



Data Analytics

Visualizing to Informed Decisions

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Poll Question #1

- ▶ Do you currently have a formal analytics strategy?
 - A. Yes
 - B. No
 - C. Not Sure
 - D. No, but I have been pushing for one for years

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Only 16% of organizations can currently say that 75% or more of their employees have access to company data and analytics.

[MicroStrategy 2018 Global State of Enterprise Analytics Report](#)

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Breaking it Down

Analytics

+

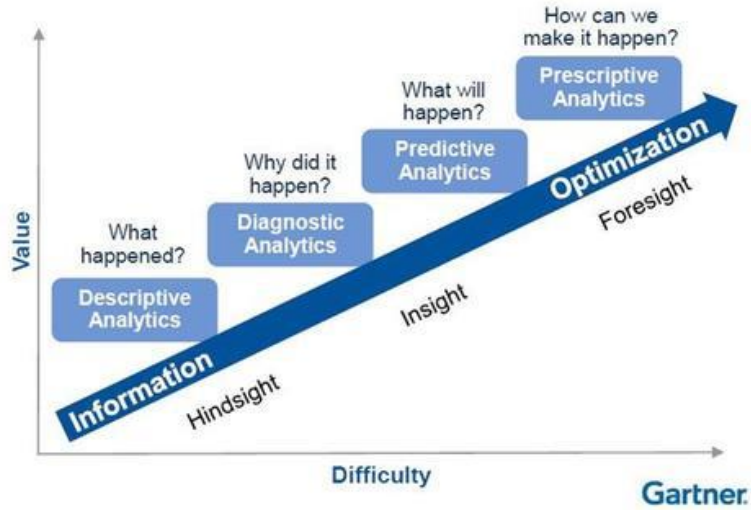
Visualization

=

Informed Decisions



Gartner Analytics Ascendancy



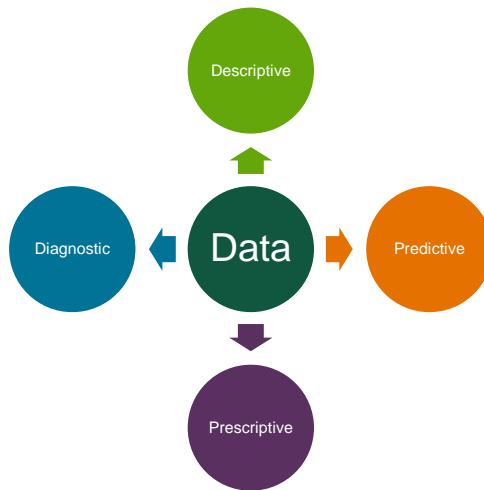
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Analytics Version n.1

Bryce Gartner



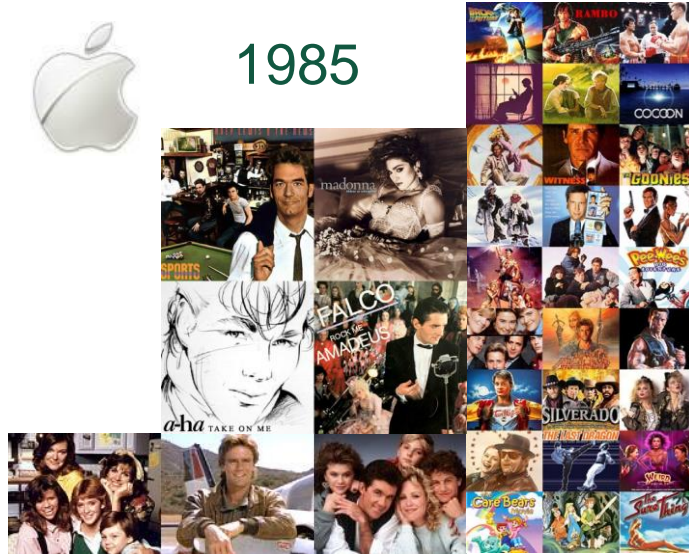
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1985



