

Zone Transition Times

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About Sam

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Carnegie Mellon University Ice and Roller Hockey Teams

Entering job market in 2014-15...

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Quantifying Defensive Ability – Past

Count-based measures from NHL real-time scoring system

1. Hits
2. Blocked shots
3. Faceoffs won/lost
4. Penalties in minutes (PIMs)
5. Plus/minus
6. Shorthanded time on ice (per game)

Not predictive of future (positive) outcomes!

Quantifying Defensive Ability – Present

Count-based measures from NHL real-time scoring system

1. Shot attempt-based statistics:
Corsi Against, Fenwick Against
2. Shot- or goal-based statistics:
Shots Against, Goals Against
3. Rates:
CorsiAgn60, FenwickAgn60, ShotsAgn60, GoalsAgn60
4. Player Usage:
Offensive zone start percentage

Predictive of future (positive) outcomes!

What else can we extract from the RTSS data?

What is this "RTSS", and what's in it?

VISITOR



ANAHEIM DUCKS
Game 1 Away Game 1

Play By Play

Thursday, October 9, 2014
Attendance 18,633 at CONSOL Energy
Center
Start 7:10 EDT; End 9:45 EDT
Game 0007
Final

HOME



PITTSBURGH PENGUINS
Game 1 Home Game 1

#	PerStr	Time: Elapsed Game	Event	Description	ANA On Ice	PIT On Ice
1	1	0:00 20:00	PSTR	Period Start- Local time: 7:10 EDT	15 10 19 4 6 36 C R L D D G	87 72 14 10 58 29 C R L D D G
2	1	0:00 20:00	FAC	ANA won Neu. Zone - ANA #15 GETZLAF vs PIT #87 CROSBY	15 10 19 4 6 36 C R L D D G	87 72 14 10 58 29 C R L D D G
3	1	0:17 19:43	BLOCK	PIT #72 HORNQVIST BLOCKED BY ANA #6 LOVEJOY, Wrist, Def. Zone	15 10 19 4 6 36 C R L D D G	87 72 14 10 58 29 C R L D D G
4	1	0:32 19:28	SHOT	PIT ONGOAL - #87 CROSBY, Snap, Off. Zone, 41 ft.	15 33 19 4 47 36 C R L D D G	87 72 14 10 58 29 C R L D D G
5	1	0:58 19:02	STOP	OFFSIDE	7 17 33 3 47 36 C C R D D G	16 71 9 3 7 29 C C L D D G
6	1	0:58 19:02	FAC	ANA won Neu. Zone - ANA #17 KESLER vs PIT #16 SUTTER	7 17 33 23 47 36 C C R D D G	16 71 9 3 7 29 C C L D D G
7	1	1:16 18:44	SHOT	ANA ONGOAL - #33 SILFVERBERG, Wrist, Off. Zone, 22 ft.	7 17 33 23 47 36 C C R D D G	16 71 9 3 7 29 C C L D D G
8	1	2:03 17:57	STOP	PUCK IN BENCHES	12 16 67 3 45 36 R R R D D G	57 23 17 4 47 29 C R L D D G
9	1	2:03 17:57	FAC	ANA won Neu. Zone - ANA #44 THOMPSON vs PIT #87 CROSBY	44 18 39 3 45 36 C R L D D G	87 72 14 10 58 29 C R L D D G
10	1	2:48 17:12	TAKE	ANA TAKEAWAY - #10 PERRY, Def. Zone	15 10 19 4 6 36 C R L D D G	38 87 72 10 58 29 C C R D D G

Look! Zone information!

Story Time

April 8th, 2014: Sam gives a lecture on Markov chains

- ▶ Markov chains examine the **transition between “states”**
- ▶ “State”: One possible outcome of a random process

Simple (boring) Markov chain:

- ▶ Process: Sequence of coin flips
- ▶ States: Heads, Tails
- ▶ Ex: H, T, T, H, H, H, T, H, T, H, T, T, T, T, H

Story Time

April 9th, 2014: Sam observes this sequence at the DET @ PIT game

1. Detroit attempts a shot
2. Rob Scuderi clears puck from crease/slot to corner
3. Detroit gains possession
4. Go back to step 1

Describe the **transition of puck location** in hockey as a Markov chain?

- ▶ Process: What zone is the puck in?
- ▶ States: Offensive, Neutral, Defensive
- ▶ Ex: O, O, O, N, D, D, N, D, D, D, D, O, O, N, O, O, O, O, O, N, D

Zone Transition Times (ZTT)

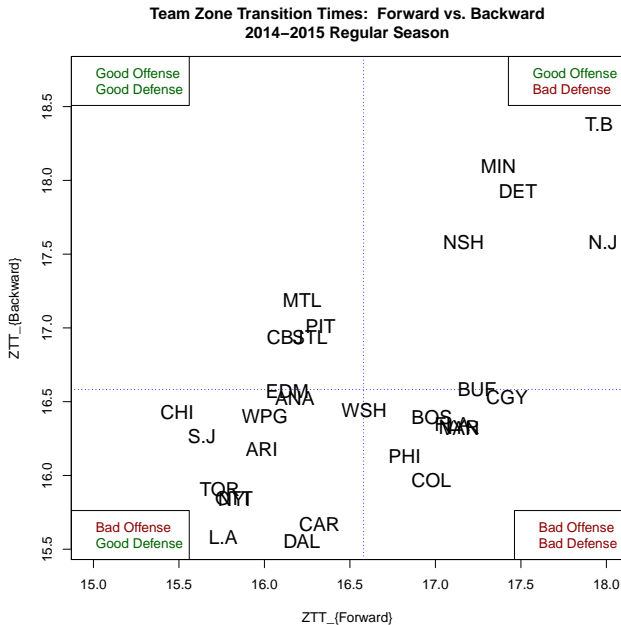
ZTT: Time it takes to move the puck from one zone to another

ZTT_{DO} = Time it takes to move the puck from the D zone to the O zone
 \approx “How quickly can we get the puck out of our zone?”

