



EVM Visualization: The Technomics Radar Tool

Tyler Staffin – Technomics, Inc.



Tyler Staffin

Tyler Staffin is a recent Mathematics (B.S.) graduate of Penn State University. Since then, he has been working at Technomics in Arlington, Virginia as a Cost Analysis Associate. He has been introduced to the Cost Analysis community through the lens of EVM, and looks forward to being involved with ICEAA and further research efforts in the near future.

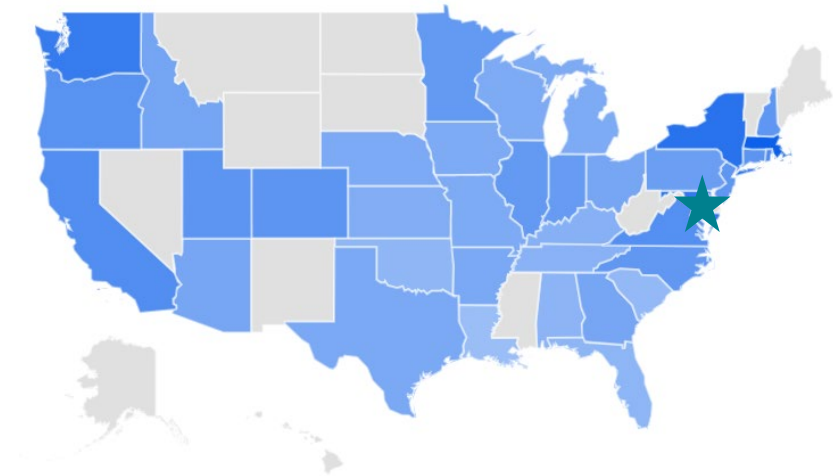
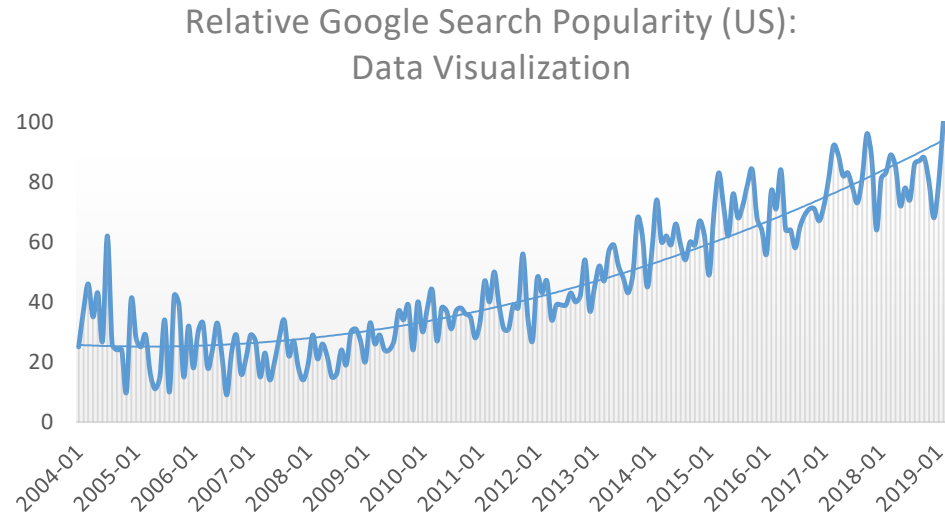


Dr. Brian Flynn

Brian Flynn supports national security efforts at Technomics' Arlington, Virginia, headquarters. His areas of expertise include capability portfolio analysis and AoAs, weapon system and software cost estimating – including the cloud, EVM, econometric modeling, and corporate financial health. Dr. Flynn has undying pride in his service as a Marine.

Data Visualization is the presentation of data in a pictorial or graphical format. It enables decision makers to see analytics presented visually, so they can grasp difficult concepts or identify new patterns...

Data Visualization in Context



Current Challenges in EVMS

**Simplistic
Perspective**

**Moving
Target**

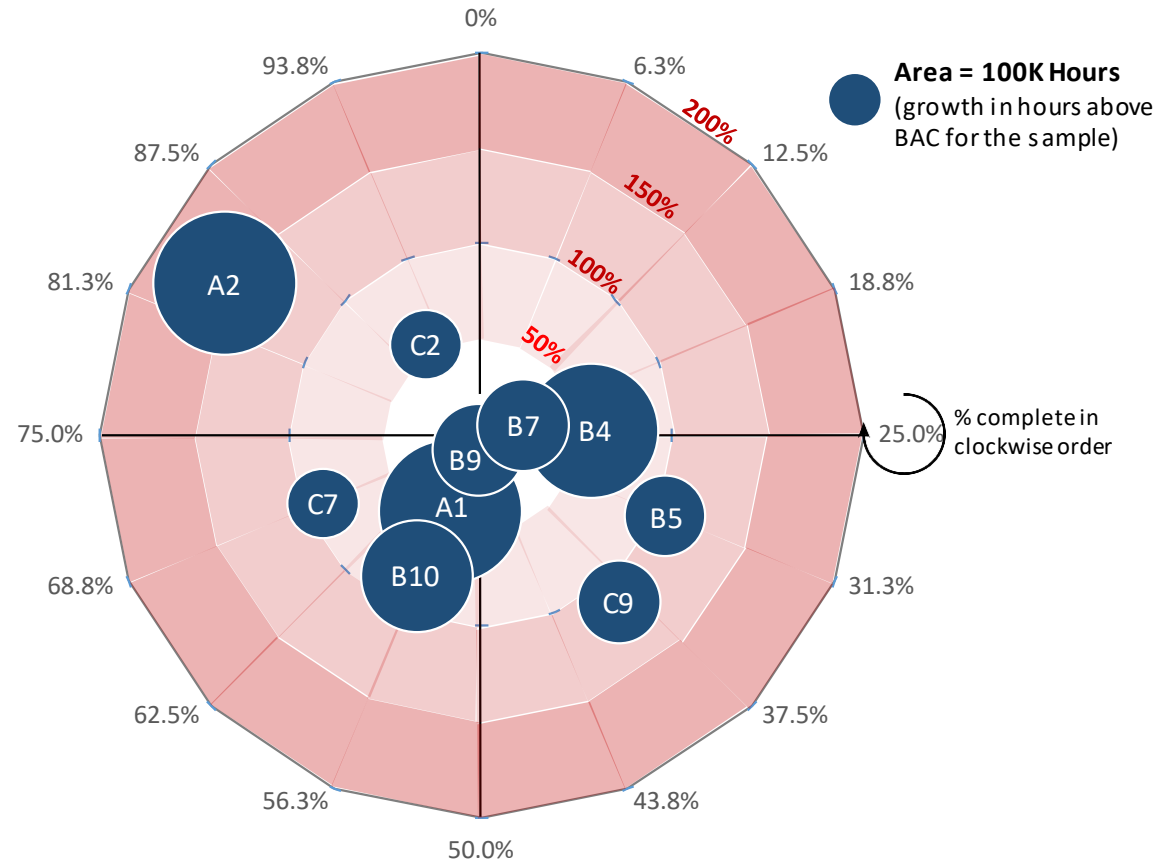
**Poor Data
Visualization**

**Inadequate
Governance
Structure**

**Overwhelming
Detail**

The Technomics Radar Tool – Original Vision

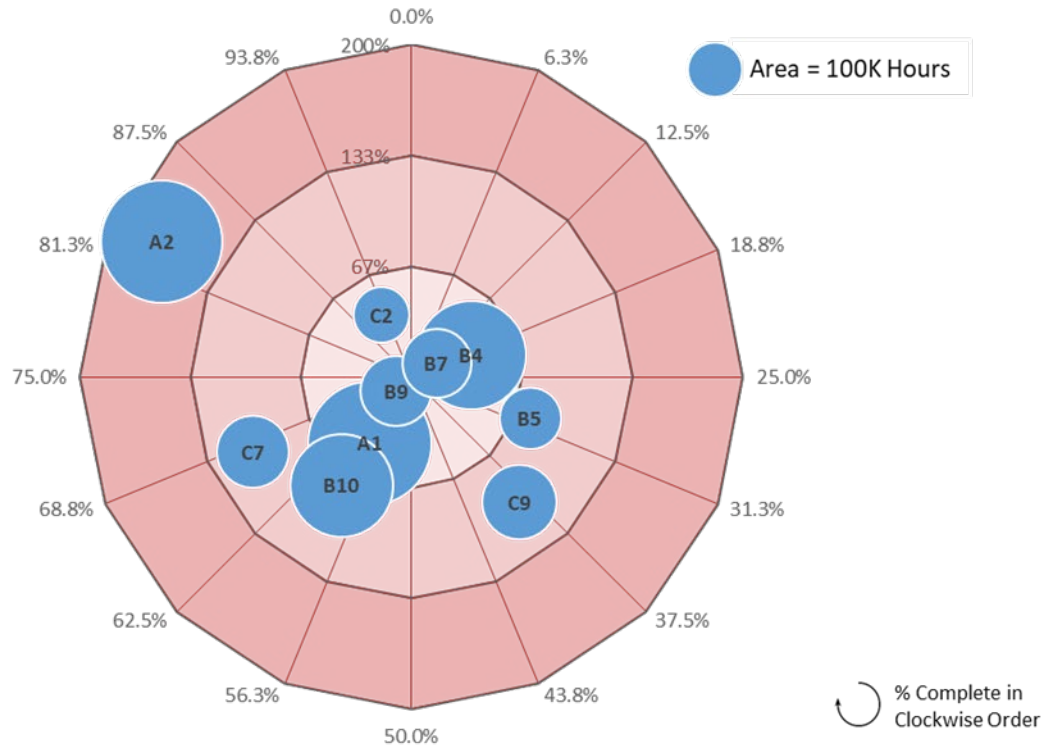
Projected Growth in Hours at Completion Above BAC:
Numerical (bubble sizes) and Percent (growth rings)



