

# Assignment\_1\_DATA608

## R Markdown

### Principles of Data Visualization and Introduction to ggplot2

I have provided you with data about the 5,000 fastest growing companies in the US, as compiled by Inc. magazine. lets read this in:

```
inc <- read.csv("https://raw.githubusercontent.com/charleyferrari/CUNY_DATA_608/master/module1/Data/inc.csv")
```

And lets preview this data:

```
head(inc)
```

```
##      Rank      Name Growth_Rate  Revenue
## 1      1      Fuhu      421.48 1.179e+08
## 2      2  FederalConference.com    248.31 4.960e+07
## 3      3    The HCI Group    245.45 2.550e+07
## 4      4      Bridger    233.08 1.900e+09
## 5      5      DataXu    213.37 8.700e+07
## 6      6 MileStone Community Builders    179.38 4.570e+07
##
##      Industry Employees      City State
## 1 Consumer Products & Services    104  El Segundo  CA
## 2      Government Services      51  Dumfries  VA
## 3      Health    132 Jacksonville  FL
## 4      Energy      50    Addison  TX
## 5 Advertising & Marketing    220    Boston  MA
## 6      Real Estate      63    Austin  TX
```

```
summary(inc)
```

```
##      Rank      Name      Growth_Rate      Revenue
## Min.   : 1  Length:5001  Min.   : 0.340  Min.   :2.000e+06
## 1st Qu.:1252 Class :character 1st Qu.: 0.770  1st Qu.:5.100e+06
## Median :2502 Mode  :character Median : 1.420  Median :1.090e+07
## Mean   :2502      Mean   : 4.612  Mean   :4.822e+07
## 3rd Qu.:3751      3rd Qu.: 3.290  3rd Qu.:2.860e+07
## Max.   :5000      Max.   :421.480  Max.   :1.010e+10
##
##      Industry      Employees      City      State
## Length:5001  Min.   : 1.0  Length:5001  Length:5001
## Class :character 1st Qu.: 25.0  Class :character  Class :character
## Mode  :character Median : 53.0  Mode  :character  Mode  :character
##      Mean   : 232.7
##      3rd Qu.: 132.0
##      Max.   :66803.0
##      NA's   :12
```

Think a bit on what these summaries mean. Use the space below to add some more relevant non-visual exploratory information you think helps you understand this data:

## Solution:

A good first step in any analysis is to distill all of the information into a few summary statistics and graphics. As a simple example, the function summary returns a numerical summary: minimum, first quartile, median, mean, second quartile, and maximum as given above. However, looking at min and max for Revenue for example show that there is a range of companies included here with revenue ranging from 2 million all the way to 10 billion. It might make sense to look at growth rates by grouping revenue into categories. One would assume lower growth rates for mature companies and vice versa higher growth rates for young companies with lower revenues. We can use the group\_by, summarise and arrange functions to check if this hypothesis is true.

Below, we summarize growth rates by industry sorted in descending order and notice that Government Services has the highest median growth rate along with other mature industries such as Energy and Real Estate and contrary to expectations, the Computer Hardware sector has the lowest median growth rate of all industries. We repeat the exercise by sorting by mean and by standard deviation of growth rate for industries in descending order and notice that the results are slightly different. Sorting by median growth rate brings the Energy and Consumer Products & Services to the top (previously ranked #2 and #5) while sending Software and Media to rank #7 and #9 (previously #4 and #7, respectively).

