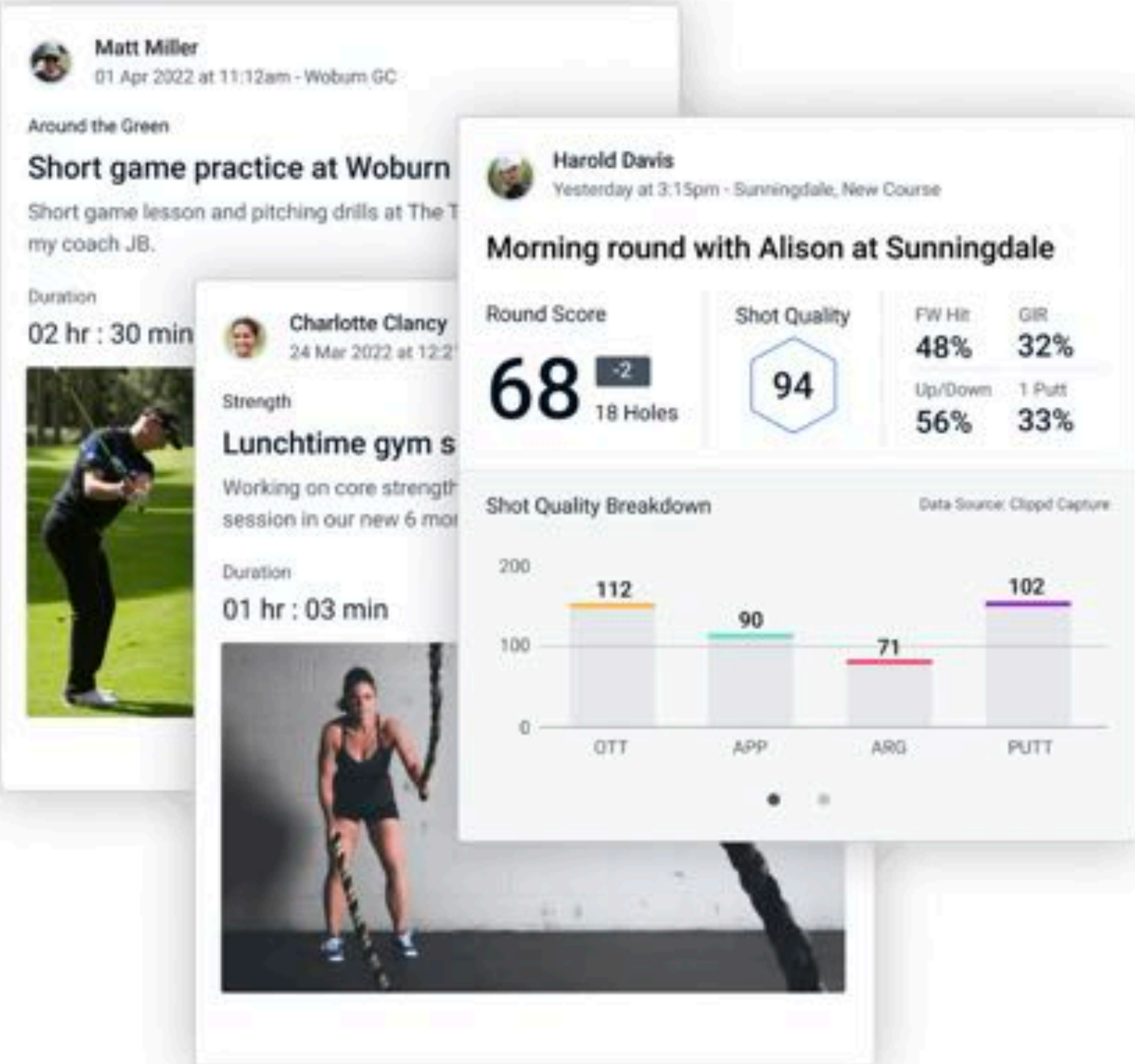
Clippd is a game changer for me as a golf coach. Within seconds of opening the platform I can tell a player exactly what he or she needs to be working on, rather than having to wade through the data. The quality and accessibility of the feedback means I can deliver the information to the player with clarity and simplicity.



