They're on Fire: Team Momentum in Round-Based First Person Shooter Esports

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Game types

Search and Destroy (SnD) in Call of Duty (COD)

- 2020-2022 Call of Duty League (CDL) matches (qualifiers and majors)
- 4v4.
- First to 6 round wins
- Teams swap sides (offense and defense) after every round

A Plant/Defuse in Valorant

- 2021 Valorant Champions Tour (VCT) matches (qualifiers and majors)
- 5v5
- First to 13 round wins
- One team plays offense in 12 consecutive rounds before swapping sides
- Must win by 2 cod_rounds

How does a team win a round of COD SnD / Valorant plant/defuse?

1. One team eliminates all members of the other team prior to a bomb plant.

2. The offensive team eliminates all members of the defensive team after a bomb plant.

3. The defensive team defuses the bomb after a bomb plant.

Often the defensive team will try to eliminate all o team members prior to making the defuse, but in some cases, they may try to "ninja" defuse.

4. The offensive team does not make a plant by the time the round timer ends.
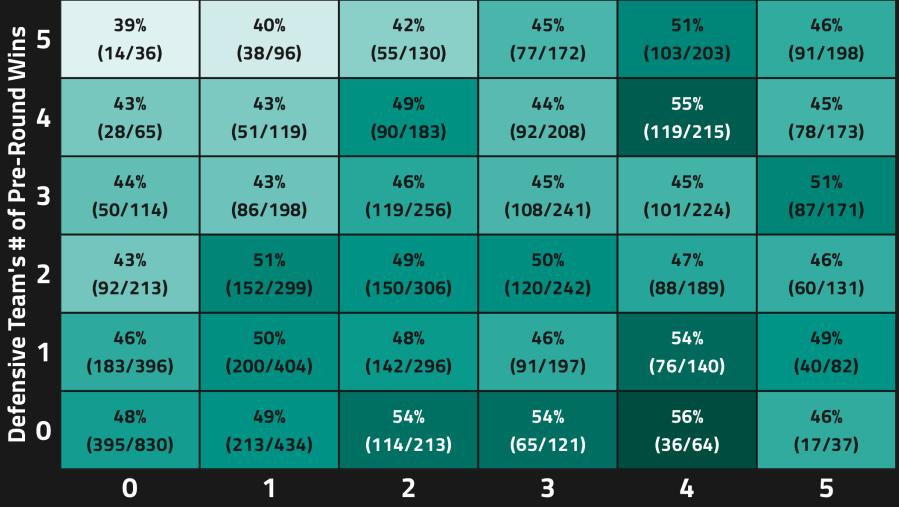
COD SnD data overview

- Total series: **830**

- Total rounds: **7,596**

- Offensive plant %: **52%**

- Offensive win %: **48%**

- Win % when planting: **65%**

- Win % when earning first blood: **72%**

Valorant data overview

- Total series: **5,242**

- Total rounds: **107,496**

- Offensive win %: **50.0%**

What are your chances of winning the next round (COD SnD)?

Offensive Round Win %

	0	**1**	**2**	**3**	**4**	**5**
5	39% (14/36)	40% (38/96)	42% (55/130)	45% (77/172)	51% (103/203)	46% (91/198)
4	43% (28/65)	43% (51/119)	49% (90/183)	44% (92/208)	55% (119/215)	45% (78/173)
3	44% (50/114)	43% (86/198)	46% (119/256)	45% (108/241)	45% (101/224)	51% (87/171)
2	43% (92/213)	51% (152/299)	49% (150/306)	50% (120/242)	47% (88/189)	46% (60/131)
1	46% (183/396)	50% (200/404)	48% (142/296)	46% (91/197)	54% (76/140)	49% (40/82)
0	48% (395/830)	49% (213/434)	54% (114/213)	54% (65/121)	56% (36/64)	46% (17/37)

Defensive Team's # of Pre-Round Wins (vertical axis)

Offensive Team's # of Pre-Round Wins (horizontal axis)