The true picture emerges when we sort by standard deviation, the industries that were previously identified as having high mean and median growth rates also happen to have a high standard deviation. Taking the example of the Energy industry, it becomes clear that there is a wide gamut of companies ranging from growth rates of < 1% (Maneri-Agraz Enterprises, Customized Energy Solutions) to companies such as Bridger which have a growth rate of 233%. Looking further at the methodology behind the Inc. rankings reveals that growth rates are calculated over a 3-year timeframe and are not annualized numbers which could be the reason why the results of the aggregation below don't align with intuition. Looking at another industry "Consumer Products & Services", companies that are listed as having high growth rates are LivingSocial (a web rating company), Goal Zero (a portable battery company) and Fuhu (now bankrupt, previously a computer manufacturer). The growth rates for this category appear to make sense but nevertheless the Inc. calculation methodology for growth rates can lead to erroneous conclusions and needs to be treated with caution.

```
# Insert your code here, create more chunks as necessary
```

```
# Sort in descending order by median growth rates
```

```
library(tidyverse)
```

```
## -- Attaching packages ----- tidyverse 1.3.1 --
```

```
## v ggplot2 3.3.5      v purrr  0.3.4
```

```
## v tibble  3.1.6      v dplyr  1.0.8
```

```
## v tidyr   1.2.0      v stringr 1.4.0
```

```
## v readr   2.1.2      v forcats 0.5.1
```

```
## Warning: package 'tidyr' was built under R version 4.0.5
```

```
## Warning: package 'readr' was built under R version 4.0.5
```

```
## Warning: package 'dplyr' was built under R version 4.0.5
```

```
## -- Conflicts ----- tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag() masks stats::lag()
```

```
visualize1 <- inc %>%
  group_by(Industry) %>%
  summarise(mean_Growth_Rate = mean(Growth_Rate), median_Growth_Rate = median(Growth_Rate), sd_Growth_Rate = sd(Growth_Rate))
  arrange(desc(median_Growth_Rate))

visualize1
```

```
## # A tibble: 25 x 4
##   Industry mean_Growth_Rate median_Growth_Rate sd_Growth_Rate
##   <chr>          <dbl>          <dbl>          <dbl>
## 1 Government Services 7.24          2.11          22.1
## 2 Energy              9.60          2.08          25.3
## 3 Real Estate         7.75          2.07          20.4
## 4 Media               4.37          1.94          5.44
## 5 Consumer Products & Services 8.78          1.82          33.9
## 6 Retail              6.18          1.76          16.5
## 7 Software            5.02          1.72          11.3
## 8 Advertising & Marketing 6.23          1.61          17.9
## 9 Health              4.86          1.57          15.4
## 10 Security           3.39          1.54          5.80
## # ... with 15 more rows
```

```
# Sort in descending order by mean growth rates
```

```
visualize2 <- inc %>%
  group_by(Industry) %>%
  summarise(mean_Growth_Rate = mean(Growth_Rate), median_Growth_Rate = median(Growth_Rate), sd_Growth_Rate = sd(Growth_Rate))
  arrange(desc(mean_Growth_Rate))

visualize2
```

```
## # A tibble: 25 x 4
##   Industry mean_Growth_Rate median_Growth_Rate sd_Growth_Rate
##   <chr>          <dbl>          <dbl>          <dbl>
## 1 Energy              9.60          2.08          25.3
## 2 Consumer Products & Services 8.78          1.82          33.9
## 3 Real Estate         7.75          2.07          20.4
## 4 Government Services 7.24          2.11          22.1
## 5 Advertising & Marketing 6.23          1.61          17.9
## 6 Retail              6.18          1.76          16.5
## 7 Financial Services   5.44          1.48          14.9
## 8 Software            5.02          1.72          11.3
## 9 Health              4.86          1.57          15.4
## 10 Media              4.37          1.94          5.44
## # ... with 15 more rows
```

```
# Sort in descending order by standard deviation of growth rates
```

```
visualize3 <- inc %>%
```

```
group_by(Industry) %>%
summarise(mean_Growth_Rate = mean(Growth_Rate), median_Growth_Rate = median(Growth_Rate), sd_Growth_Rate = sd(Growth_Rate))
arrange(desc(sd_Growth_Rate))

visualize3
```

```
## # A tibble: 25 x 4
##   Industry          mean_Growth_Rate median_Growth_Rate sd_Growth_Rate
##   <chr>              <dbl>              <dbl>          <dbl>
## 1 Consumer Products & Services      8.78              1.82          33.9
## 2 Energy                          9.60              2.08          25.3
## 3 Government Services              7.24              2.11          22.1
## 4 Real Estate                      7.75              2.07          20.4
## 5 Advertising & Marketing          6.23              1.61          17.9
## 6 Computer Hardware               4.09              1.04          16.5
## 7 Retail                         6.18              1.76          16.5
## 8 Health                        4.86              1.57          15.4
## 9 Financial Services              5.44              1.48          14.9
## 10 Software                      5.02              1.72          11.3
## # ... with 15 more rows
```