7



7

Excel – Most Widely Used Tool

Row ID	Order ID	Order Date	Ship Date	Ship Mode	Customer ID	Customer Name	Segment	Country	City	State
1	CA-2017-152156	11/8/17 0:00	11/11/17 0:00	Second Class	CG-12520	Claire Gute	Consumer	United States	Henderson	Kentucky
2	CA-2017-152156	11/8/17 0:00	11/11/17 0:00	Second Class	CG-12520	Claire Gute	Consumer	United States	Henderson	Kentucky
3	CA-2017-138688	6/12/17 0:00	6/16/17 0:00	Second Class	DV-13045	Darrin Van Huff	Corporate	United States	Los Angeles	California
4	US-2016-108966	10/11/16 0:00	10/18/16 0:00	Standard Class	SO-20335	Sean O'Donnell	Consumer	United States	Fort Lauderdale	Florida
5	US-2016-108966	10/11/16 0:00	10/18/16 0:00	Standard Class	SO-20335	Sean O'Donnell	Consumer	United States	Fort Lauderdale	Florida
6	CA-2015-115812	6/9/15 0:00	6/14/15 0:00	Standard Class	BH-11710	Brosina Hoffman	Consumer	United States	Los Angeles	California
7	CA-2015-115812	6/9/15 0:00	6/14/15 0:00	Standard Class	BH-11710	Brosina Hoffman	Consumer	United States	Los Angeles	California
8	CA-2015-115812	6/9/15 0:00	6/14/15 0:00	Standard Class	BH-11710	Brosina Hoffman	Consumer	United States	Los Angeles	California
9	CA-2015-115812	6/9/15 0:00	6/14/15 0:00	Standard Class	BH-11710	Brosina Hoffman	Consumer	United States	Los Angeles	California
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12	CA-2015-115812	6/9/15 0:00	6/14/15 0:00	Standard Class	BH-11710	Brosina Hoffman	Consumer	United States	Los Angeles	California
13	CA-2018-114412	4/15/18 0:00	4/20/18 0:00	Standard Class	AA-10480	Andrew Allen	Consumer	United States	Concord	North Carolina
14	CA-2017-161389	12/5/17 0:00	12/10/17 0:00	Standard Class	IM-15070	Irene Maddox	Consumer	United States	Seattle	Washington
15	US-2016-118983	11/22/16 0:00	11/26/16 0:00	Standard Class	HP-14815	Harold Pawlan	Home Office	United States	Fort Worth	Texas
16	US-2016-118983	11/22/16 0:00	11/26/16 0:00	Standard Class	HP-14815	Harold Pawlan	Home Office	United States	Fort Worth	Texas
17	CA-2015-105893	11/11/15 0:00	11/18/15 0:00	Standard Class	PK-19075	Pete Kriz	Consumer	United States	Madison	Wisconsin
18	CA-2015-167164	5/13/15 0:00	5/15/15 0:00	Second Class	AG-10270	Alejandro Grove	Consumer	United States	West Jordan	Utah
19	CA-2015-143336	8/27/15 0:00	9/1/15 0:00	Second Class	ZD-21925	Zuschuss Donatelli	Consumer	United States	San Francisco	California

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Excel

30 Years Later – Price Waterhouse, 88% of all spreadsheets contain an error, >150 Rows 92%

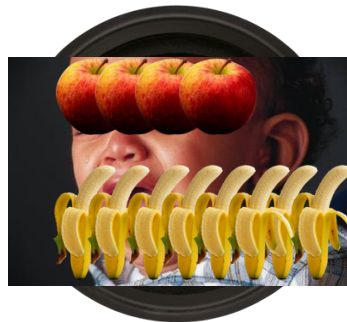
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The Concept Is SIMPLE



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Critical Questions

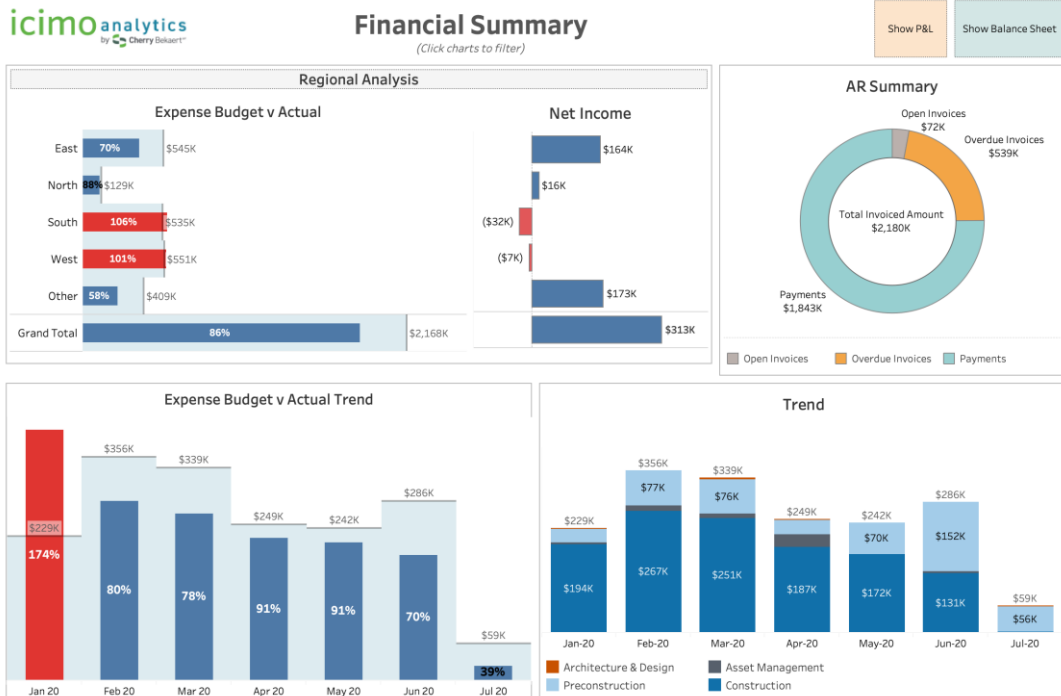
► Driver of All Analytics

- Support the Outcome
 - ▷ Impact Preferred Future
- Strategic Objectives
 - ▷ Goals
 - ▷ Prove a theory
 - ▷ Disprove a myth

