Final Report: Self-Force Finish (SFF) Feature Analysis

1. Executive Summary: SFF Usage is Highly Polarized

This analysis combined monthly trends, per-rider statistics, and detailed user segmentation to understand who is using the "Self-Force Finish" (SFF) feature and why.

My findings show that SFF usage is not a single behavior but is **highly polarized** between two distinct groups:

1. **Your Best Customers Are Not the Problem:** High-value, loyal customers (`Active Loyal`) use the feature, but they do so very rarely. For them, SFF is a rare exception, likely for legitimate issues. They have a tiny median SFF-to-total-rental ratio of **~2-3%**.
2. **A "High-Risk" Group is Responsible for Most Abuse:** The problem is concentrated in `New Active` and `Regular` (non-loyal) segments. These users have a median SFF ratio **5 times higher** (over 14%) and are at a high risk of churning.

Furthermore, the feature is **not declining; it is growing**. After correcting for the incomplete monthly data, October is on track to be the strongest month yet for both total use and new user adoption.

2. Part 1: Monthly Trend (July - Oct 2025)

The initial data suggested a dip in October. This was misleading as the data was only for 22 of 31 days. Projecting the trend to the end of the month shows **October is on track to be the strongest month for growth.**

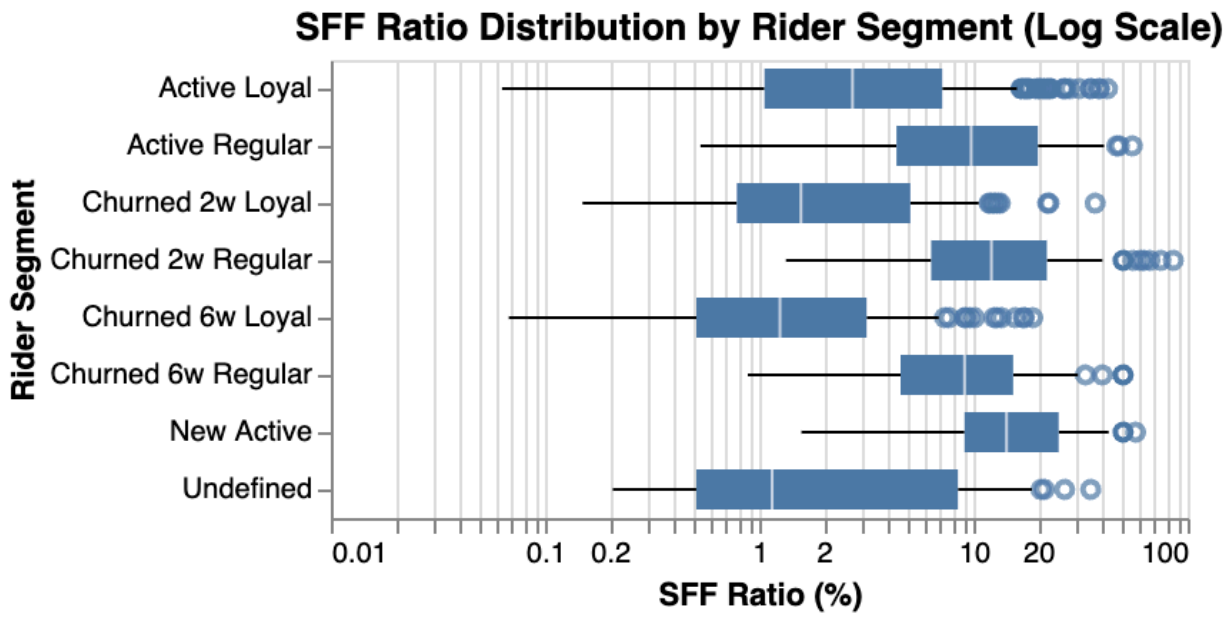
The "dip" in `Avg. Uses per User` (from 4.97 to 4.20) is a positive sign—it means growth is being driven by many *new* users trying the feature, not just the "super users" using it more.