## Question 1

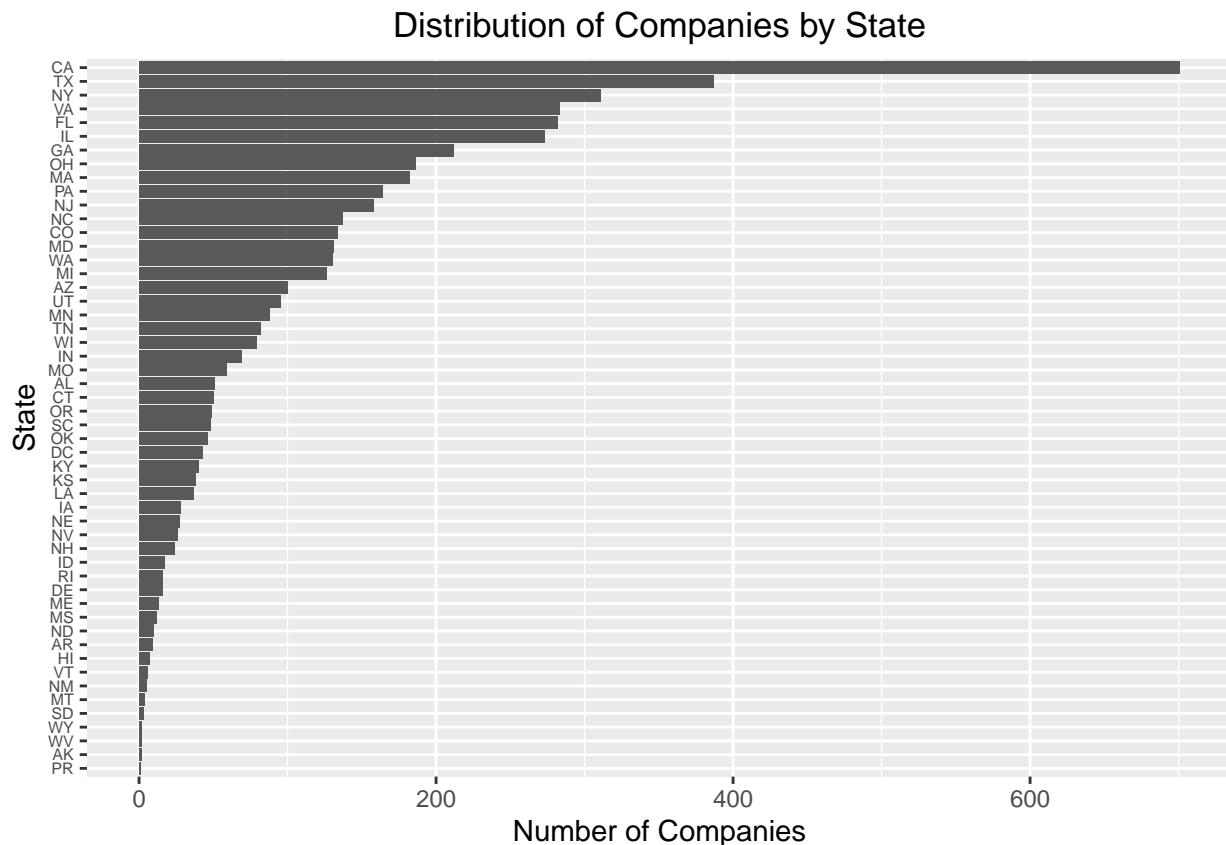
Create a graph that shows the distribution of companies in the dataset by State (ie how many are in each state). There are a lot of States, so consider which axis you should use. This visualization is ultimately going to be consumed on a 'portrait' oriented screen (ie taller than wide), which should further guide your layout choices.

## Solution:

```
# Answer Question 1 here

state <- inc %>%
  group_by(State) %>%
  summarize(Count = n())

ggplot(data = state, aes(x = reorder(State, Count), y = Count)) +
  geom_bar(stat = "identity") +
  coord_flip() +
  labs(title = "Distribution of Companies by State", x = "State", y = "Number of Companies") +
  theme(axis.text.y = element_text(size = 6)) +
  theme(plot.title = element_text(hjust = 0.5))
```



## Question 2

Let's dig in on the state with the 3rd most companies in the data set. Imagine you work for the state and are interested in how many people are employed by companies in different industries. Create a plot that shows the average and/or median employment by industry for companies in this state (only use cases with full data, use R's `complete.cases()` function.) In addition to this, your graph should show how variable the ranges are, and you should deal with outliers.

## Solution:

We first create `visualize4` which is a filtered subset of `inc` containing only use cases with complete data for the state of New York. By sorting this dataset in descending order, we notice that there is a wide variance in Employment with companies such as "Sutherland Global Services" and "Coty" employing tens of thousands of employees and on the other end 227 companies with fewer than 100 employees. Instead of eliminating companies that are either small or large (outliers), I instead chose to display median values using the `visualize6` dataset in Boxplot # 4.

We could also have chosen to display the untransformed count of employees by industry for the state of New York as depicted in the `visualize4` dataset. The outliers are clearly evident in the Business Products & Services and in the Consumer Products & Services industries. By eliminating these two industries as a whole, we arrive at a more normalized version of the boxplot that allows a comparison among the remaining industries as depicted in the Boxplot # 2 chart. Note that eliminating outliers in the chart is not the same as eliminating outliers in the underlying dataset. This is evident by comparing Boxplot # 3 (modified chart) with boxplot # 2 (modified data). The modified chart displays all industries and eliminates companies that are outliers rather than eliminate entire industries.

```
# Answer Question 2 here

library(tidyverse)
library(ggplot2)

# Filter on New York state and include only complete use cases

visualize4 <- inc[complete.cases(inc[, c('State')]),] %>%
  filter(State == "NY", na.rm = TRUE) %>%
  arrange(desc(Employees))

visualize4
```