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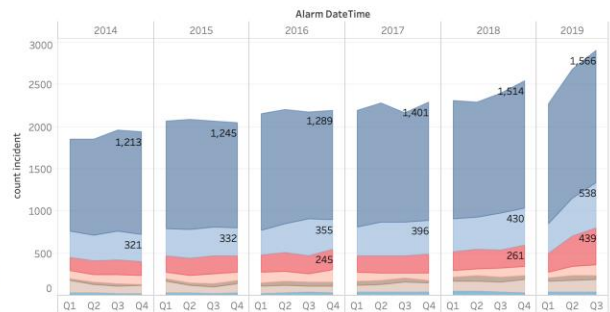


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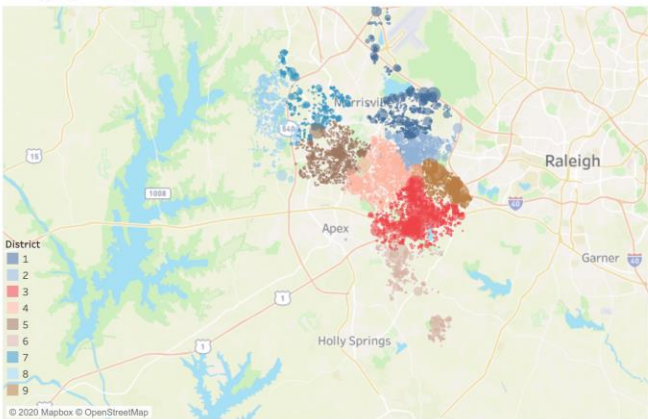
Overall Incidents by Category



Time Series Trend



Category Map by District



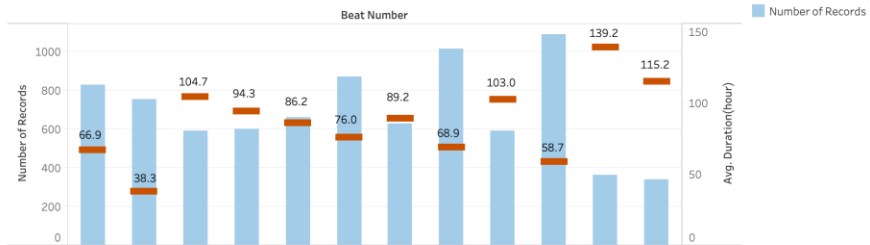
Top Causes



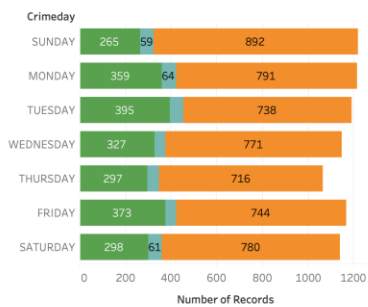
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Workload and Efficiency of Beats

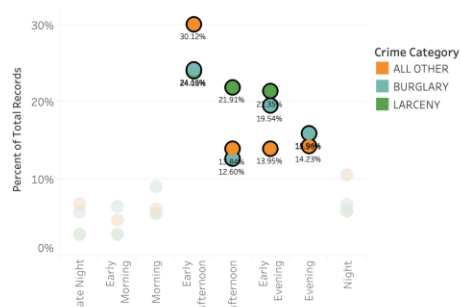
Workloads for All Beats in 2018-2019



Number of Incidents in Week Day



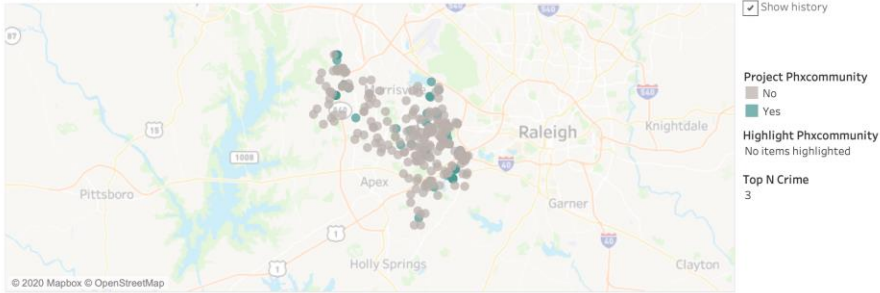
Percentage of Incidents by Time of Day



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Project Phoenix Communities

Project Phoenix in October 2019

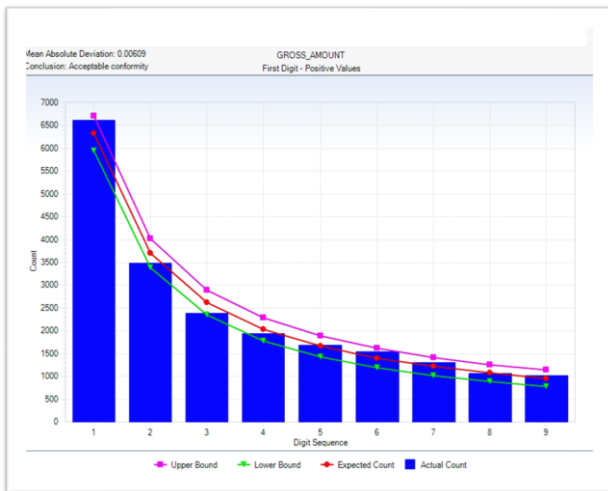


Project Phoenix for Top 3 Crime(s)



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Benford's Law – Analytic



► Normal Random Distribution

The principle that in any large, randomly produced set of natural numbers, such as tables of logarithms or corporate sales statistics, around 30 percent will begin with the digit 1, 18 percent with 2, and so on, with the smallest percentage beginning with 9. The law is applied in analyzing the validity of statistics and financial records.