4. Social

The place to compare and share your golf game

- Compare - look at your performance next to that of friends or the best players in the world
- Gamification - draw on golfers' competitive instincts to inspire everyone to new heights
- A new home for golf - *“if it's not on Strava, it didn't happen”*

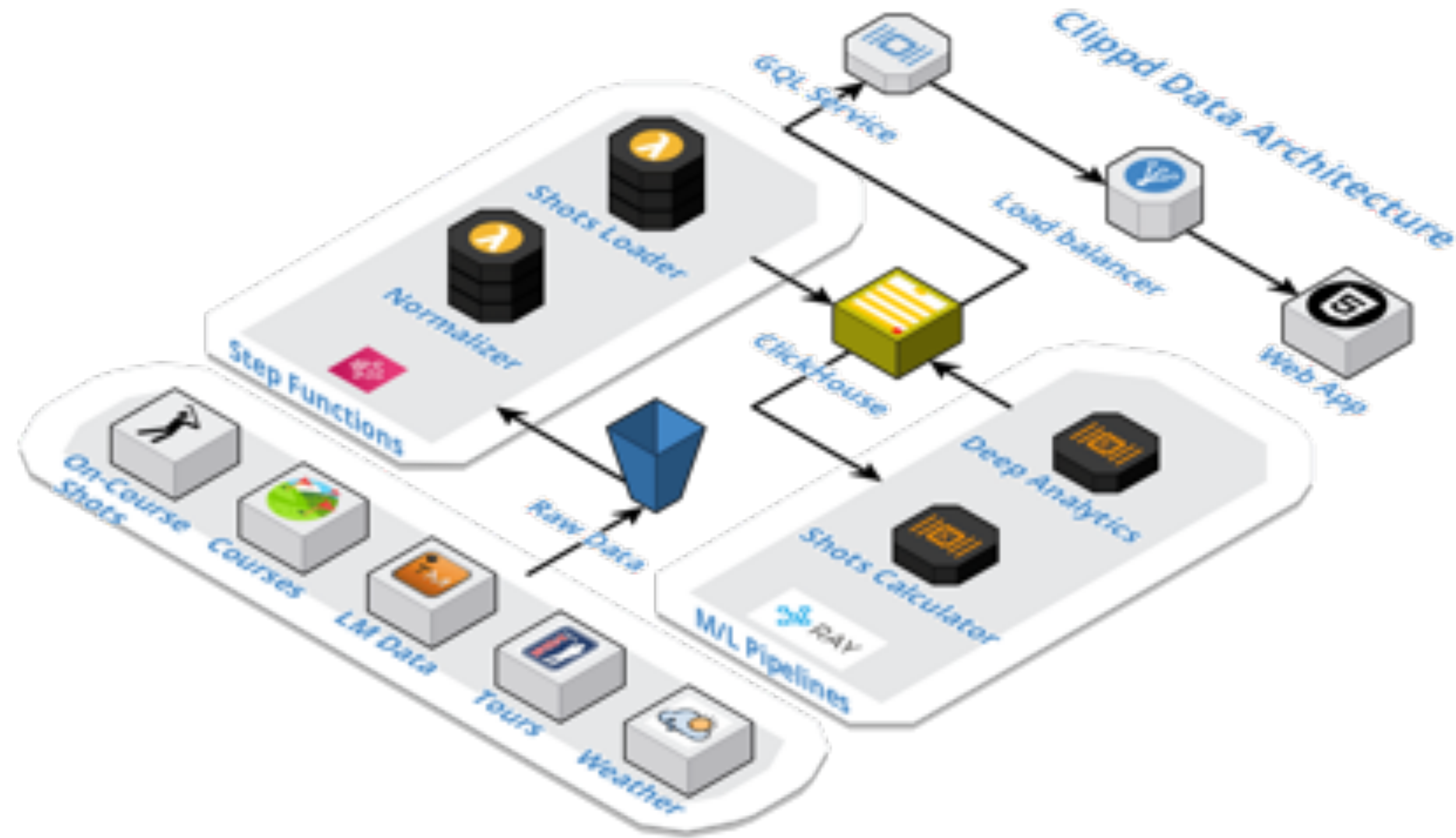


Data Architecture
Simplified ETL design and M/L pipelines

Architecture: adopted serverless architecture to make the data ingestions highly scalable for the golfers to get an understanding of their own game, in near real-time for post game analysis or following their sport icon in broadcast during championships

ETL design: data can be either pushed through an automated API or pulled from FTP to web scrapes. Clippd stores all the source data in s3 in raw formats and then transforms them into a normalised shot model, enhancing it with course rating, course conditions and weather data providing a realistic approximation of the players' skill

Machine Learning: Ray core provides simple primitives for building distributed Python applications for scaling specific workloads like reinforcement learning and model serving



Why ClickHouse?