##	Rank	Name	Growth_Rate	Revenue
## 1	4577	Sutherland Global Services	0.48	5.976e+08
## 2	4936	Coty	0.36	4.600e+09
## 3	4716	Westcon Group	0.44	3.800e+09
## 4	3899	Denihan Hospitality Group	0.71	2.808e+08
## 5	4363	TransPerfect	0.55	3.413e+08
## 6	1499	Sterling Infosystems	2.66	2.149e+08
## 7	4465	OpenLink	0.52	3.043e+08
## 8	3136	FSO Onsite Outsourcing	1.05	5.530e+07
## 9	2830	ReSource Pro	1.22	2.430e+07
## 10	2995	Pride Technologies	1.13	2.310e+08
## 11	3387	Mitchell/Martin	0.92	1.453e+08
## 12	4747	TravelClick	0.43	2.571e+08
## 13	2964	DataArt	1.14	3.070e+07
## 14	4913	Jackson Lewis	0.37	3.520e+08
## 15	4646	Mimeo.com	0.46	8.770e+07
## 16	4153	Everyday Health	0.62	1.464e+08
## 17	4003	Ovation Travel Group	0.67	5.860e+07
## 18	1640	BlueWolf	2.38	9.040e+07
## 19	2971	ConServe	1.14	5.270e+07
## 20	4727	Arrow Security	0.44	1.400e+07
## 21	3584	Infusion	0.84	6.790e+07
## 22	4535	Capital Access Network	0.49	1.516e+08
## 23	4224	Fragomen	0.60	3.465e+08
## 24	3500	Magnolia Bakery	0.88	2.360e+07
## 25	1069	Systems Made Simple	3.94	1.671e+08
## 26	4039	Empire Office	0.66	3.496e+08
## 27	3704	Infinity Consulting Solutions	0.79	3.570e+07
## 28	3021	Linium	1.11	4.590e+07
## 29	2218	Globo Mobile	1.67	4.500e+06
## 30	2896	Telx	1.18	2.143e+08
## 31	4820	Aluf Plastics	0.40	1.029e+08
## 32	2436	Shinetech Software	1.48	1.200e+07
## 33	3871	eTransMedia Technology	0.72	2.590e+07
## 34	4981	SmartSource Computer & Audio Visual Rentals	0.35	5.730e+07
## 35	1190	Usablenet	3.52	5.900e+07
## 36	2556	Precision Pipeline Solutions	1.39	3.120e+07
## 37	4944	McElroy Deutsch	0.36	1.165e+08
## 38	4732	Mycroft	0.43	2.640e+07
## 39	4552	Paradysz	0.49	4.100e+07
## 40	4738	McMurry/TMG	0.43	9.140e+07

## 41	3009	5Linx Enterprises	1.12	1.036e+08
## 42	1565	Droga5	2.54	6.730e+07
## 43	2997	Fibertech Networks	1.13	1.423e+08
## 44	3661	Environmental Products & Services of Vermont	0.81	4.510e+07
## 45	1895	nfrastructure	2.00	5.320e+07
## 46	1371	Impelsys	2.94	1.290e+07
## 47	3054	DDS Companies	1.09	5.250e+07
## 48	275	Technical Solutions	15.85	1.630e+07
## 49	3262	Striven Systems	0.98	2.530e+07
## 50	890	Payoneer	5.00	4.040e+07
## 51	701	Thrillist Media Group	6.52	5.250e+07
## 52	3787	Optimax Systems	0.76	2.010e+07
## 53	4335	New York Kids Club	0.56	1.250e+07
## 54	497	RCS Capital	9.19	2.875e+08
## 55	4595	Numerix	0.48	5.640e+07
## 56	3153	Juice Pharma Worldwide	1.04	5.380e+07
## 57	2173	PM Pediatrics	1.70	1.410e+07
## 58	1091	Blue Fountain Media	3.85	1.420e+07
## 59	2678	Treo Solutions	1.31	2.760e+07
## 60	3891	Net@Work	0.72	2.930e+07
## 61	660	OnDeck	6.98	3.670e+07
## 62	750	Livestream	6.13	1.890e+07
## 63	3632	Integrated Systems Management	0.83	4.600e+06
## 64	4117	NorthPoint	0.64	2.730e+07
## 65	883	Envisage Information Systems	5.04	1.700e+07
## 66	4611	Inergex	0.47	1.740e+07
## 67	4422	BPA International	0.53	5.400e+06
## 68	609	SmartWatt Energy	7.54	3.880e+07
## 69	2751	IOMedia	1.27	1.350e+07
## 70	3592	Liberty Pumps	0.84	6.080e+07
## 71	2805	LeadDog Marketing Group	1.23	3.290e+07
## 72	2828	D4	1.22	1.430e+07
## 73	661	Quality In Real Time	6.94	2.900e+06
## 74	1985	U.S. Energy Development	1.89	1.408e+08
## 75	219	Novisync Solutions	19.28	7.500e+06
## 76	4352	Kitware	0.55	2.130e+07
## 77	3168	Atrium Staffing	1.03	9.700e+07
## 78	2494	RVM	1.42	1.880e+07
## 79	3924	Finger Lakes Technologies Group	0.70	2.310e+07
## 80	4544	ePromos Promotional Products	0.49	2.840e+07
## 81	717	Merchant Industry	6.42	2.240e+07
## 82	752	Private Prep	6.12	2.500e+06
## 83	1054	Tarte	4.03	5.240e+07
## 84	1982	Imagine Swimming	1.89	5.100e+06
## 85	174	Refinery29	23.01	1.660e+07
## 86	4803	Benefit Resource	0.41	1.330e+07
## 87	2981	Flexible Systems	1.13	2.960e+07
## 88	4474	Sam Schwartz Engineering	0.51	1.680e+07
## 89	935	Ioxus	4.67	5.400e+06
## 90	2924	WTP Advisors	1.16	1.600e+07
## 91	38	Conductor	67.02	7.100e+06
## 92	4605	QED National	0.47	6.700e+06
## 93	1423	Media6Degrees	2.82	3.670e+07
## 94	3535	Tully Rinckey	0.86	8.800e+06