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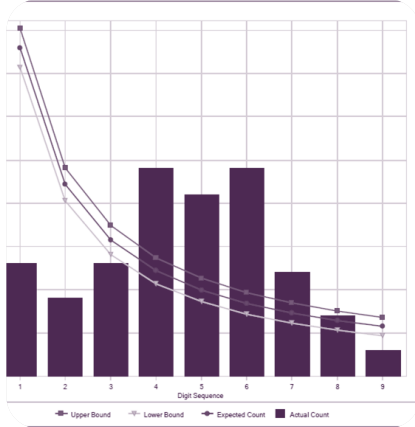


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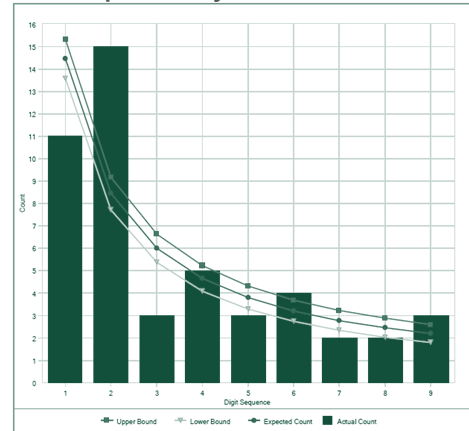
Poll Question #2

Which scenario represents fraud?

▶ Hammer'n'Nails General Contractor



▶ Buzzin Electric Specialty Contractor



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Data Elements

▶ Keys to Enriching Analysis

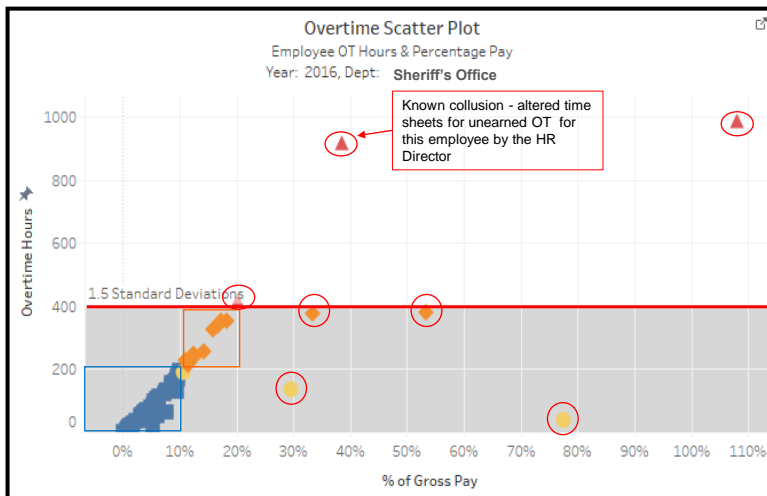
- ▶ Internal Data
 - G/L - ERP
 - Operational
- ▶ External Factors and Data
 - Publicly Available Data
 - Regulatory and Compliance
 - Vendor
 - Weather

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Data Analytics Helps Uncover Truth

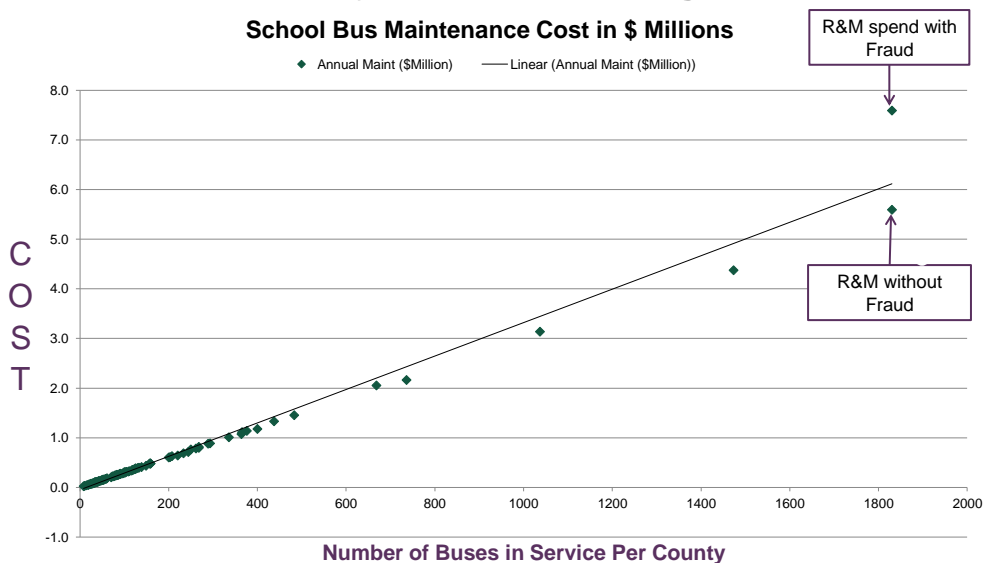


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Data Analytics Detect Irregularities