Benefits relevant to our use case

Clippd aggregates large volumes of user data across multiple different technologies and presents insights in a large number of beautifully designed but disparate visuals. Some of the key benefits associated with ClickHouse that are relevant to our use case are:

- Cost effectiveness
- Horizontal scalability
- Easy to manage table joins
- Extended SQL support - alignment of expertise and ability to store nested data structures for certain visuals



1 year trend query

```
SELECT
  act_ply,
  activity_month AS month,
  player_quality_total AS playerQualityTotal,
  player_quality_ott AS playerQualityOtt,
  player_quality_app AS playerQualityApp,
  player_quality_arg AS playerQualityArg,
  player_quality_put AS playerQualityPut,
  runningAccumulate(state,act_ply) AS row_num,
  player_id AS playerId
FROM
(
  SELECT
    any(player_quality_total) AS player_quality_total,
    any(player_quality_ott) AS player_quality_ott,
    any(player_quality_app) AS player_quality_app,
    any(player_quality_arg) AS player_quality_arg,
    any(player_quality_put) AS player_quality_put,
    concat(toString(activity_id),'-000-',player_id) as act_ply,
    hole_id,
    shot_id,
    activity_time,
    update_time,
    toDate(addMonths(toStartOfMonth(activity_time), 1)) AS activity_month,
    player_id,
    sumState(1) AS state
  FROM
    calculated_scores
  WHERE
    player_id in (?)
    AND data_source not in ('whs')
    AND activity_time >= ?
  GROUP BY
    player_id,
    update_time,
    activity_time,
    act_ply,
    hole_id,
    shot_id
  ORDER BY
    activity_time DESC,
    act_ply DESC,
    hole_id DESC,
    shot_id DESC,
    update_time DESC
  LIMIT 1 BY
    activity_time,
    act_ply,
    hole_id,
    shot_id
)
WHERE
  row_num = 1
ORDER BY
  player_id DESC,
  activity_time DESC,
  hole_id DESC,
  shot_id DESC,
  [playerIds, formatAsSQLDate(startOfRange)]
```

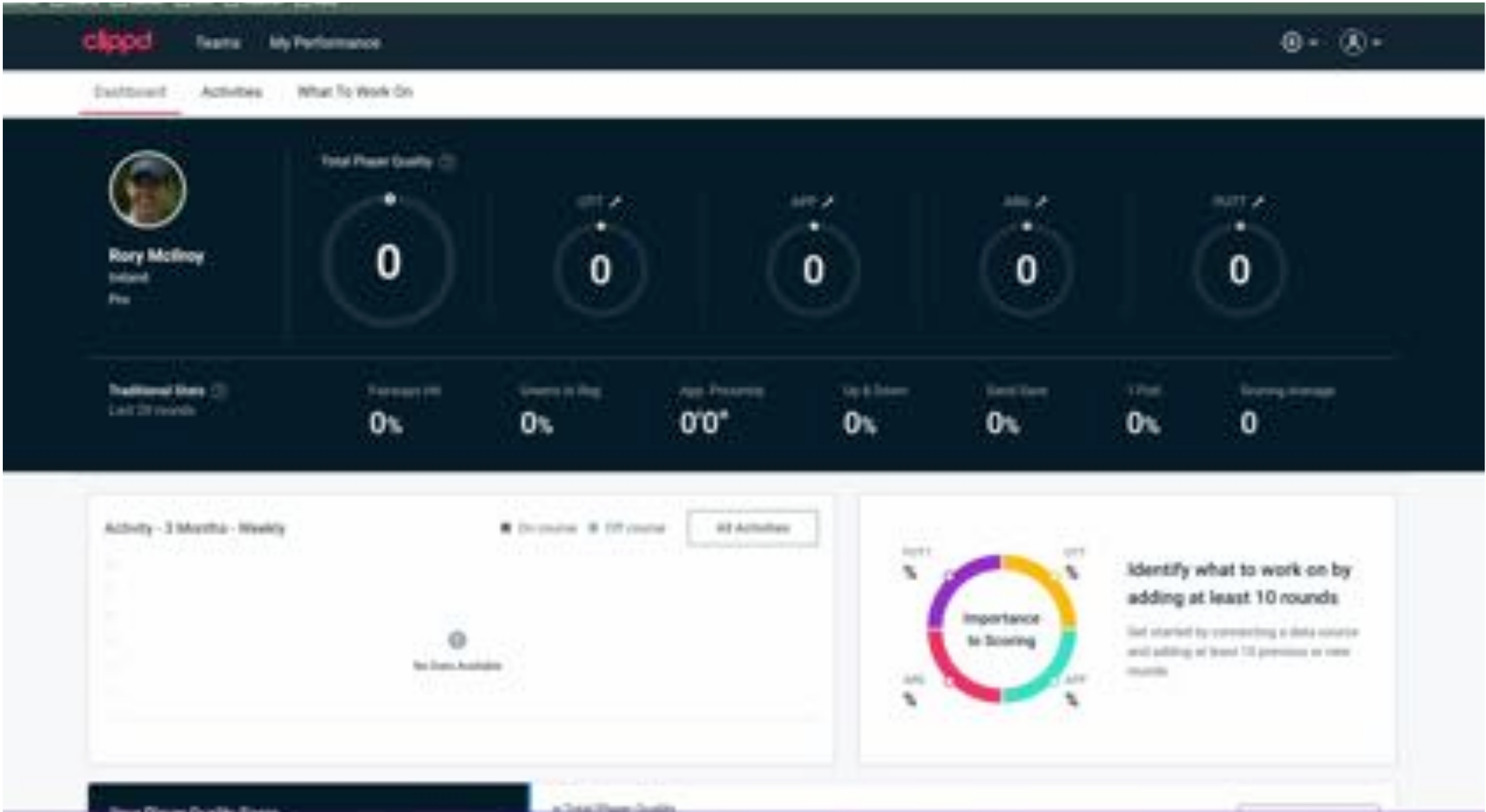
Use Case #1 - Player Dashboard
Providing an easy to digest overview of a player’s golf game