The Technomics Radar Tool – Enhanced

**Projected Growth in Hours at Completion Above BAC:
Numerical (bubble sizes) and Percent (growth rings)**

Top 10



Plot Top 10 Elements

Plot Top 15 Elements

Plot Top 25 Elements

Select Date:

Mar-19

Set Bound: 100%

Plot Options:

Bubble Size: 60
Minimum: 0%
Maximum: 200%

Update Plot Options

Center Data Labels

Copy Plot to Clipboard

Hypothetical Dataset: Program Z Structured EVMS

$$z = \sum_{p=1}^k a_p + \sum_{q=1}^m b_q + \sum_{r=1}^n c_r$$

$$CPI = \frac{BCWP}{ACWP}$$

$$PC = \frac{BCWP}{BAC}$$

$$SPI = \frac{BCWP}{BCWS}$$

Procedure Overview

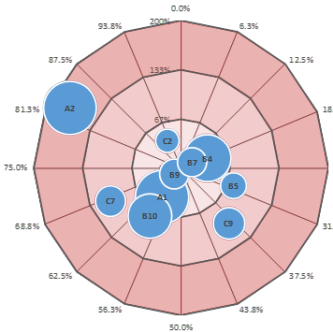
Receive EVM Data



Process EVM Data



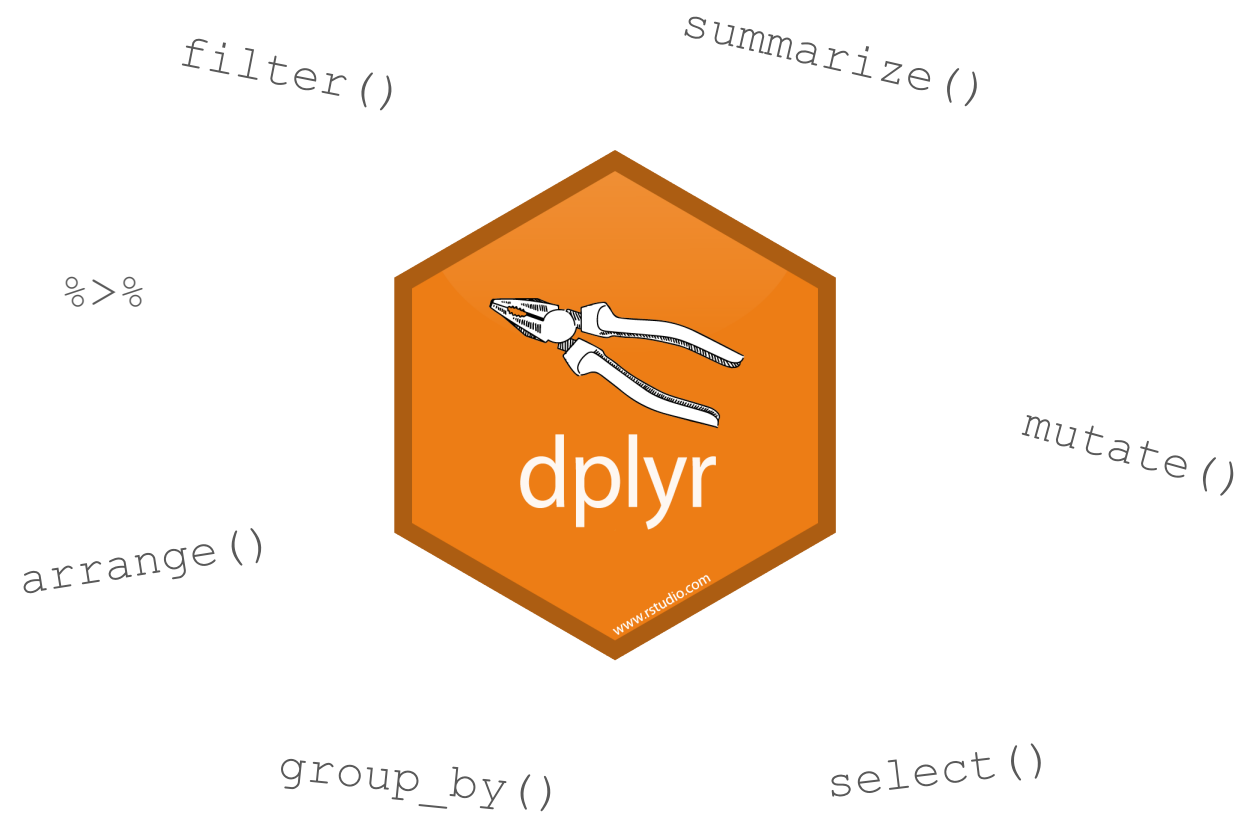
Visualize EVM Data



Inform Decision-Makers



EVM Data Processing via R



TRT Mechanics: Raw Data Entry

Raw Data Snapshot

Report Month	Contract	Product	Account	Task	Sub-Task	BAC	BCWS	BCWP	ACWP
Feb-19	Phase III	Product B	B10	B10A	B10A9	0.00	0	0	20.73
Feb-19	Phase III	Product B	B10	B10A	B10A10	0.00	0	0	305.4221
Feb-19	Phase III	Product B	B10	B10A	B10A11	215.25	258.2958	258.2958	1571.653
Feb-19	Phase III	Product B	B10	B10A	B10A12	0.00	0	0	61.44586
Feb-19	Phase III	Product B	B10	B10A	B10A13	42.52	51.0277	0	7.973078
Feb-19	Phase III	Product B	B10	B10B	B10B1	3357.57	4029.084	3968.435	7011.95
Feb-19	Phase III	Product B	B10	B10B	B10B2	9818.48	10617.01	6242.92	6091.219
Feb-19	Phase III	Product B	B10	B10B	B10B3	292.33	0	0	4.464924
Feb-19	Phase III	Product B	B10	B10B	B10B4	1087.00	1182.142	1292.17	3454.894
Feb-19	Phase III	Product B	B10	B10B	B10B5	4267.40	1781.717	1495.75	1784.375
Feb-19	Phase III	Product B	B10	B10B	B10B6	0.00	0	0	24.7697
Feb-19	Phase III	Product B	B10	B10B	B10B7	4363.93	5096.424	4409.697	5704.578
Feb-19	Phase III	Product B	B10	B10B	B10B8	8702.23	2504.567	2640.747	1971.37
Feb-19	Phase III	Product B	B10	B10B	B10B9	1203.03	1325.636	1336.267	1285.898
Feb-19	Phase III	Product B	B10	B10B	B10B10	19278.85	21138.25	20436.96	43088.22
Feb-19	Phase III	Product B	B10	B10B	B10B11	30964.17	10983.99	4018.4	5377.15
Feb-19	Phase III	Product B	B10	B10B	B10B12	0.00	0	0	8.717232
Feb-19	Phase III	Product B	B10	B10C	B10C1	434.07	313.5865	171.1342	1375.941