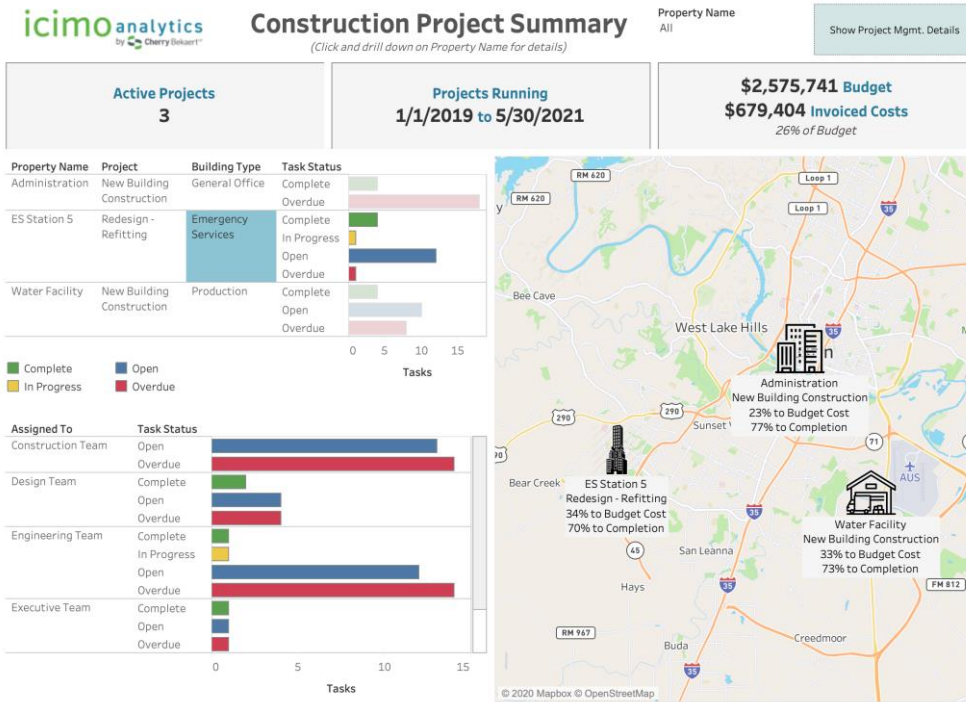


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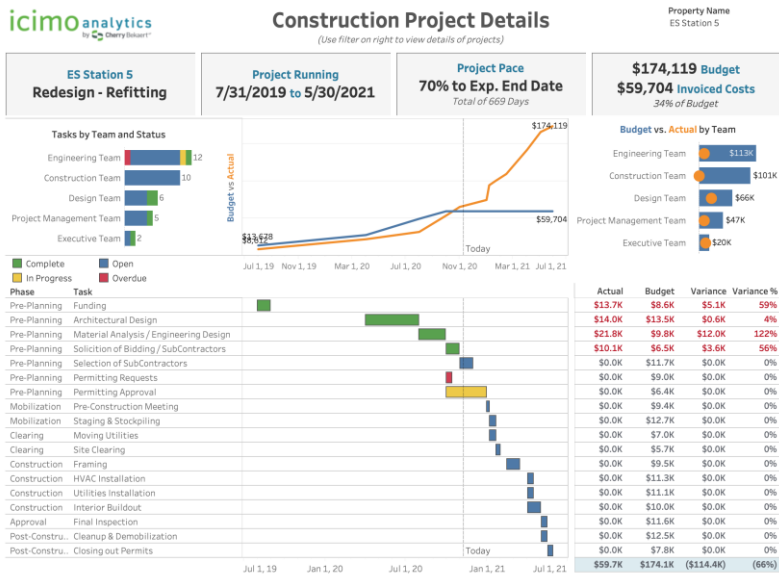


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20



21



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Poll Question #3

- ▶ What is your favorite use of Artificial Intelligence and Machine Learning?
 - A. NFL – AWS Next Gen Stats
 - B. Amazon Other Customers Bought This
 - C. Hurricane Spaghetti Models
 - D. Netflix Recommended Movies
 - E. I have no idea what AI/ML does.