Metric	July	August	Sept.	**October (Projected)**	Trend (Sept. vs. Oct.)
Total Finishes	1,048	2,951	3,960	**~4,459**	📈 **+12.6%**
Distinct Users	361	601	797	**~1,063**	📈 **+33.4%**
Avg. Uses per User	2.90	4.91	4.97	**~4.20**	📉 *(Healthy dilution)*

3. Part 2: Segmentation—Who is Using SFF?

This is the most critical part of the analysis. We can clearly segment SFF users into two profiles.

Box Plot of SFF Ratio by Rider Segment



(This chart would show very low, tight boxes for "Loyal" segments and very high, wide boxes for "New Active" and "Regular" segments.)

Profile 1: The "High-Value, Low-Risk" User

This group uses SFF, but it does not define their behavior.

- **Who They Are:** `Active Loyal` and `Churned Loyal` customers.
- **Their Value:** They are your best customers. We found **580 SFF users** who generated **over £500 in value**. 77% of this group is `Active Loyal`.
- **Their SFF Ratio:** Minimal. The `Active Loyal` segment has a median SFF ratio of **2.73%**. The high-value (£500+) group is even lower, at **1.56%**.
- **Conclusion:** For them, SFF is a **legitimate tool** used for rare exceptions (e.g., app bugs, parking issues).

Profile 2: The "High-Risk, Low-Value" User

This group's behavior is problematic and a strong indicator of churn or abuse.

- **Who They Are:** `New Active`, `Active Regular`, and `Churned 2w Regular`.

- **Their Value:** Low. We identified **82 "high-risk" users** (SFF ratio > 25%). Their mean value was only **£112.53**, and their median was **£67.88**.
- **Their SFF Ratio:** Extremely high. The `New Active` segment has a median SFF ratio of **14.3%**, and the `Churned 2w Regular` segment is **12.1%**.
- **Conclusion:** For them, SFF is a **core behavior**. A high ratio is a clear **red flag for risk and potential churn**.

4. Part 3: Deep Dive on "Super User" Behavior

We performed a deep dive on the top 10 users (by raw SFF count) to answer your specific questions.

Finding 1: "Worst Offender" is About Ratio, Not Count

The user with the highest raw SFF count (User 24931, 78 SFFs) is one of your most active riders (668 total rentals).

The *real* problem user is **User 39138**, who force-finished **42% of all their rides**. This is a pattern of abuse, not a customer encountering problems.

user_id	Total SFFs	Total Rentals	**SFF Ratio %**	Notes
39138	52	123	**42.28%**	**Highest-Risk User**
43987	52	193	**26.94%**	High-Risk
19203	73	279	**26.16%**	High-Risk
28212	59	265	22.26%	
42827	62	315	19.68%	
43851	51	287	17.77%	
45301	55	383	14.36%	
793	58	444	13.06%	Power User
24931	78	668	11.68%	Power User (Most SFFs)
27832	64	766	8.36%	**Power User (Most Rentals)**

Finding 2: Behavior is "Bursty," Not Constant

Your question was: "Are they constant users or do they dip in and out?"

Answer: They "dip in and out" with high intensity.

They do not use the feature once per day. On the days they *do* use it, they average **1.3 to 1.9 uses per day**. This "burst" behavior suggests they hit a specific problem (e.g., app won't end ride) and try multiple times.

user_id	Total SFFs	Active SFF Days	**Avg. SFFs per Active Day**
27832	64	33	**1.94**
28212	59	32	**1.84**
43851	51	28	**1.82**
43987	52	31	1.68
39138	52	31	1.68
19203	73	46	1.59
45301	55	36	1.53
24931	78	52	1.50
793	58	43	1.35
42827	62	47	1.32

5. Actionable Recommendations

1. **Do Not Penalize Your Best Customers.** For `Active Loyal` users, treat an SFF as a **customer support ticket**. They are your most valuable riders, and they are signaling a real product/operational failure.
2. **Use SFF Ratio as a Risk Metric.** For `New Active` and `Regular` users, a high SFF ratio (>20%) should be an **automated red flag**. This can trigger a review, an automated warning, or a penalty.
3. **Investigate the "Burst" Behavior.** The fact that users average 1.9 uses on their active days points to a specific, acute failure. The product/tech team should investigate the user journey on those high-intensity days. Are they stuck? Is the app crashing? Are they trying to park in a no-park zone?