## 95	2526	Soleo Communications	1.40	1.410e+07
## 96	3601	Best Cleaners	0.84	4.800e+06
## 97	4755	Greyston Bakery	0.42	1.010e+07
## 98	3764	American Portfolios Financial Services	0.77	1.170e+08
## 99	2280	Celerant Technology	1.60	1.820e+07
## 100	3401	Alphaserve Technologies	0.92	1.640e+07
## 101	4896	Rand Engineering & Architecture	0.38	9.800e+06
## 102	30	Sailthru	73.22	8.100e+06
## 103	2067	Signature Systems Group	1.81	8.100e+07
## 104	70	33Across	44.99	2.790e+07
## 105	922	Rebecca Minkoff	4.75	5.890e+07
## 106	2179	Christmas Central	1.69	1.650e+07
## 107	2399	Rain	1.51	1.070e+07
## 108	3289	Butler/Till	0.97	1.236e+08
## 109	4774	The Lloyd Group	0.42	9.900e+06
## 110	656	ForwardThink Group	7.01	2.170e+07
## 111	3351	Bespoke Education	0.94	2.600e+06
## 112	4891	Express Air Freight Unlmted	0.38	2.860e+07
## 113	4639	American Petroleum Equipment & Construction	0.46	1.040e+07
## 114	2795	Onco360	1.24	1.122e+08
## 115	4934	Buffalo Filter	0.37	1.500e+07
## 116	1129	Likeable Media	3.72	5.000e+06
## 117	3097	Gates Automotive	1.07	6.900e+06
## 118	4652	SaveAround	0.46	6.900e+06
## 119	2405	Sullivan	1.50	9.900e+06
## 120	4569	Bogota Latin Bistro	0.48	3.800e+06
## 121	4632	Transfinder	0.47	7.800e+06
## 122	4490	Catseye Pest Control	0.51	9.000e+06
## 123	1259	Decorplanet.com	3.25	1.380e+07
## 124	2142	Liberty Jet Management	1.73	8.900e+06
## 125	3864	ClassBook.com	0.73	9.600e+06
## 126	4170	Creative Environment Solutions	0.62	5.300e+06
## 127	4000	Send Word Now	0.67	1.660e+07
## 128	522	Rockhedge Herb Farms	8.70	5.100e+06
## 129	2336	BountyJobs	1.56	3.080e+07
## 130	3355	Home Clean Home	0.94	2.100e+06
## 131	3383	Graduationsource	0.92	5.300e+06
## 132	4166	Motivators.com	0.62	1.320e+07
## 133	4839	Makovsky	0.40	1.430e+07
## 134	4602	Brite Computers	0.47	1.990e+07
## 135	3358	HR Works	0.93	4.300e+06
## 136	2475	Systems Management/Planning	1.45	5.200e+07
## 137	521	Happy Family Brands	8.70	6.250e+07
## 138	815	Fingerpaint	5.55	9.500e+06
## 139	1293	Madison Logic	3.14	1.490e+07
## 140	3943	Gersh Academy	0.70	8.600e+06
## 141	4448	The Atlantic Group	0.52	6.430e+07
## 142	1442	Global Warranty Group	2.78	2.810e+07
## 143	2542	The Fortus Group	1.39	6.200e+06
## 144	3210	Dance With Me	1.01	4.000e+06
## 145	314	Panjiva	13.77	4.000e+06
## 146	3685	Eminent Technology Solutions	0.80	6.300e+06
## 147	1755	Deep Blue Communications	2.19	5.600e+06
## 148	4245	Computer Resources of America	0.59	7.700e+06