CDL SnD Major and Weekly matches, 2020 - present
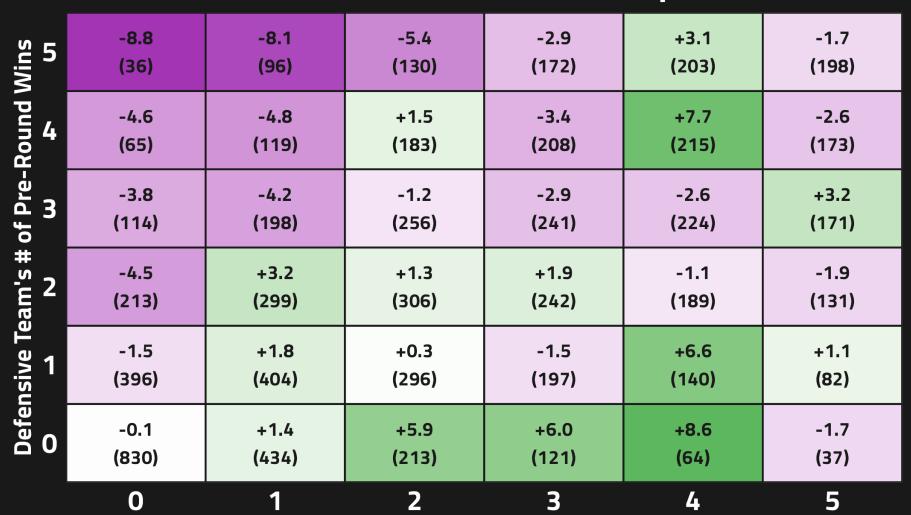
What are your chances of winning the next round (COD SnD)?

Offensive Round Win % Over Expected

Defensive Team's # of Pre-Round Wins						
5	-8.8 (36)	-8.1 (96)	-5.4 (130)	-2.9 (172)	+3.1 (203)	-1.7 (198)
4	-4.6 (65)	-4.8 (119)	+1.5 (183)	-3.4 (208)	+7.7 (215)	-2.6 (173)
3	-3.8 (114)	-4.2 (198)	-1.2 (256)	-2.9 (241)	-2.6 (224)	+3.2 (171)
2	-4.5 (213)	+3.2 (299)	+1.3 (306)	+1.9 (242)	-1.1 (189)	-1.9 (131)
1	-1.5 (396)	+1.8 (404)	+0.3 (296)	-1.5 (197)	+6.6 (140)	+1.1 (82)
0	-0.1 (830)	+1.4 (434)	+5.9 (213)	+6.0 (121)	+8.6 (64)	-1.7 (37)
	0	**1**	**2**	**3**	**4**	**5**

Offensive Team's # of Pre-Round Wins

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CDL SnD Major and Weekly matches, 2020 - present

7

What are your chances of winning the next round (Valorant)?

Offensive Round Win %

2021 VCT matches

8

What are your chances of winning the series (COD SnD)?

Offensive Series Win %

Defensive Team's # of Pre-Round Wins	0	1	2	3	4	5
5	0% (0/36)	4% (4/96)	5% (7/130)	13% (22/172)	21% (42/203)	46% (91/198)
4	8% (5/65)	6% (7/119)	24% (44/183)	24% (50/208)	57% (123/215)	72% (124/173)
3	9% (10/114)	26% (52/198)	34% (87/256)	51% (123/241)	64% (143/224)	89% (152/171)
2	26% (55/213)	38% (114/299)	54% (164/306)	59% (143/242)	85% (161/189)	92% (121/131)
1	35% (140/396)	54% (217/404)	60% (177/296)	76% (149/197)	89% (124/140)	99% (81/82)
0	52% (434/830)	59% (257/434)	76% (162/213)	79% (95/121)	100% (64/64)	95% (35/37)

Offensive Team's # of Pre-Round Wins

CALL·DUTY LEAGUE

CDL SnD Major and Weekly matches, 2020 - present

What are your chances of winning the series (COD SnD)?

Offensive Series Win % Over Expected

	0	1	2	3	4	5
5	-1.6 (36)	+1.0 (96)	-0.9 (130)	+0.3 (172)	-4.3 (203)	-4.0 (198)
4	+1.4 (65)	-5.1 (119)	+5.3 (183)	-7.2 (208)	+7.2 (215)	-3.3 (173)
3	-5.7 (114)	+3.6 (198)	-0.4 (256)	+1.0 (241)	-4.9 (224)	+1.4 (171)
2	+0.4 (213)	+1.8 (299)	+3.6 (306)	-6.5 (242)	+3.9 (189)	-1.4 (131)
1	-2.3 (396)	+3.7 (404)	-3.9 (296)	-1.7 (197)	-0.5 (140)	+1.9 (82)
0	+2.3 (830)	-3.1 (434)	+1.4 (213)	-7.0 (121)	+6.3 (64)	-3.8 (37)

Defensive Team's # of Pre-Round Wins (vertical axis)

Offensive Team's # of Pre-Round Wins (horizontal axis)

CDL SnD Major and Weekly matches, 2020 - present

What are your chances of winning the series (Valorant)?