TRT Mechanics: Data Processing

Top 25 Worst Performing Accounts by EAC CV

Rank	Account	BAC	BCWP	ACWP	BCWS	Work Remaining	Cum. CPI	Cum. SPI	CPI x SPI	EAC	EAC CV	% Complete
1	A1	1,063,726	626,120	909,311	655,356	437,606	0.69	0.96	0.66	1,574,519	-510,793	59%
2	A2	291,112	241,061	598,273	372,088	50,050	0.40	0.65	0.26	790,007	-498,895	83%
14	A3	75,372	58,981	118,036	77,301	16,390	0.50	0.76	0.38	161,025	-85,654	78%
17	A4	171,889	104,353	125,389	107,250	67,536	0.83	0.97	0.81	208,791	-36,902	61%
23	A5	131,320	72,625	50,764	88,651	58,695	1.43	0.82	1.17	100,844	30,476	55%
15	B1	406,228	177,884	189,799	189,882	228,344	0.94	0.94	0.88	449,871	-43,643	44%
13	B2	354,972	148,700	179,668	156,837	206,272	0.83	0.95	0.78	442,538	-87,566	42%
22	B3	106,769	47,015	44,062	48,331	59,754	1.07	0.97	1.04	101,628	5,141	44%
3	B4	1,031,623	204,544	274,206	212,951	827,079	0.75	0.96	0.72	1,428,536	-396,913	20%
9	B5	167,014	50,775	66,616	75,893	116,239	0.76	0.67	0.51	294,559	-127,545	30%
24	B6	1,179,602	162,424	148,520	169,348	1,017,178	1.09	0.96	1.05	1,118,271	61,331	14%
8	B7	931,770	167,441	179,368	186,096	764,329	0.93	0.90	0.84	1,089,366	-157,596	18%
25	B8	566,508	221,112	173,225	223,518	345,395	1.28	0.99	1.26	446,761	119,747	39%
7	B9	1,282,344	799,911	849,456	934,847	482,433	0.94	0.86	0.81	1,448,191	-165,848	62%
4	B10	449,517	265,533	419,555	349,246	183,984	0.63	0.76	0.48	801,906	-352,389	59%
12	C1	196,131	142,402	195,569	172,975	53,728	0.73	0.82	0.60	285,199	-89,068	73%
10	C2	256,760	237,950	332,545	258,638	18,810	0.72	0.92	0.66	361,119	-104,359	93%
19	C3	125,584	109,100	123,453	110,063	16,483	0.88	0.99	0.88	142,269	-16,686	87%
18	C4	396,099	253,811	287,210	207,455	142,289	0.88	1.22	1.08	418,816	-22,716	64%
11	C5	285,501	120,245	165,671	110,994	165,257	0.73	1.08	0.79	375,844	-90,342	42%
20	C6	106,775	64,916	68,786	67,985	41,859	0.94	0.95	0.90	115,238	-8,463	61%
6	C7	161,915	109,950	217,312	124,842	51,965	0.51	0.88	0.45	333,930	-172,016	68%
16	C8	83,246	16,485	19,453	22,108	66,761	0.85	0.75	0.63	125,108	-41,862	20%
5	C9	186,159	72,116	115,172	102,125	114,043	0.63	0.71	0.44	373,094	-186,935	39%
21	C10	531,391	293,797	276,155	342,920	237,594	1.06	0.86	0.91	536,823	-5,432	55%

Report Month

Mar-19

TRT Mechanics: Plot Formatting

Plot Control Panel

Rank	Account	% Complete	EAC	EAC CV	Relative Growth (Nominal Hours)	Bubble Diameter	Θ (Includes π Radians Rotation)	Cost Growth Factor (CGF)	X-Coordinate (CGFcos Θ)	Y-Coordinate (CGFsin Θ)
1	A1	58.9%	1,574,519	510,793	5.11	0.565	-2.128	0.480	-0.254	-0.408
2	A2	82.8%	790,007	498,895	4.99	0.558	-3.632	1.714	-1.512	0.807
3	B4	19.8%	1,428,536	396,913	3.97	0.498	0.325	0.385	0.365	0.123
4	B10	59.1%	801,906	352,389	3.52	0.469	-2.141	0.784	-0.423	-0.660
5	C9	38.7%	373,094	186,935	1.87	0.342	-0.863	1.004	0.653	-0.763
6	C7	67.9%	333,930	172,016	1.72	0.328	-2.696	1.062	-0.959	-0.458
7	B9	62.4%	1,448,191	165,848	1.66	0.322	-2.349	0.129	-0.091	-0.092
8	B7	18.0%	1,089,366	157,596	1.58	0.314	0.442	0.169	0.153	0.072
9	B5	30.4%	294,559	127,545	1.28	0.282	-0.339	0.764	0.720	-0.254
10	C2	92.7%	361,119	104,359	1.04	0.255	-4.252	0.406	-0.181	0.364
Legend:	Area = 100K Hours		Legend Size:	100,000	1.00	0.25	Legend Coordinates:		1.84	1.84

TRT Mechanics: Plot Formatting (cont.)

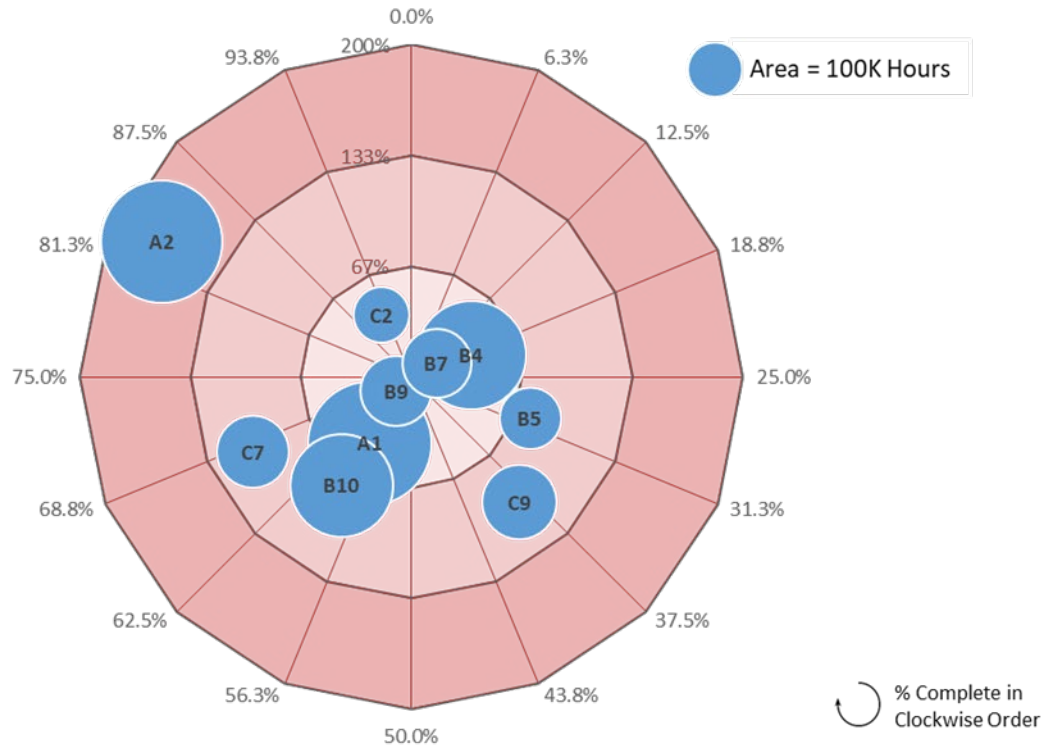
Styling Control Panel

Background 1	Background 2	Background 3	Border 1	Border 2	Border 3	Border 4
1.666666667	1	0.333333333	0	0.666666667	1.333333333	2
1.666666667	1	0.333333333	0	0.666666667	1.333333333	2
1.666666667	1	0.333333333	0	0.666666667	1.333333333	2
1.666666667	1	0.333333333	0	0.666666667	1.333333333	2
1.666666667	1	0.333333333	0	0.666666667	1.333333333	2
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1.666666667	1	0.333333333	0	0.666666667	1.333333333	2
1.666666667	1	0.333333333	0	0.666666667	1.333333333	2

TRT Mechanics: The Radar Plot

Projected Growth in Hours at Completion Above BAC:
Numerical (bubble sizes) and Percent (growth rings)

Top 10



Plot Top 10 Elements

Plot Top 15 Elements

Plot Top 25 Elements

Select Date:

Mar-19

Set Bound: 100%

Plot Options:

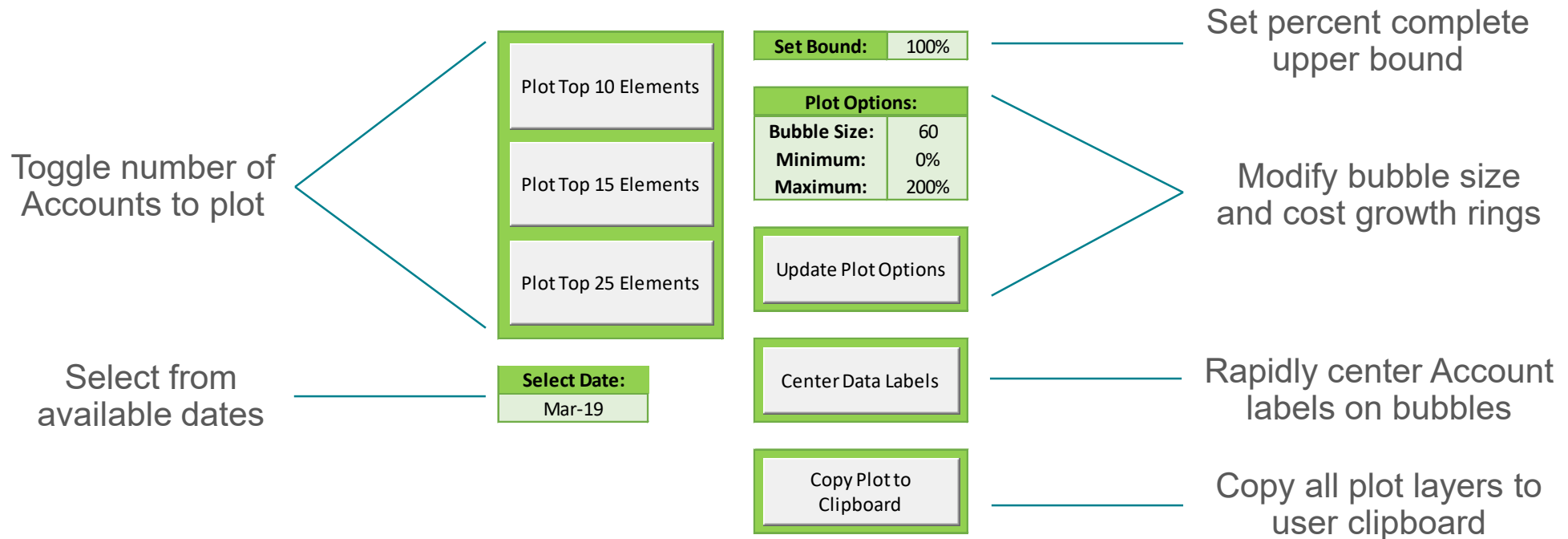
Bubble Size: 60
Minimum: 0%
Maximum: 200%

Update Plot Options

Center Data Labels

Copy Plot to
Clipboard

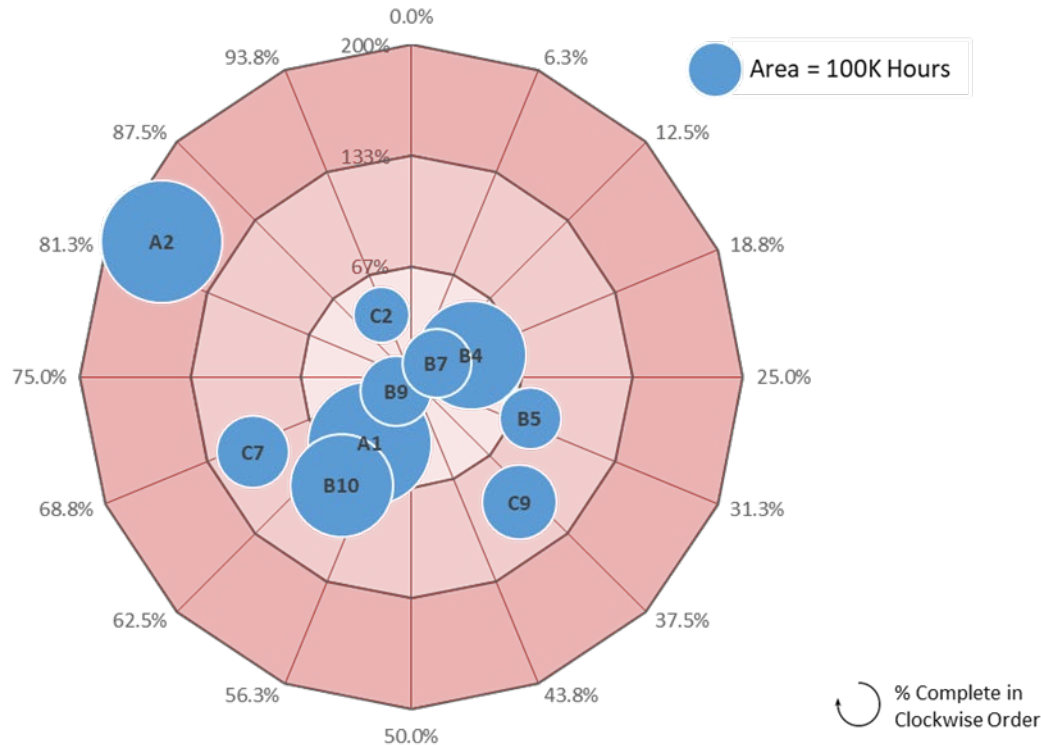
TRT Mechanics: The Radar Plot (cont.)



TRT Mechanics: Element View

**Projected Growth in Hours at Completion Above BAC:
Numerical (bubble sizes) and Percent (growth rings)**

Top 10



Plot Top 10 Elements

Plot Top 15 Elements

Plot Top 25 Elements

Select Date:

Mar-19

Set Bound: 100%

Plot Options:

Bubble Size: 60

Minimum: 0%

Maximum: 200%

Update Plot Options

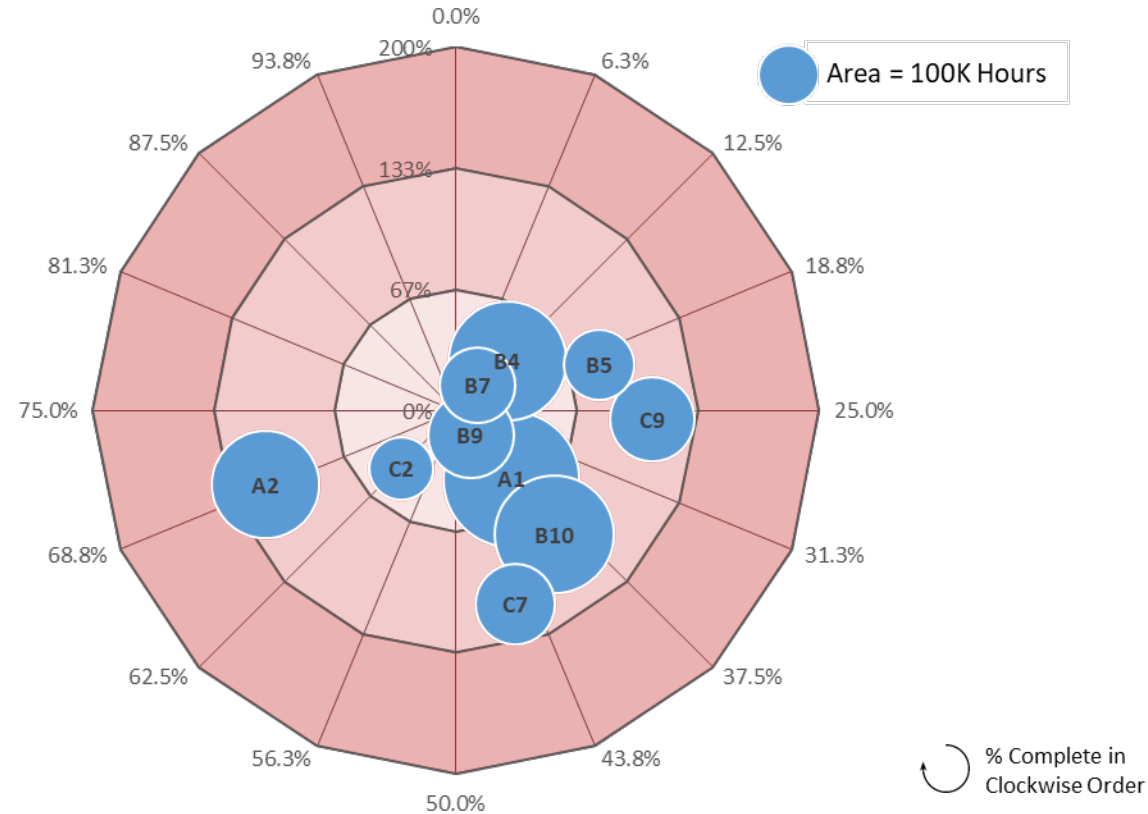
Center Data Labels

Copy Plot to Clipboard

Element View: 10 Accounts

**Projected Growth in Hours at Completion Above BAC:
Numerical (bubble sizes) and Percent (growth rings)**

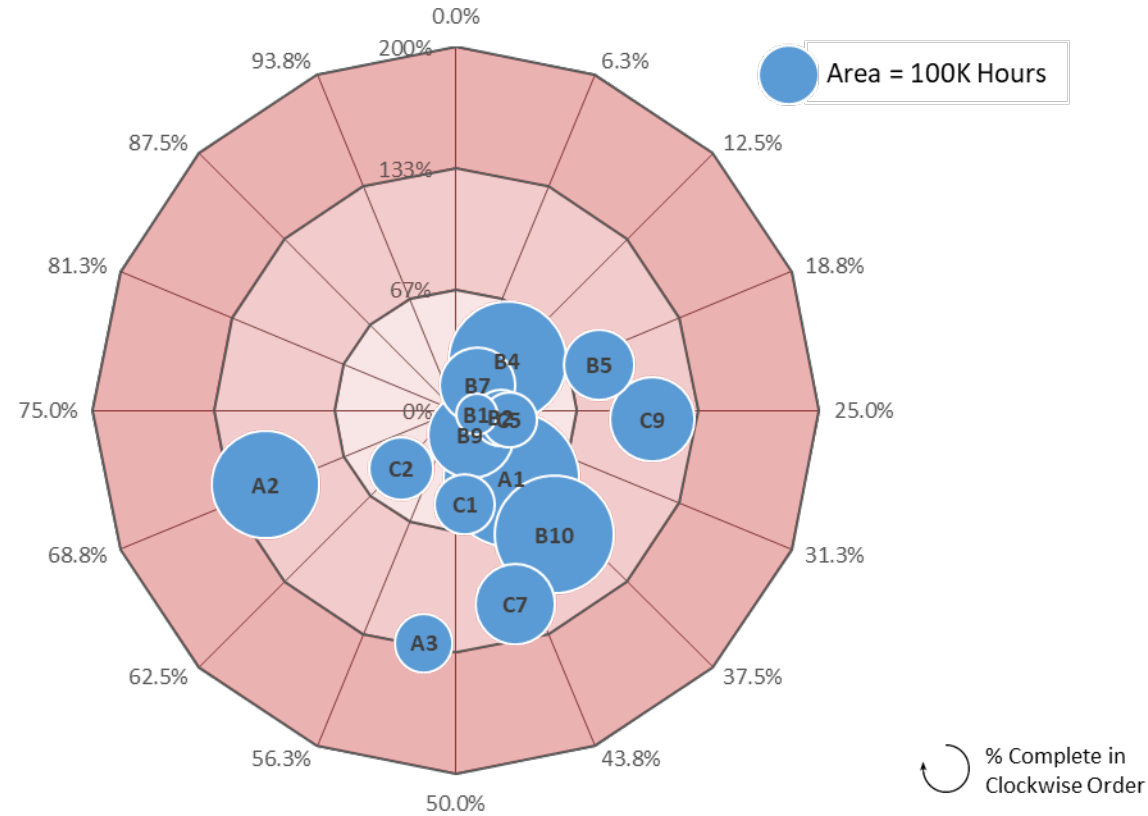
Top 10



Element View: 15 Accounts

**Projected Growth in Hours at Completion Above BAC:
Numerical (bubble sizes) and Percent (growth rings)**

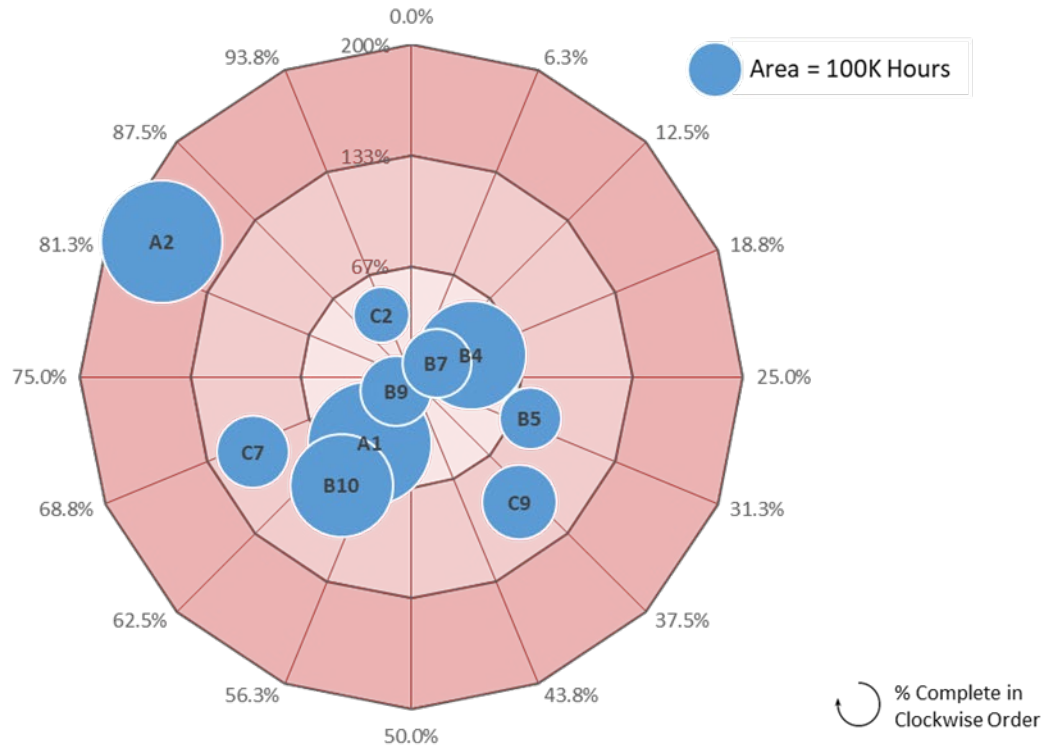
Top 15



TRT Mechanics: Tracking Accounts Over Time

Projected Growth in Hours at Completion Above BAC:
Numerical (bubble sizes) and Percent (growth rings)

Top 10



Plot Top 10 Elements

Plot Top 15 Elements

Plot Top 25 Elements

Select Date:

Mar-19

Set Bound: 100%

Plot Options:

Bubble Size: 60
Minimum: 0%
Maximum: 200%

Update Plot Options

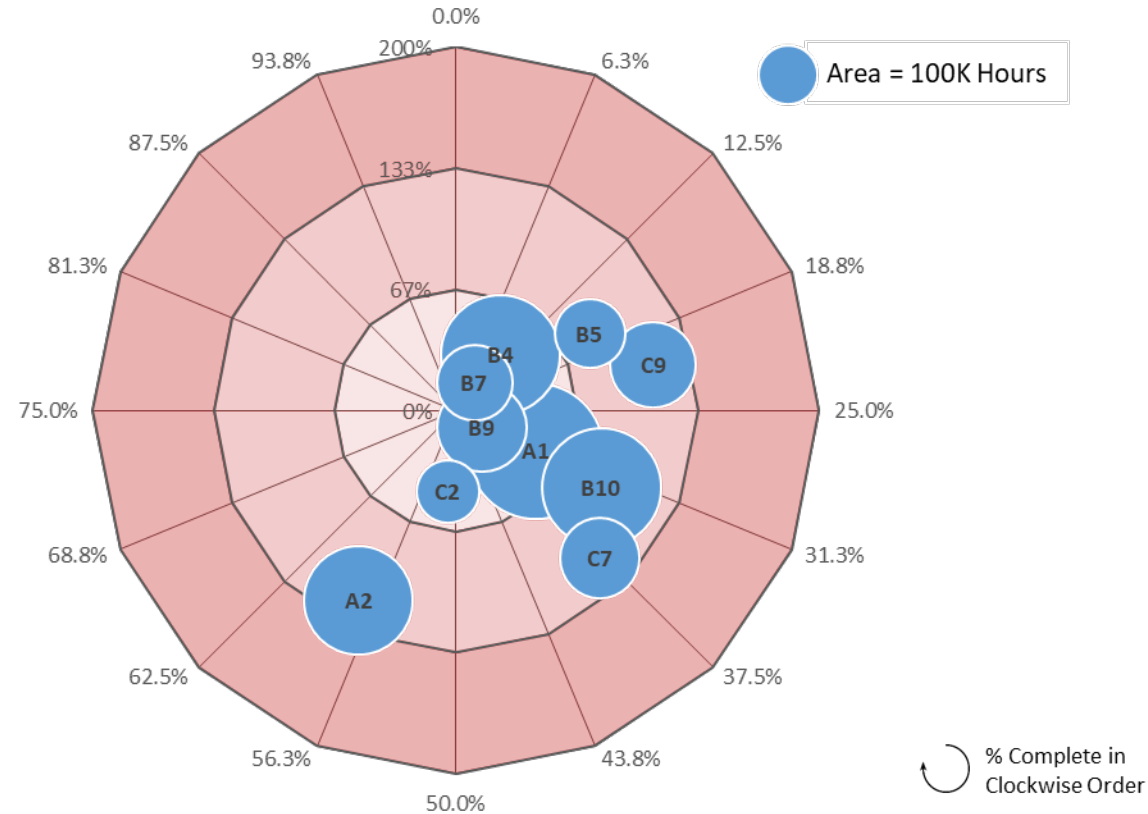
Center Data Labels

Copy Plot to Clipboard

Tracking Accounts Over Time: Period I

**Projected Growth in Hours at Completion Above BAC:
Numerical (bubble sizes) and Percent (growth rings)**

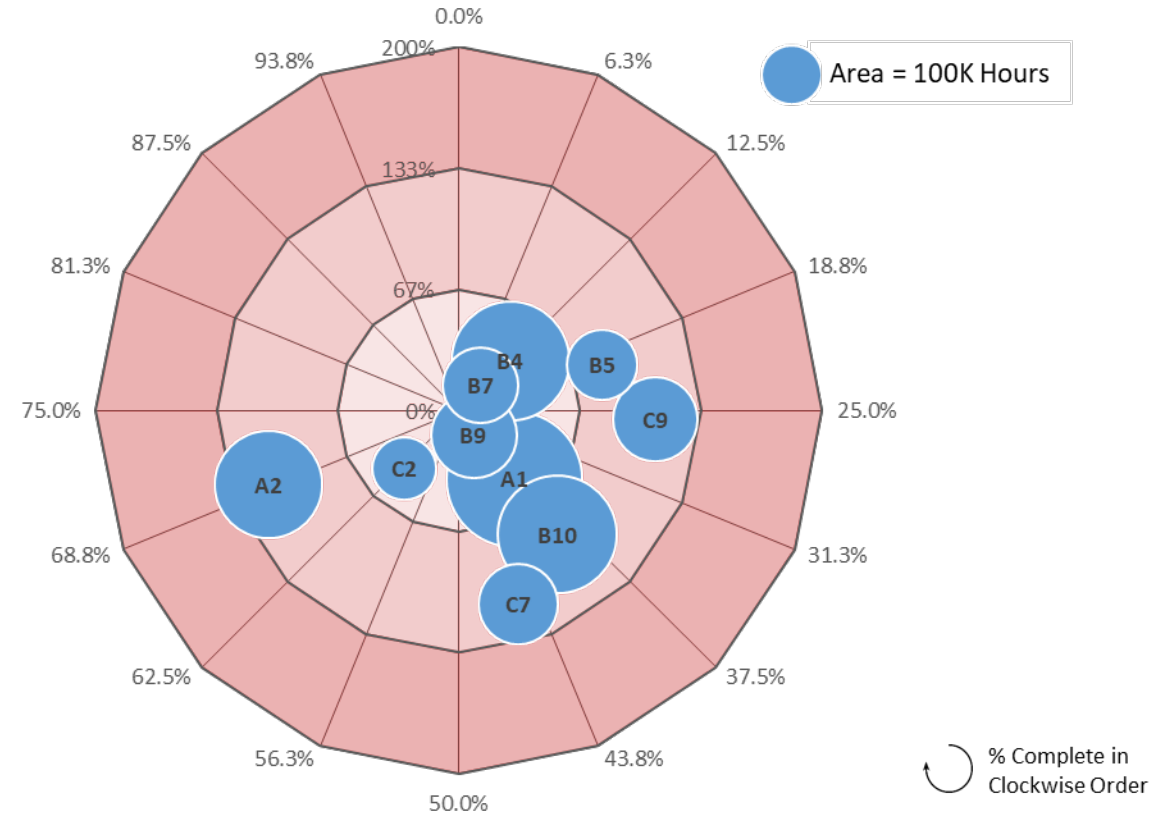
Top 10



Tracking Accounts Over Time: Period II

Projected Growth in Hours at Completion Above BAC:
Numerical (bubble sizes) and Percent (growth rings)

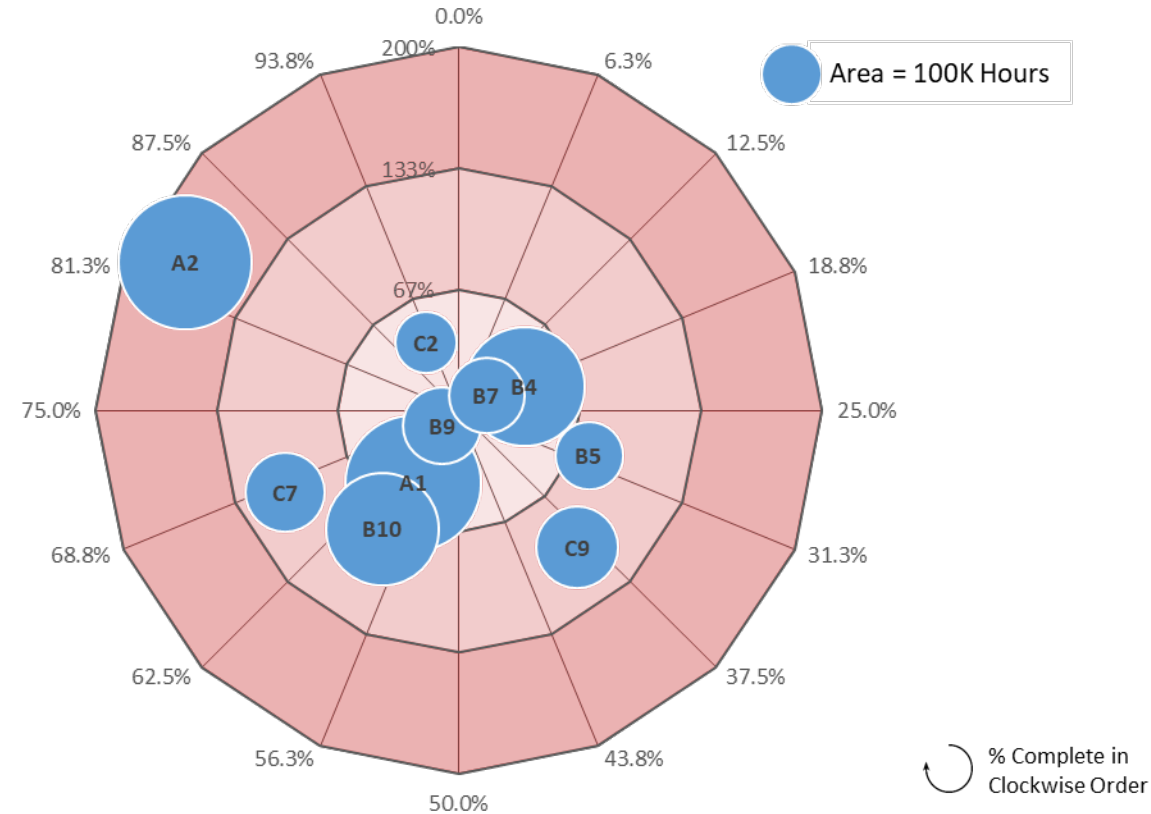
Top 10



Tracking Accounts Over Time: Period III

Projected Growth in Hours at Completion Above BAC:
Numerical (bubble sizes) and Percent (growth rings)