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AI and ML

- ▶ Finding Opportunities
 - ▶ Designing models to incorporate more data
 - ▶ Including more outside impacts
 - ▶ Narrowing spread of predicted outcomes
 - ▶ Prescribing solutions

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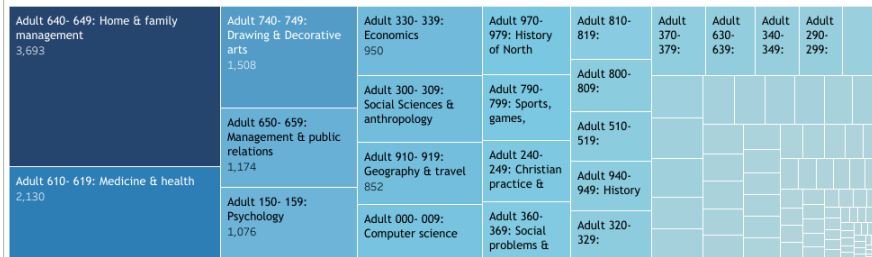
24

Adult Collection Circulation

Select Branch Name
All

Select a data point to filter the Adult Circulation Detail in the bottom right of the dashboard.

Adult Non-Fiction



Adult Fiction Categories

Adult Hardcover Fiction	12,319
Adult Hardcover Myste...	5,512
Adult Hardcover Roma...	1,871
Adult Hardcover Histor...	1,286
Adult Hardcover Scienc...	864
Adult Hardcover Fanta...	830
Adult Short Story Colle...	355
Adult Hardcover	75
Adult Hardcover Weste...	52
Adult Graphic Novels	14

Adult Paperback

Adult Paperback Romance	5,066
Adult Paperback Fiction	613
Adult Paperback Mystery	593
Adult Paperback Fantasy	390
Adult Paperback Science Fiction	168
Adult Paperback Western	60
Adult Paperback Historical Fiction	4

Adult Circulation Detail

Browse Call No	Browse Title	Browse Author	Publication Year	Branch
001.9 BRO	Suspicious minds : why we believ...	Brotherton, Rob, au...	2015	Rolling
001.9 LEC	Atlas of cursed places : a travel guide to dangerous and frightful...	Le Carrer, Olivier, author.	2015	Lakedale Rolling
001.42 BOO	The craft of research	Booth, Wayne C.	2008	Linden Hills
001.94 HAN	Magicians of the gods : the forgo...	Hancock, Graham, a.	2015	Barring
002.09 DAM	The case for books : past, presen...	Darnton, Robert.	2009	Linden Hills
004.6 DON	Network warrior	Donahue, Gary A., author.	2011	Barring Lakedale Linden Hills
004.09 DYS	Turing's cathedral : the origins of...	Dyson, George, 1953-	2012	Linden Hills