Offensive Series Win %

Defensive Team's # of Pre-Round Wins (rows) vs **Offensive Team's # of Pre-Round Wins** (columns)

Def \ Off	0	1	2	3	4	5	6	7	8	9	10	11	12
12	0%	0%	0%	0%	0%	0%	0%	1%	3%	6%	12%	23%	
11	0%	0%	0%	1%	1%	2%	4%	6%	12%	20%	32%	48%	76%
10	0%	0%	3%	3%	5%	7%	11%	17%	26%	36%	51%	64%	88%
9	2%	2%	4%	8%	9%	14%	21%	30%	38%	50%	65%	77%	95%
8	3%	3%	7%	12%	16%	24%	30%	39%	47%	63%	75%	85%	97%
7	4%	7%	11%	16%	22%	31%	37%	49%	59%	73%	80%	90%	99%
6	9%	10%	12%	23%	32%	40%	52%	60%	69%	80%	86%	95%	100%
5	12%	13%	20%	33%	41%	49%	61%	71%	79%	85%	91%	97%	100%
4	16%	20%	28%	40%	49%	59%	71%	77%	82%	89%	94%	98%	100%
3	23%	29%	37%	49%	58%	67%	76%	82%	87%	93%	96%	98%	100%
2	32%	40%	47%	60%	70%	78%	87%	90%	93%	96%	98%	100%	100%
1	36%	54%	58%	73%	78%	86%	90%	93%	95%	96%	98%	99%	100%
0	50%	64%	66%	78%	83%	89%	90%	93%	95%	98%	98%	100%	100%

Defensive Team's # of Pre-Round Wins (vertical axis)

Offensive Team's # of Pre-Round Wins (horizontal axis)
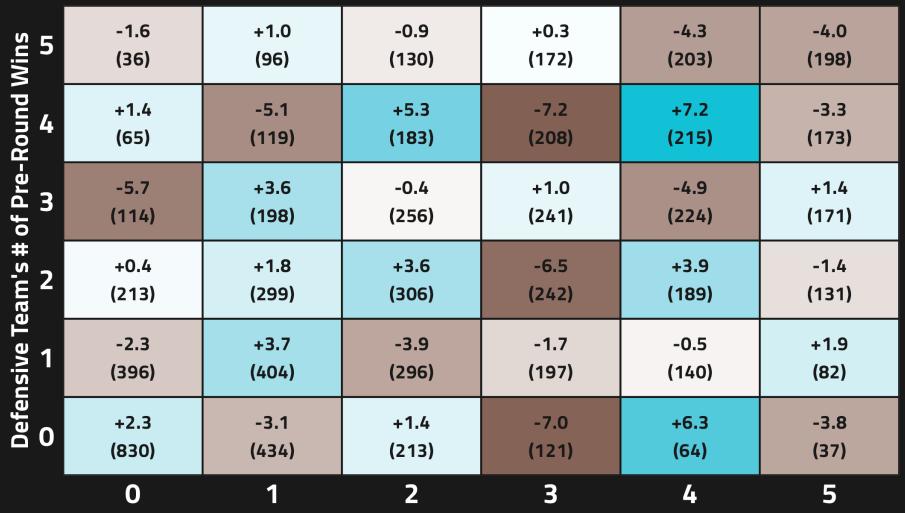
VALORANT CHAMPIONS TOUR

2021 VCT matches

What are your chances of winning the series (Valorant)?

Offensive Series Win % Over Expected

Defensive Team's # of Pre-Round Wins (rows) vs **Offensive Team's # of Pre-Round Wins** (columns)