Part 4: Hub Analysis — A Location Problem vs. A User Problem

After identifying the "who" (user segments), we investigated the "where" (hub allocation). The findings are definitive and clearly separate the problem into two distinct categories.

Finding 1: "Q-Park Leicester Square" is the #1 SFF Hotspot

Our query of SFF *events* by hub (based on where the rental *started*) shows Leicester Square is the #1 problem location by a wide margin.

Total SFF Events (Jul-Oct):

- **Q-Park Leicester Square: 3,055**
- NCP Vintry: 2,485
- Q-Park Queensway: 1,433
- *(...and so on)*

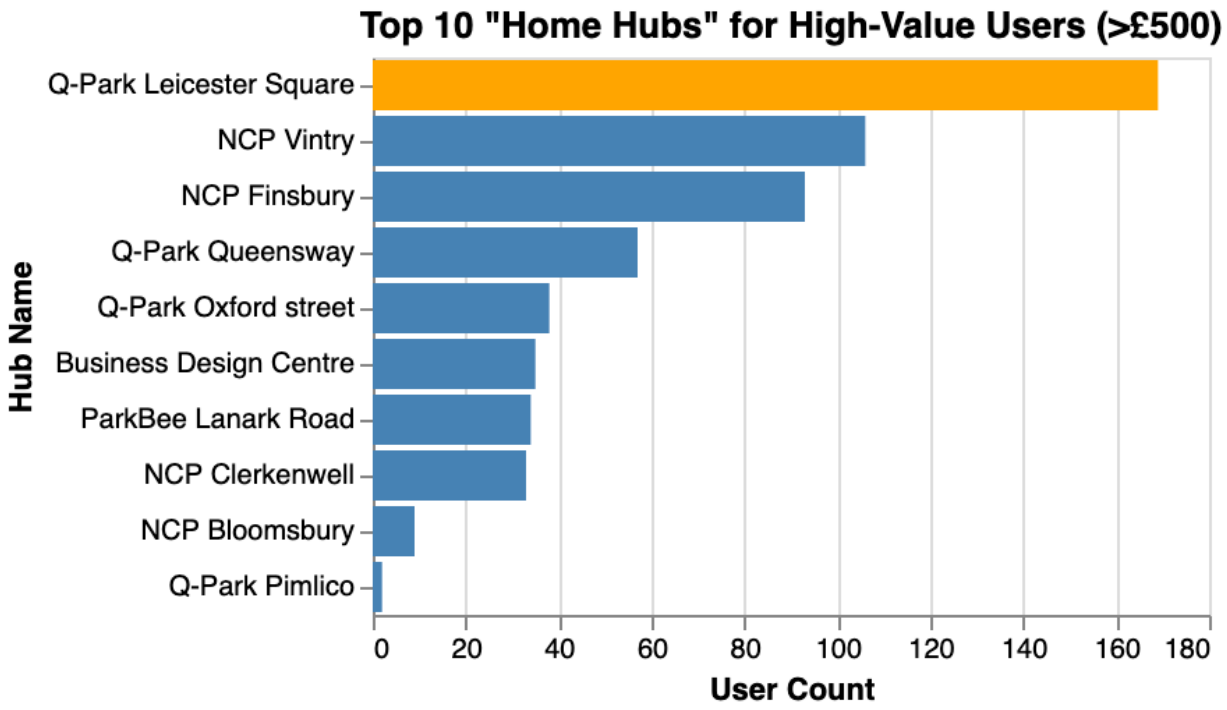
Finding 2: Leicester Square is a "High-Value," Not "High-Risk," Hub