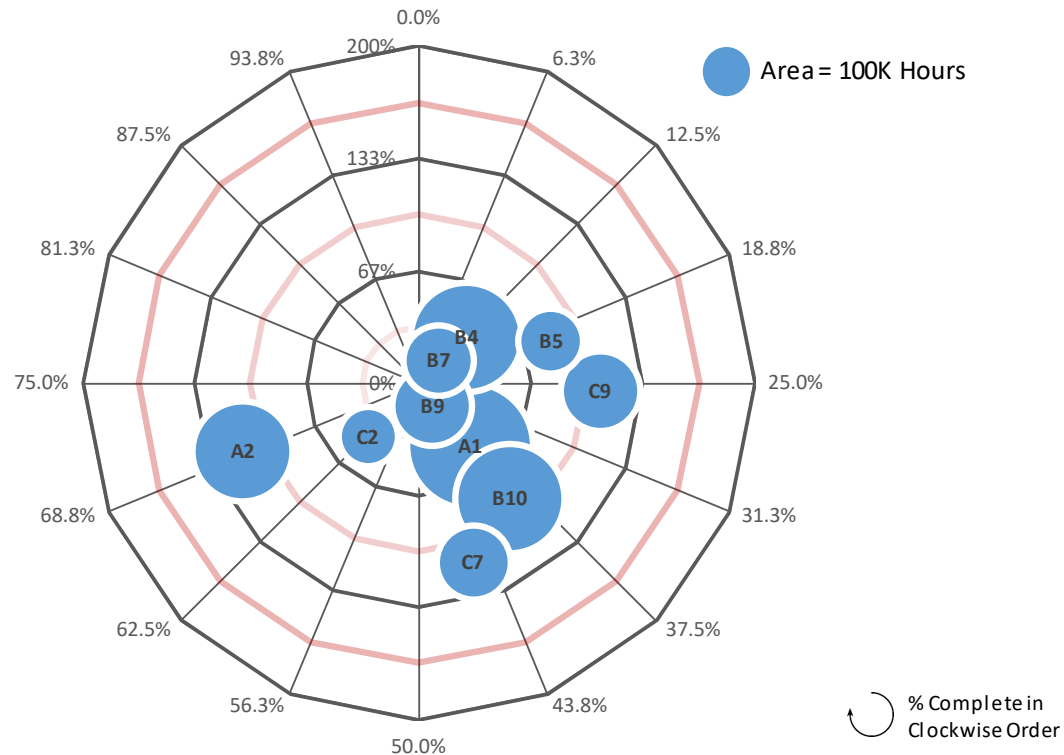
Top 10



TRT Mechanics: Plot Options

Projected Growth in Hours at Completion Above BAC:
Numerical (bubble sizes) and Percent (growth rings)

Top 10



Plot Top 10 Elements

Plot Top 15 Elements

Plot Top 25 Elements

Select Date:

Feb-19

Set Bound:

100%

Plot Options:

Bubble Size:

60

Minimum:

0%

Maximum:

200%

Update Plot Options

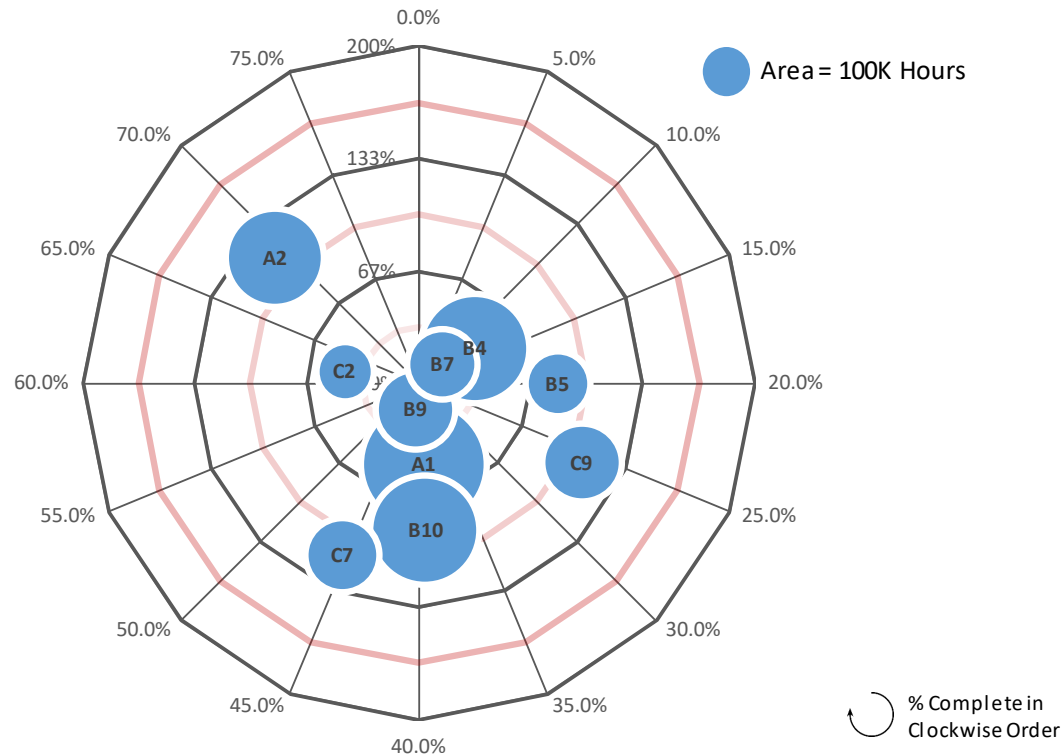
Center Data Labels

Copy Plot to Clipboard

Plot Options: Percent Complete Boundary

Projected Growth in Hours at Completion Above BAC:
Numerical (bubble sizes) and Percent (growth rings)

Top 10



Plot Top 10 Elements

Plot Top 15 Elements

Plot Top 25 Elements

Select Date:

Feb-19

Set Bound: 80%

Plot Options:

Bubble Size: 60

Minimum: 0%

Maximum: 200%

Update Plot Options

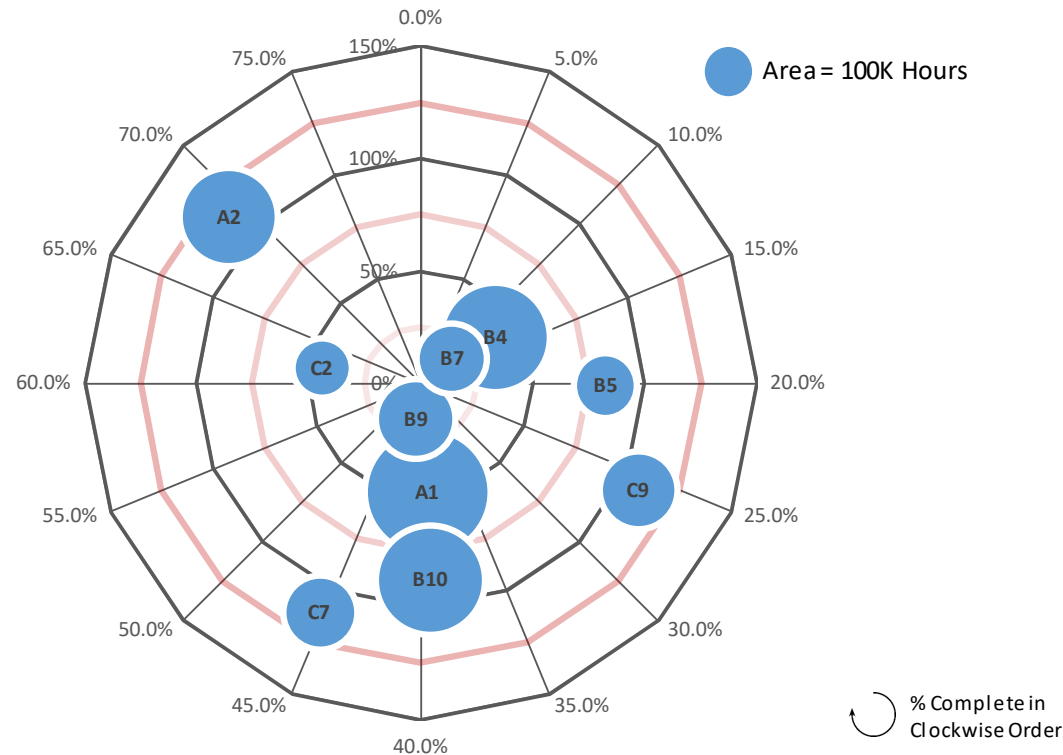
Center Data Labels

Copy Plot to
Clipboard

Plot Options: Percent Growth Maximum

Projected Growth in Hours at Completion Above BAC:
Numerical (bubble sizes) and Percent (growth rings)

Top 10



Plot Top 10 Elements

Plot Top 15 Elements

Plot Top 25 Elements

Select Date:

Feb-19

Set Bound: 80%

Plot Options:

Bubble Size: 60

Minimum: 0%

Maximum: 150%

Update Plot Options

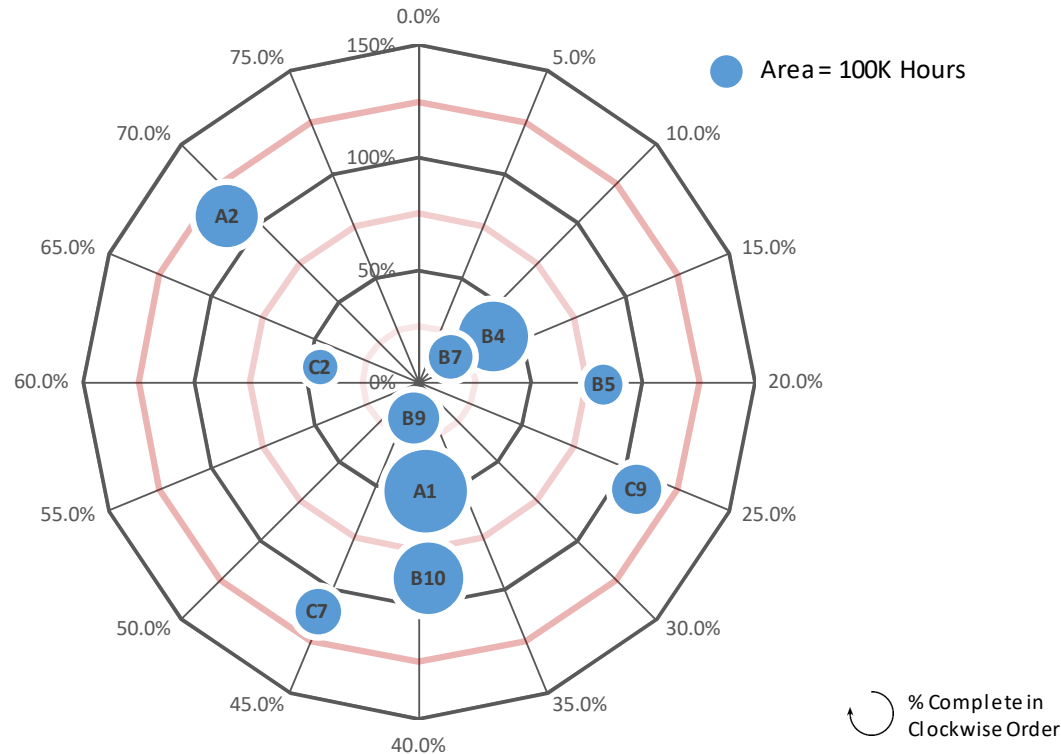
Center Data Labels

Copy Plot to Clipboard

Plot Options: Element Scaling

Projected Growth in Hours at Completion Above BAC:
Numerical (bubble sizes) and Percent (growth rings)

Top 10



Plot Top 10 Elements

Plot Top 15 Elements

Plot Top 25 Elements

Select Date:

Feb-19

Set Bound: 80%

Plot Options:

Bubble Size: 40

Minimum: 0%

Maximum: 150%

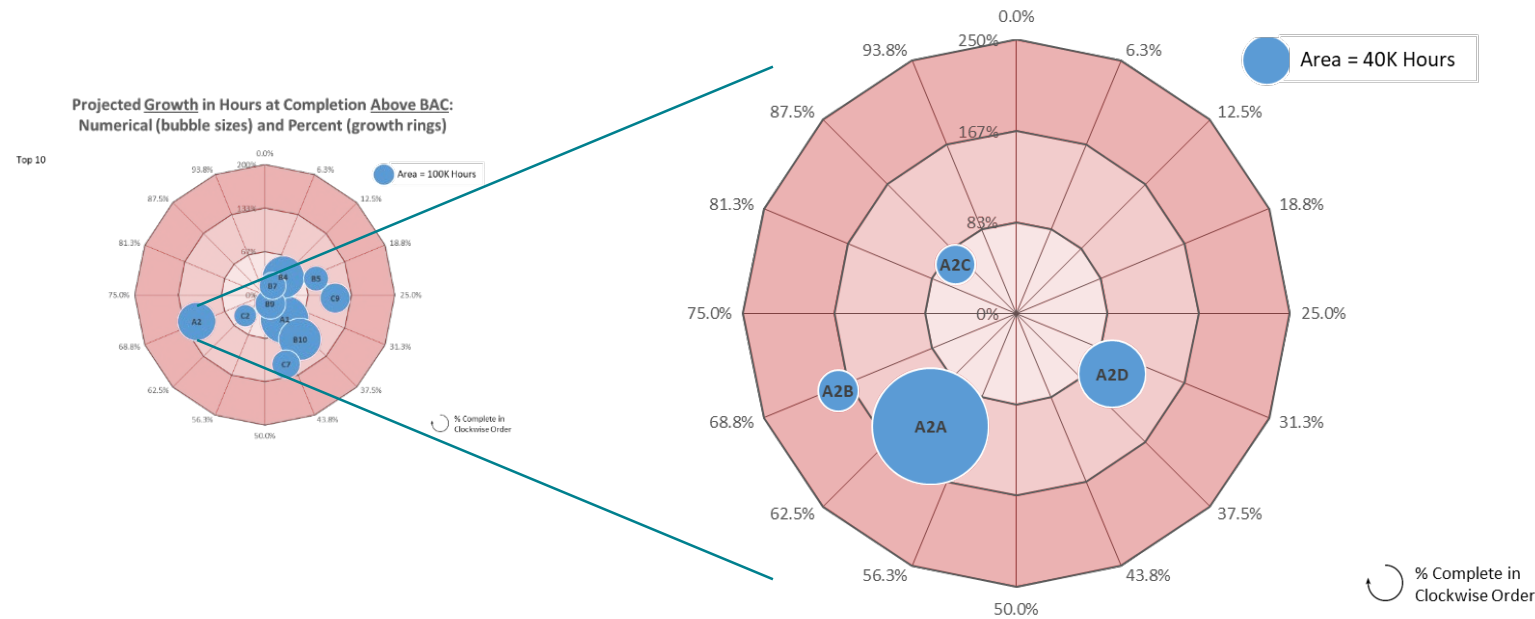
Update Plot Options

Center Data Labels

Copy Plot to
Clipboard

Future Enhancements: Task Deep Dive

Projected Growth in Hours at Completion Above BAC:
Numerical (bubble sizes) and Percent (growth rings)

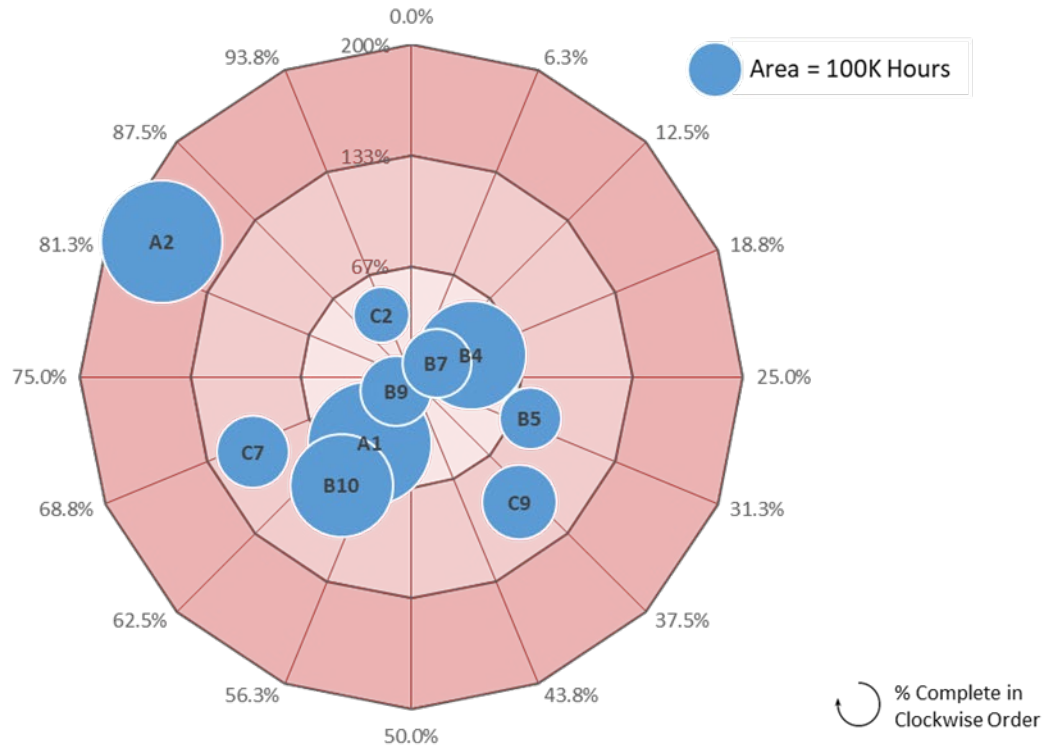


- Moving forward, this tool will include another layer of automated insight, permitting users to look closer at the lower-level Tasks underlying each Account

In Summary

Projected Growth in Hours at Completion Above BAC: Numerical (bubble sizes) and Percent (growth rings)

Top 10



Plot Top 10 Elements

Plot Top 15 Elements

Plot Top 25 Elements

Select Date:

Mar-19

Set Bound: 100%

Plot Options:

Bubble Size: 60
Minimum: 0%
Maximum: 200%

Update Plot Options

Center Data Labels

Copy Plot to Clipboard

Questions?