The Player Dashboard is a user’s starting point for investigations into a golfer’s performance.

This might be as far as some users go in their journey so it needs to deliver enough information to be useful but at the same time must not be overwhelming.

This is where our proprietary metrics, Shot Quality and Player Quality, come in. They provide the user with an overview of performance across multiple areas of the game using a single number between 0 and 200.

This data is populated entirely via a query to our ClickHouse tables through a GQL server.



Player Heatmap query

```
SELECT
  act_ply,
  activity_time AS activityTime,
  player_quality_total AS playerQualityTotal,
  player_quality_ott AS playerQualityOtt,
  player_quality_app AS playerQualityApp,
  player_quality_arg AS playerQualityArg,
  player_quality_put AS playerQualityPut,
  runningAccumulate(state,act_ply) AS row_num,
  player_id AS playerId
FROM
  (
    SELECT
      any(player_quality_total) AS player_quality_total,
      any(player_quality_ott) AS player_quality_ott,
      any(player_quality_app) AS player_quality_app,
      any(player_quality_arg) AS player_quality_arg,
      any(player_quality_put) AS player_quality_put,
      concat(toString(activity_id),'-000-',player_id) as act_ply,
      hole_id,
      shot_id,
      activity_time,
      update_time,
      player_id,
      sumState(1) AS state
    FROM
      calculated_scores
    WHERE
      player_id in (?)
      AND activity_type = 'Round'
      AND data_source not in ('whs')
    GROUP BY
      player_id,
      update_time,
      activity_time,
      act_ply,
      hole_id,
      shot_id
    ORDER BY
      activity_time DESC,
      act_ply DESC,
      hole_id DESC,
      shot_id DESC,
      update_time DESC
    LIMIT 1 BY
      activity_time,
      act_ply,
      hole_id,
      shot_id
  )
WHERE
  row_num = 1
ORDER BY
  playerId DESC,
  activity_time DESC,
  hole_id DESC,
  shot_id DESC
Limit ? by playerId
```

Use Case #2 - Player Heatmap

Providing a coach with a comprehensive overview of their teams

The Player Heatmap, which can be found in a Coach’s team dashboard, is a hugely important tool in a coach’s arsenal.

It provides the coach with a single view across all of the players in his team, both in terms of an absolute measure of their current skill level and where their game is trending.

Again, this data is populated entirely via a query to our ClickHouse tables through a GQL server.



And down the fairway, far along
It glowed a lonely white;
I played an iron sure and strong
And **clipp'd** it out of sight,
And spite of grassy banks between
I knew I'd find it on the green.

Sir John Betjeman
Extract — Seaside Golf