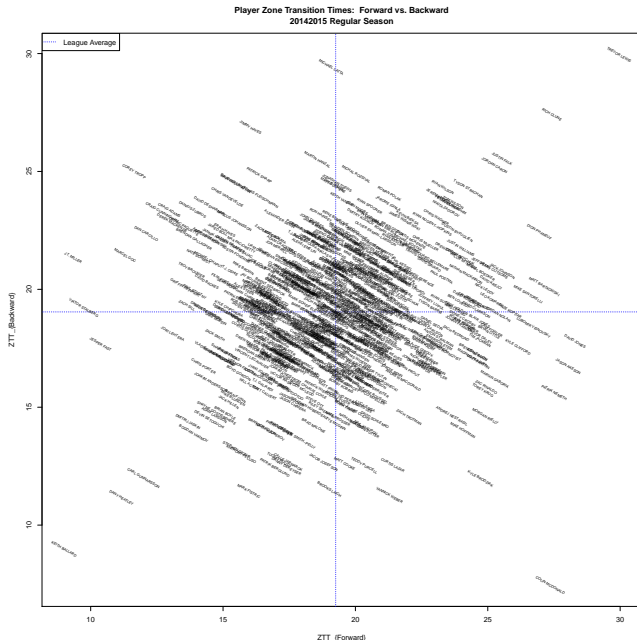
ZTT_{OD} = Time spent in O zone before puck is moved to D zone
 \approx “For how long can we keep the puck in the offensive zone?”

What's special about this: Can be estimated directly from RTSS data!

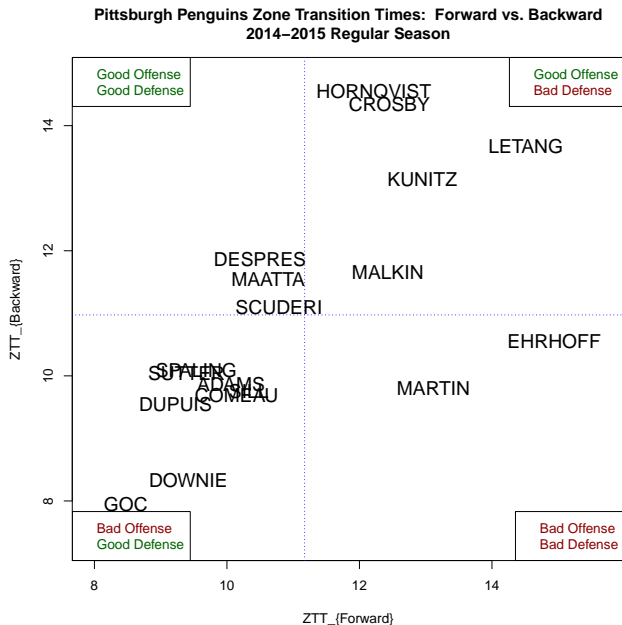
ZTT Results: Teams, 2014-15 Season



ZTT Results: Players, 2014-15 Season

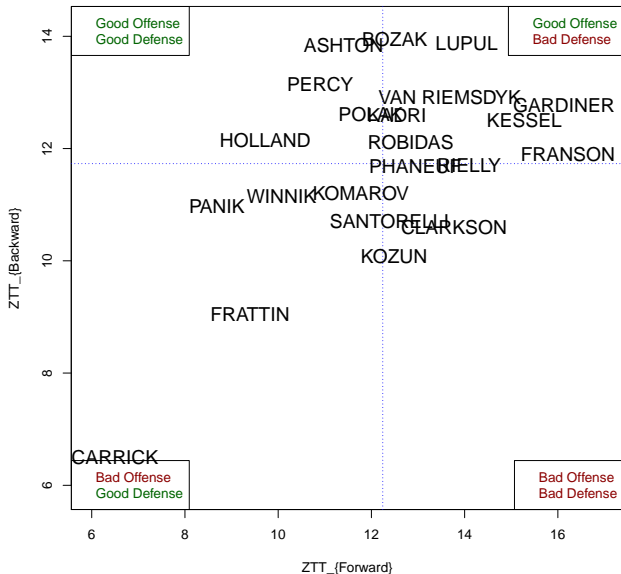


ZTT Results: Pittsburgh Players, 2014-15 Season



ZTT Results: Toronto Players, 2014-15 Season

Toronto Maple Leafs Players Zone Transition Times: Forward vs. Backward
2014-2015 Regular Season



Why isn't this on www.war-on-ice.com yet?

Because it's painfully slow

And because we've been organizing this workshop thing

And because I'm writing this dissertation thing

But we're working on it

Questions?

Contact me!

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Thanks!