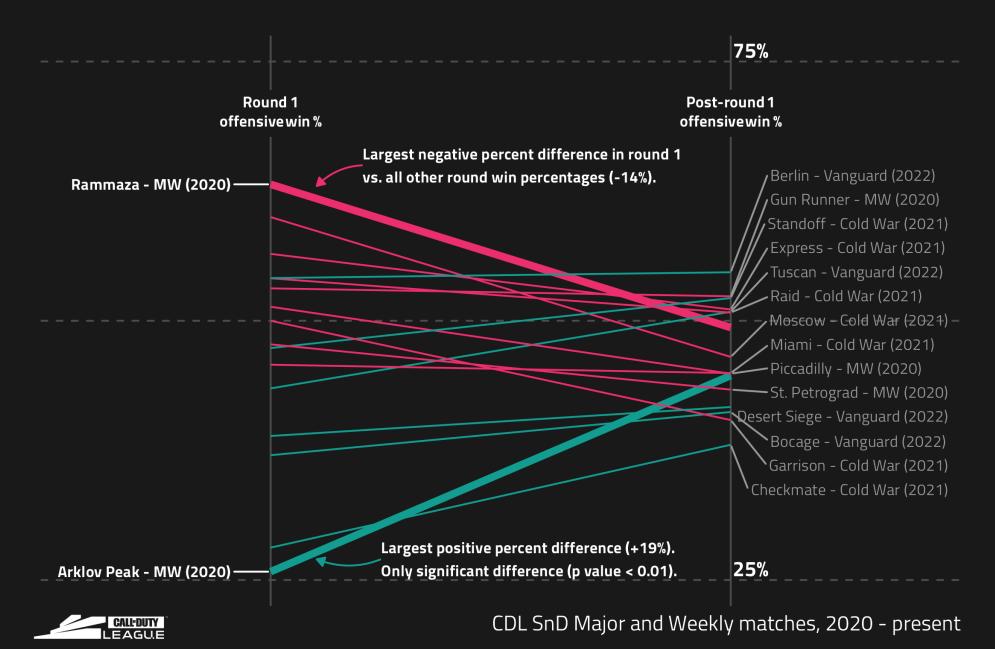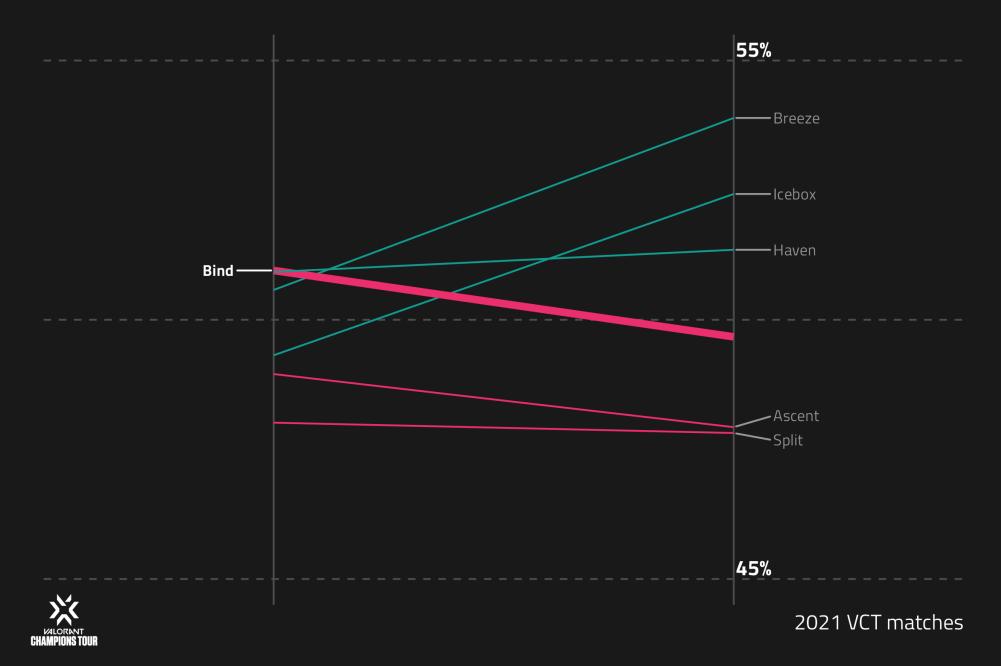| Def \ Off	0	1	2	3	4	5	6	7	8	9	10	11	12
12	-0.0	-0.0	-0.0	-0.1	-0.2	-0.4	-0.3	-0.8	-0.5	-0.2	-0.1	-2.4	
11	-0.1	-0.2	+0.0	+0.0	+0.4	-0.0	+0.7	-0.3	+1.3	+1.0	+0.5	-1.8	+0.7
10	-0.4	-0.2	+1.6	+1.3	+1.4	+1.8	+1.7	+2.1	+3.4	+1.6	+0.8	-5.2	+0.8
9	+0.7	+0.3	+1.4	+3.4	+2.0	+2.6	+3.6	+4.6	+1.8	-0.1	-0.7	-4.6	+0.9
8	+0.3	-0.9	+0.7	+3.2	+2.7	+4.4	+2.9	+1.4	-2.7	-1.1	-2.3	-4.2	-0.0
7	-0.6	-0.4	+0.1	+1.0	+1.3	+2.1	-1.6	-0.8	-3.6	-2.1	-5.6	-3.9	+0.5
6	+0.3	-2.0	-4.3	+0.0	+1.9	+0.5	+1.9	-1.1	-3.2	-3.1	-4.9	-1.9	+0.3
5	-1.0	-4.5	-3.7	+1.3	+0.5	-1.3	+0.7	-0.4	-2.1	-3.9	-3.1	-1.2	+0.4
4	-3.2	-4.9	-4.5	-0.6	-0.9	-0.5	+1.4	-1.5	-4.9	-3.2	-2.9	-0.9	+0.2
3	-3.5	-3.8	-4.0	-1.4	-1.1	-1.7	-1.0	-2.5	-3.5	-2.8	-1.7	-1.0	+0.1
2	-1.7	-1.9	-3.3	+1.1	+2.2	+2.3	+3.3	+0.3	-0.9	-0.7	-0.8	-0.0	+0.0
1	-5.5	+3.7	-0.5	+5.9	+3.0	+3.9	+2.4	+0.3	-1.4	-2.0	-1.8	-0.4	+0.0
0	+0.1	+5.9	-0.1	+4.4	+1.8	+2.3	-1.5	-2.5	-2.8	-1.1	-1.2	+0.1	+0.0