We then analyzed the "home hub" of our user segments. The expectation was that our "High-Risk" users were causing the problem at Leicester Square. **The opposite is true.**

- **It's the #1 "Home Hub" for your Best Customers:** Leicester Square is the preferred hub for **169** of your "High-Value" (>£500) users, more than any other hub.
- **It Has a Low Concentration of "High-Risk" Users:** Only **14** "High-Risk" (SFF ratio > 25%) users are allocated to this hub. This results in a "High-Risk Concentration" of only **4.1%**, one of the lowest of your major hubs.
- **The "High-Risk" Users are Elsewhere:** The "High-Risk" users are concentrated at other hubs, such as `NCP Vintry` (17 users) and `Q-Park Queensway` (15 users).

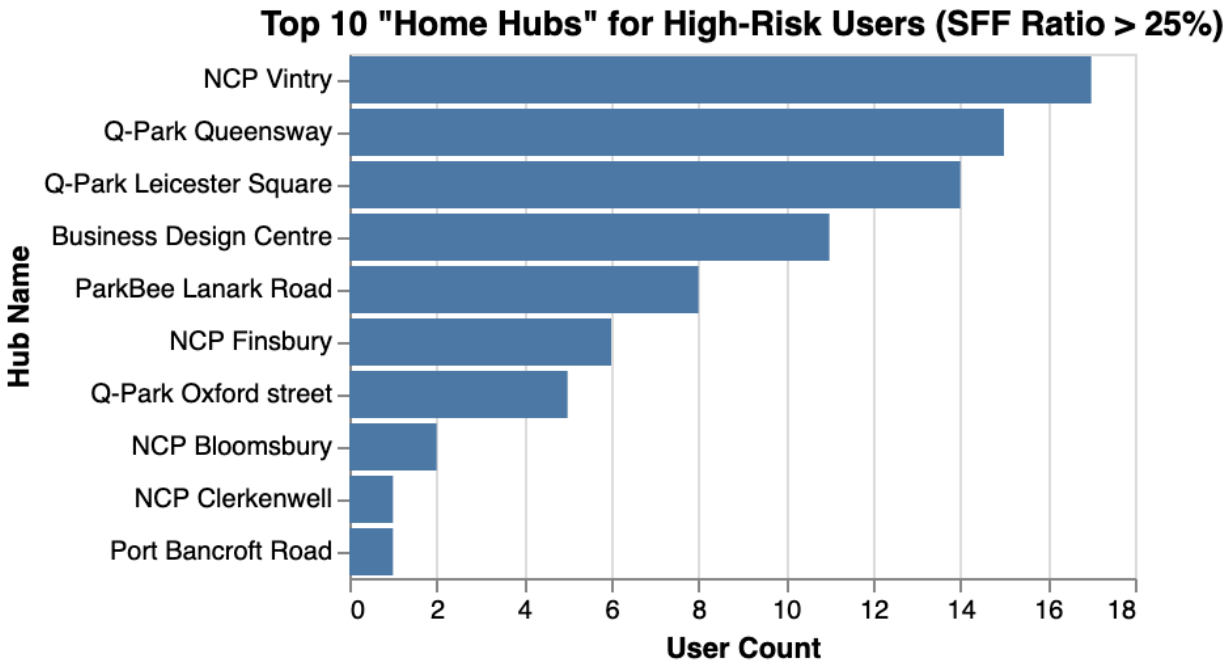
Conclusion: The problem at Leicester Square is **operational**, not behavioral. The 3,000+ SFF events are not from abusers. They are **support tickets from your most valuable customers** who are encountering a legitimate, recurring failure at that location.