## 149 4399	Direct Agents	0.54 2.270e+07
## 150 285	SET	15.28 2.370e+07
## 151 669	Touchstorm	6.84 6.700e+06
## 152 2506	QueBIT	1.42 1.470e+07
## 153 4336	Cyrus Innovation	0.56 5.900e+06
## 154 450	Carrot Creative	10.24 7.200e+06
## 155 1048	Curbed Media	4.06 5.100e+06
## 156 3643	Docutrend	0.82 8.200e+06
## 157 4008	Nutricap Labs	0.67 3.000e+07
## 158 2209	inVNT	1.67 2.550e+07
## 159 2877	Myriad Supply	1.19 2.290e+07
## 160 4849	GTM Payroll Services	0.40 6.700e+06
## 161 71	LiveIntent	44.85 6.900e+06
## 162 153	Regal Wings	25.13 1.540e+07
## 163 1706	MKG	2.27 2.090e+07
## 164 1876	Servomation	2.03 5.500e+06
## 165 830	Launchpad Advertising	5.40 6.600e+06
## 166 1036	Enstoa	4.11 7.000e+06
## 167 1119	Adafruit	3.75 8.700e+06
## 168 1382	City Sounds of NY	2.92 2.000e+06
## 169 4007	Spear Physical Therapy	0.67 5.200e+06
## 170 4560	Sentry Communications & Security	0.48 6.000e+06
## 171 3424	Stemp Systems Group	19.37 6.800e+06
## 172 1503	AdCorp Media Group	2.65 6.800e+06
## 173 1451	Professional Data Systems	2.76 6.300e+06
## 174 3117	Team Epiphany	1.06 8.200e+06
## 175 1609	Enter:Marketing	2.47 6.500e+06
## 176 2831	Taylor Creative	1.22 9.200e+06
## 177 3603	Gerstein Fisher	0.84 9.700e+06
## 178 3103	SmartSign.com	1.07 2.530e+07
## 179 2116	Charter School Business Management	1.76 3.800e+06
## 180 3663	Liquid Technology	0.81 1.000e+07
## 181 48	Cinium Financial Services	53.65 5.900e+06
## 182 2198	KJT Group	1.68 7.200e+06
## 183 2372	DiGennaro Communications	1.52 4.700e+06
## 184 2718	CreativeFeed	1.29 9.700e+06
## 185 3594	Post Beam	0.84 5.900e+06
## 186 4287	LinguaLinx	0.57 4.300e+06
## 187 515	Integra Networks	8.83 1.660e+07
## 188 4565	EquipSystems	0.48 3.000e+06
## 189 309	Ivy Exec	14.01 2.200e+06
## 190 854	Hipercept	5.23 4.200e+06
## 191 1166	Manhattan Strategy Group	3.60 6.300e+06
## 192 2452	Cafe Grumpy	1.46 2.200e+06
## 193 3789	Xtreme Trips	0.76 6.700e+06
## 194 4162	JR Products	0.62 4.900e+06
## 195 4522	Geneva Worldwide	0.50 7.400e+06
## 196 4475	Presentation Products	0.51 9.700e+06
## 197 124	Quantum Networks	29.44 1.150e+07
## 198 709	Driven Local	6.45 7.500e+06
## 199 1010	Resolute Digital	4.26 7.100e+06
## 200 1181	Sub Rosa	3.56 9.500e+06
## 201 4128	Cvision Technologies	0.63 5.200e+06
## 202 37	YellowHammer	67.40 1.800e+07