25

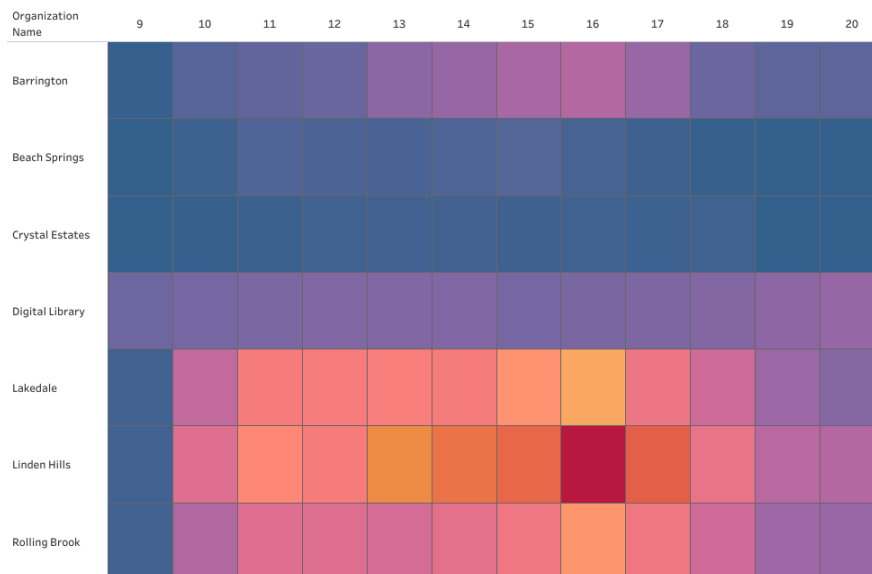
Transactions by Hour

Select Branch Name
Multiple values

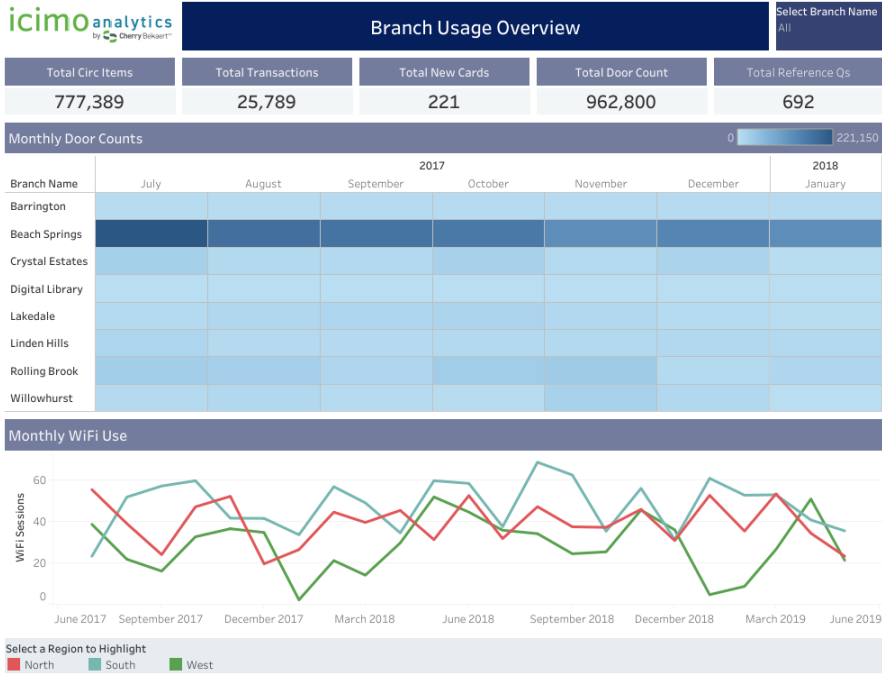
Select a Transaction Type
Check out

Select a Workstation Type
Multiple values

Transactions
84 81,339



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Turnover Rate per Branch

Select Branch Name: Barrington | Choose a Month: July

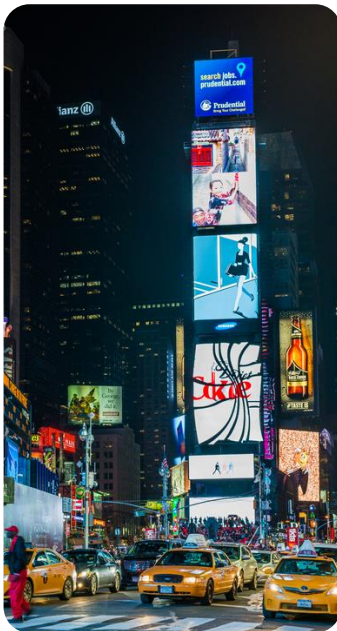
Barrington for the Month of July

Collection Name	Turnover Rate	Circ Items	Transactions
Children's Entertainment Video	1.079	76	82
Adult Entertainment Video	0.731	1,270	929
Kits	0.625	8	5
Adult Graphic Novel	0.618	55	34
Television Series	0.496	280	139
Adult Large Print	0.481	79	38
Job Skills	0.460	124	57
Teen Fiction	0.391	617	241
Children's Graphic Novel	0.390	688	268
Teen Graphic Novel	0.370	605	224
Teen Biography	0.367	30	11
Adult Audiobook	0.357	1,528	546
Adult Fiction	0.350	3,164	1,107
Children's Fiction	0.335	2,971	996
Teen Paperback	0.326	43	14
Adult Non-Fiction	0.321	3,586	1,150
Children's Picture Books	0.300	7,049	2,113
Classics	0.292	89	26
Adult Biography	0.287	275	79
Teen Non-Fiction	0.265	325	86
Children's Audiobook	0.253	198	50
Adult Educational Video	0.247	542	134
Teen Magazine	0.238	21	5
Adult Paperback	0.220	708	156
Children's Music	0.219	128	28
Children's Educational Video	0.210	395	83
Children's Paperback	0.188	426	80
Children's Non-fiction	0.163	2,522	411
Children's World Languages	0.147	238	35
Adult Basic English	0.125	32	4
Children's Biography	0.119	386	46