2021 VCT matches

What are your chances of winning the series (Valorant)?

Are offensive win %'s different in round 1 (COD SnD)?

75%

Round 1
offensive win %

Post-round 1
offensive win %

Largest negative percent difference in round 1
vs. all other round win percentages (-14%).

Rammaza - MW (2020)

Berlin - Vanguard (2022)
Gun Runner - MW (2020)
Standoff - Cold War (2021)
Express - Cold War (2021)
Tuscan - Vanguard (2022)
Raid - Cold War (2021)
Moscow - Cold War (2021)
Miami - Cold War (2021)
Piccadilly - MW (2020)
St. Petrograd - MW (2020)
Desert Siege - Vanguard (2022)
Bocage - Vanguard (2022)
Garrison - Cold War (2021)
Checkmate - Cold War (2021)

Arklov Peak - MW (2020)

Largest positive percent difference (+19%).
Only significant difference (p value < 0.01).

25%

CDL SnD Major and Weekly matches, 2020 - present

14

Are offensive win %'s different in round 1 (Valorant)?

55%

Breeze

Icebox

Haven

Bind

Ascent
Split

45%

2021 VCT matches

15

What are the most common series winning states (COD SnD)?

Series outcome %

	6-0	6-1	6-2	6-3	6-4	6-5
Actual	4.7% (39)	11.8% (98)	16.3% (135)	21.9% (182)	21.4% (178)	23.9% (198)
Expected	3.1%	9.4%	16.4%	21.9%	24.6%	24.6%
Diff.	+1.6%	+2.4%	-0.1%	+0.1%	-3.2%	-0.8%

CDL SnD Major and Weekly matches, 2020 - present

16

What are the most common series winning states (Valorant)?

Series outcome %

	13-1	13-2	13-3	13-4	13-5	13-6	13-7	13-8	13-9	13-10	13-11	12-12
Actual	3.5% (181)	5.5% (286)	6.6% (344)	7.7% (406)	8.5% (444)	9.5% (500)	10.1% (532)	9.6% (502)	9.8% (513)	9.7% (511)	10.2% (537)	9.3% (486)
Expected	0.2%	0.6%	1.4%	2.8%	4.7%	7.1%	9.6%	12.0%	14.0%	15.4%	16.1%	16.1%
Diff.	+3.3%	+4.9%	+5.2%	+5.0%	+3.7%	+2.5%	+0.5%	-2.4%	-4.2%	-5.7%	-5.9%	-6.8%

2021 VCT matches

17

When do back-to-back round wins occur (COD SnD)?

Back-to-back round win %

# of cod_rounds in Complete Series	Round 2	Round 3	Round 4	Round 5	Round 6	Round 7	Round 8	Round 9	Round 10	Round 11
11	23% (92)	24% (94)	21% (84)	23% (91)	24% (95)	24% (94)	20% (81)	23% (92)	21% (84)	23% (91)
10	22% (80)	22% (79)	20% (70)	23% (82)	23% (82)	22% (79)	22% (77)	22% (79)	28% (101)	
9	23% (84)	23% (84)	21% (75)	23% (82)	24% (86)	23% (83)	23% (83)	32% (118)		
8	24% (65)	23% (62)	26% (70)	27% (73)	31% (83)	25% (68)	33% (90)			
7	34% (66)	34% (67)	35% (69)	33% (65)	31% (61)	40% (79)				

Back-to-back wins occur most frequently in the last round.

CDL SnD Major and Weekly matches, 2020 - present

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18

Is there evidence for the "hot hand"?

Round win % after a streak of 3 round wins:

- Expected: **38.4%**
- Actual: **54%** (621 / 1150)

Is planting at one site better than the other?

Plant site	%
Primary	60.9%
Secondary	39.1%

Plant site	Win %
Primary	47.4%
Secondary	48.5%

Winning a next game given the series state