## 203 1203	InRhythm	3.47 3.200e+06
## 204 4702	Copier Fax Business Technologies	0.44 5.300e+06
## 205 2656	TekScape	1.32 1.360e+07
## 206 2702	Ryan Printing	1.30 7.300e+06
## 207 465	Bustin Boards	9.92 4.000e+06
## 208 490	MASS Communications	9.33 9.800e+06
## 209 568	LocalResponse	7.94 3.900e+06
## 210 1559	ModiFace	2.55 2.100e+06
## 211 1879	Durante Rentals	2.03 4.800e+06
## 212 1954	CleanEdison	1.94 3.500e+06
## 213 2292	IntraLogic Solutions	1.59 3.700e+06
## 214 2889	Logistic Dynamics	1.18 3.960e+07
## 215 3925	Sinu	0.70 3.000e+06
## 216 4782	Life Safety Engineered Systems	0.42 7.100e+06
## 217 4800	Documentation Strategies	0.41 2.300e+06
## 218 3532	The Urban Group	0.86 5.700e+06
## 219 3544	Proactive Technologies	0.86 4.000e+06
## 220 3549	Influence Graphics	0.86 4.100e+06
## 221 4671	Webucator	0.45 4.600e+06
## 222 1646	New York Technology Partners - Rochester	2.37 3.200e+06
## 223 2077	Sachin Babi	1.80 4.700e+06
## 224 4559	Tabush	0.48 3.900e+06
## 225 232	Rethink Autism	18.27 4.100e+06
## 226 744	BulbAmerica	6.16 6.300e+06
## 227 1067	Dionysus Consulting	3.96 3.400e+06
## 228 1622	LJM Consultants	2.43 4.200e+06
## 229 1877	MaeTec Power	2.03 1.010e+07
## 230 3193	Access Display Group	1.02 4.100e+06
## 231 2784	SportsSignup	1.25 3.300e+06
## 232 2799	School Choice International	1.24 2.800e+06
## 233 3146	Verge Marketing	1.04 4.000e+06
## 234 4154	Business Communications Management	0.62 1.090e+07
## 235 4447	Select Office Suites	0.52 7.600e+06
## 236 1100	ArkNet Media	3.82 5.300e+06
## 237 1723	Spicer Group	2.25 5.600e+06
## 238 2549	Central Park West Dentistry	1.39 3.100e+06
## 239 2747	Stage 2 Networks	1.27 9.200e+06
## 240 418	Grok	10.77 9.400e+06
## 241 971	Imagine Easy Solutions	4.45 3.600e+06
## 242 714	The Classy Home	6.43 2.800e+06
## 243 3716	LISS Consulting	0.79 2.400e+06
## 244 4670	VarData	0.45 1.480e+07
## 245 4853	Affect	0.39 2.600e+06
## 246 26	BeenVerified	84.43 1.370e+07
## 247 126	Renegade Furniture Group	29.26 9.800e+06
## 248 1485	Cipher Tech Solutions	2.69 2.700e+06
## 249 788	Digital Energy	5.79 1.230e+07
## 250 3313	MyDailyMoment.com	0.96 5.900e+06
## 251 4250	NiCoForm	0.59 2.100e+06
## 252 4954	Premium Productions	0.36 6.800e+06
## 253 250	Gravity Media	17.24 1.240e+07
## 254 809	The Ruby Group	5.57 1.100e+07
## 255 818	Salzinger & Company	5.53 3.900e+06
## 256 1210	Trepoint	3.43 4.300e+06

## 257 1540	Gaffos.com	2.58 4.400e+06
## 258 1767	Vcorp Services	2.17 6.300e+06
## 259 2089	React2Media	1.78 5.600e+06
## 260 2562	Advantage Communications Group	1.38 5.600e+06
## 261 2706	Primary Wave Media	1.30 3.000e+06
## 262 3115	MyOTCStore.com	1.06 3.140e+07
## 263 4158	Edulence	0.62 2.000e+06
## 264 4728	DurAmerica Brokerage	0.43 2.700e+06
## 265 526	Surface Magazine	8.63 3.900e+06
## 266 769	Peeled Snacks	5.94 5.800e+06
## 267 1920	Reliance Star Payment Services	1.97 2.000e+06
## 268 2585	Primary Support	1.36 2.300e+06
## 269 2234	WorkCompEDI	1.66 2.900e+06
## 270 2432	Bear Metal Works	1.48 2.400e+06
## 271 4471	KJ Technology Consulting	0.51 4.000e+06
## 272 299	Ultraflex Power Technologies	14.54 2.200e+06
## 273 502	Targetail	9.10 3.700e+06
## 274 728	Vector Media Group	6.30 2.100e+06
## 275 1020	BarkerGilmore	4.22 2.100e+06
## 276 1458	Dynomighty Design	2.74 4.000e+06
## 277 2352	LDJ Productions	1.54 1.230e+07
## 278 2503	Marvin Traub Associates	1.42 3.800e+06
## 279 2666	Adventure in Food Trading	1.32 2.600e+06
## 280 4432	C2C Outdoor	0.53 2.770e+07
## 281 1214	ALAC International	3.42 5.650e+07
## 282 1234	Berricle	3.34 2.200e+06
## 283 2622	Leviathan	1.34 4.840e+07
## 284 4645	DatapointLabs	0.46 2.500e+06
## 285 1717	Society Awards	2.26 3.300e+06
## 286 3056	VHMnetwork	1.09 4.500e+06
## 287 3060	Nasty Pig	1.09 2.000e+06
## 288 4731	PlayScripts	0.43 2.600e+06
## 289 4950	Colorspec Coatings International	0.36 3.300e+06
## 290 2764	Weiss & Associates	1.26 2.000e+06
## 291 3251	Modus Associates	0.99 2.300e+06
## 292 4307	ItsHot.com	0.57 5.700e+06
## 293 4467	Blue Telescope	0.52 3.400e+06
## 294 896	Optimatic	4.97 8.700e+06
## 295 1612	Andiamo Partners	2.46 6.200e+06
## 296 4054	BUMI	0.65 2.300e+06
## 297 280	RosettaBooks	15.49 3.200e+06
## 298 1443	Oliver Staffing	2.78 4.600e+06
## 299 2561	1st Equity	1.38 2.100e+06
## 300 388	Odyssey Telecommunications	11.40 3.300e+06
## 301 400	Forward Health	11.07 1.050e+07
## 302 832	In the Know Experiences	5.39 4.300e+06
## 303 1709	Tribeca Nik	2.27 4.700e+06
## 304 2675	Cedar Petrochemcials	1.31 2.037e+08
## 305 3542	SweetRiot	0.86 2.000e+06
## 306 264	MSR Promo	16.30 2.400e+06
## 307 267	NUE Agency	16.04 4.500e+06
## 308 1986	Medical Supply Depot	1.89 2.600e+06
## 309 632	Armada Capital	7.27 3.600e+06
## 310 1095	UpSurge Media Group	3.84 3.600e+06