Bar Chart - Top "Home Hubs" for High-Value Users

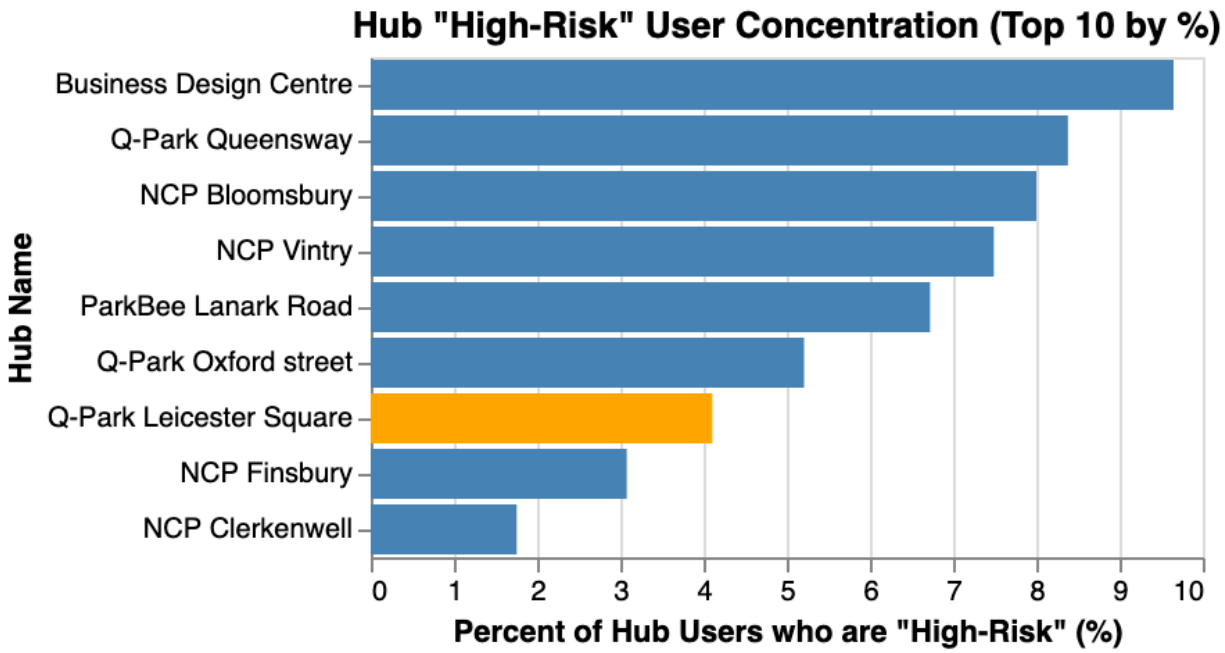


(This chart shows Leicester Square as the clear #1 hub for High-Value users.)

Bar Chart - Hub "High-Risk" User Concentration



Bar Chart - Hub "High-Risk" User Concentration (Top 10 by %)



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5. Actionable Recommendations (Revised)

1. **FIX LEICESTER SQUARE IMMEDIATELY.** This is an **operational fire**. The 3,055 SFF events are not abuse; they are support requests from your best customers. This is causing significant damage to your user experience. **Investigate immediately for:**
    - Poor GPS signal ("urban canyon" or "black hole" effect).
    - Confusing in-app instructions for starting or ending a ride.
    - Faulty hardware, beacons, or app/hub communication.
    - Physical accessibility issues (e.g., hard to exit).
2. **MANAGE "HIGH-RISK" USERS SEPARATELY.** The behavioral problem of users with high SFF ratios (>25%) is a separate issue. This group is concentrated at hubs like `NCP Vintry` and `Q-Park Queensway`. This is the group to target with policy, penalties, or automated warnings.
3. **INVESTIGATE "BURST" BEHAVIOR.** The fact that users (even legitimate ones) average 1.3-1.9 uses on their "active" SFF days points to a specific, acute failure. The product/tech team should investigate the user journey on these high-intensity days. Are they stuck? Is the app crashing? Are they trying to park in a no-park zone?