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Select Floating Branch	Select Collection Name	New Items that have not Circulated for 60 Days at Barrington as of 11/13/2017 4:23:44 PM				
Barrington	All					
BrowseCallNo	BrowseAuthor	BrowseTitle	Barcode	ToName	FirstAvailableDate	LastCircDate
641.853 CUR	Curi, Jami, author.	Candy is magic : re...	31268121936344	Gray Meadows	5/9/2017	7/29/2017
782.42166 SHA	Null	Shake it up : great ...	31268122311760	Conpeago	7/13/2017	7/29/2017
ADULT PB ROMANCE GRE	Green, Sherelle, author.	A Miami affair	31268121814855	Bridgemont	6/22/2017	9/9/2017
ADULT PB ROMANCE NIG	Night, Nicki, author	It started in parad...	31268121813840	Linden Hills	6/22/2017	9/2/2017
CLASSIC STE	Steinbeck, John, 1902-1968, a.	Of mice and men	31268122009802	Conpeago	6/1/2017	8/14/2017
DVD DRAMA AFT	Null	Aftermath	31268122085794	Deerville	6/6/2017	8/29/2017
DVD DRAMA FIF	Null	Fifty shades darker	31268122060961	Home Forest	6/5/2017	9/5/2017
DVD DRAMA SAL PERSIAN	Null	The salesman	31268121866376	Deerville	5/1/2017	9/5/2017
EASY 362.87 MCC	McCarney, Rosemary A., auth.	Where will I live?	31268121950402	Lakedale	5/10/2017	8/1/2017
EASY 507.8 LOO	Null	Look, I'm a scientis...	31268122248616	Deerville	6/28/2017	9/6/2017
EASY 513.211 DOB	Dobson, Christina, author.	Pizza counting	31268122404508	Home Forest	7/31/2017	9/11/2017
EASY 551 BEH	Behrens, Janice, 1972- author.	Totally cool caves ...	31268121873224	Nompeka	5/10/2017	7/22/2017
EASY 577.7 HAN	Hanes, Kathleen M., author.	Seagrass dreams : ...	31268122381094	Home Forest	7/21/2017	8/10/2017
EASY 577.69 SIL	Sill, Cathryn P., 1953- author.	Seashores	31268122384411	Palos Village	7/25/2017	8/3/2017
EASY 590 TEK	Tekavec, Heather, 1969- auth.	Different? Same!	31268122055417	Rollingbrook	5/31/2017	6/5/2017
EASY 591.7 LEW	Lewis, J. Patrick, author.	My home in the de...	31268121872622	Home Forest	5/10/2017	6/3/2017
		My home on the ice	31268121872507	Nompeka	5/10/2017	6/3/2017
EASY 591.73 LEW	Lewis, J. Patrick, author.	My home in the rai...	31268121882001	Libertyburg	5/9/2017	5/18/2017
EASY 591.76 LEW	Lewis, J. Patrick, author.	My home in the wa...	31268121882126	Nompeka	5/9/2017	8/22/2017
EASY 613.6 JEN	Jennings, Rosemary, author.	Safe on the school ...	31268122210392	Bridgemont	6/16/2017	6/26/2017
		Safe on your bike	31268122210541	Home Forest	6/16/2017	7/22/2017
		Safe online	31268122210699	Elkton	6/16/2017	7/22/2017
EASY 618.2 ADA	Adamo, Courtney, author.	9 months	31268121880443	Bridgemont	5/11/2017	6/14/2017
EASY 624.1 ENZ	Enz, Tammy, author.	Building structure...	31268121926238	Rollingbrook	5/3/2017	6/24/2017
EASY 796.81 PAN	Pantaleo, Steve, author.	How to be a WWE ...	31268122401603	Beach Springs	7/31/2017	8/1/2017
EASY 811.54 BROOKS	Brooks, Gwendolyn, 1917-200...	We are shining	31268122015932	Rollingbrook	6/14/2017	6/21/2017
EASY BIOGRAPHY GINSBU..	Winter, Jonah, 1962- author.	Ruth Bader Ginsbu...	31268122526508	Palos Village	8/7/2017	8/19/2017
EASY BOARD BEE	Bee, William, author, illustrat.	Stanley's opposites	31268122381995	River Harbor	7/25/2017	8/3/2017
EASY BOARD BOY	Boynton, Sandra, author, illus.	But not the hippop...	31268122072198	Gray Meadows	6/7/2017	6/15/2017
EASY BOARD CRE	Crews, Donald, author.	Freight train	31268122069921	River Harbor	6/1/2017	6/8/2017
EASY BOARD DEW	Null	Llama Llama gives	31268122538206	Nompeka	8/14/2017	8/15/2017

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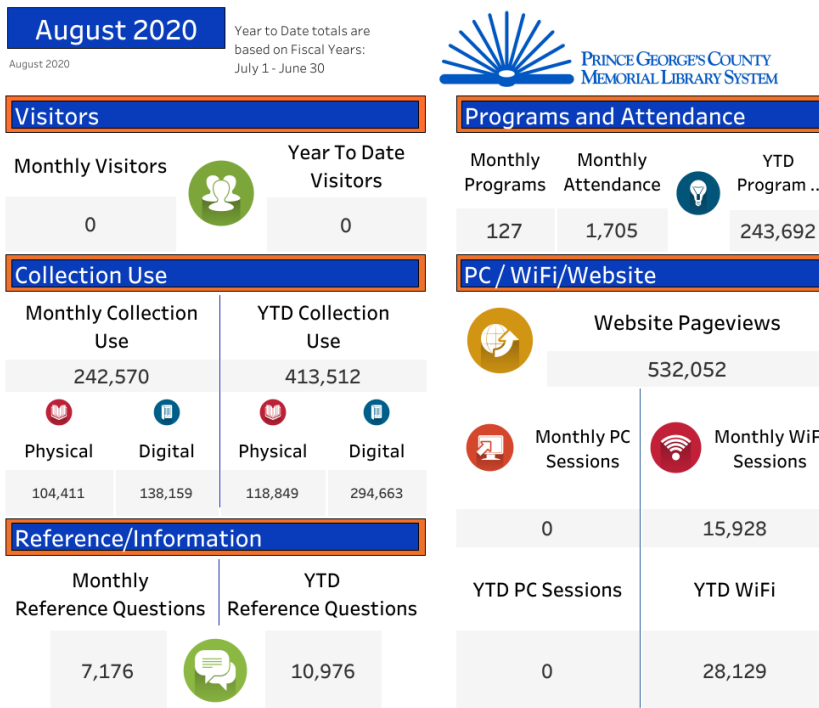
Communicating

- ▶ Visual Data Storytelling
 - ▶ Engaging Audiences
 - ▶ Providing Insight
 - ▶ Demystifying Complex Analysis





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Takeaways

Critical Questions Data Elements AI and ML Communicating

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