## 311 1028	Direct Transport Systems	4.15	2.800e+06
##	Industry Employees	City	State
## 1	Business Products & Services	32000	Pittsford NY
## 2	Consumer Products & Services	10000	New York NY
## 3	IT Services	3000	Tarrytown NY
## 4	Travel & Hospitality	2280	New York NY
## 5	Business Products & Services	2218	New York NY
## 6	Human Resources	2081	New York NY
## 7	Software	1271	Uniondale NY
## 8	Human Resources	1134	New York NY
## 9	Business Products & Services	1124	New York NY
## 10	Human Resources	1000	New York NY
## 11	IT Services	1000	New York NY
## 12	Travel & Hospitality	906	New York NY
## 13	Software	800	New York NY
## 14	Business Products & Services	690	White Plains NY
## 15	Business Products & Services	632	New York NY
## 16	Media	602	New York NY
## 17	Travel & Hospitality	509	New York NY
## 18	IT Services	500	New York NY
## 19	Financial Services	483	Fairport NY
## 20	Security	450	New York NY
## 21	IT Services	432	New York NY
## 22	Financial Services	425	New York NY
## 23	Business Products & Services	404	New York NY
## 24	Food & Beverage	383	New York NY
## 25	IT Services	382	Syracuse NY
## 26	Business Products & Services	345	New York NY
## 27	Human Resources	325	New York NY
## 28	IT Services	322	New York NY
## 29	Software	320	New York NY
## 30	Telecommunications	316	New York NY
## 31	Manufacturing	307	Orangeburg NY
## 32	IT Services	300	New York NY
## 33	Health	298	Troy NY
## 34	Business Products & Services	296	Hauppauge NY
## 35	IT Services	295	New York NY
## 36	Energy	294	New Windsor NY
## 37	Business Products & Services	288	New York NY
## 38	IT Services	275	New York NY
## 39	Advertising & Marketing	270	New York NY
## 40	Advertising & Marketing	269	New York City NY
## 41	Telecommunications	268	Rochester NY
## 42	Advertising & Marketing	250	New York NY
## 43	Telecommunications	250	ROCHESTER NY
## 44	Environmental Services	250	Syracuse NY
## 45	IT Services	237	Clifton Park NY
## 46	Software	220	New York NY
## 47	Construction	219	Rochester NY
## 48	Telecommunications	213	Walden NY
## 49	IT Services	210	Melville NY
## 50	Financial Services	207	New York NY
## 51	Media	200	New York NY
## 52	Manufacturing	200	Ontario NY

## 53	Education	200	New York	NY
## 54	Financial Services	198	New York	NY
## 55	Software	198	New York	NY
## 56	Advertising & Marketing	186	New York	NY
## 57	Health	181	Lake Success	NY
## 58	Advertising & Marketing	180	New York	NY
## 59	Health	166	troy	NY
## 60	IT Services	156	New York	NY
## 61	Financial Services	153	New York	NY
## 62	Media	146	New York	NY
## 63	IT Services	144	Tarrytown	NY
## 64	Business Products & Services	144	New York	NY
## 65	IT Services	142	Ithaca	NY
## 66	IT Services	140	Buffalo	NY
## 67	Telecommunications	139	Carle Place	NY
## 68	Energy	137	Ballston Lake	NY
## 69	Advertising & Marketing	133	New York	NY
## 70	Manufacturing	132	Bergen	NY
## 71	Advertising & Marketing	131	New York	NY
## 72	IT Services	125	Rochester	NY
## 73	Health	121	Floral Park	NY
## 74	Energy	120	Getzville	NY
## 75	IT Services	119	Fishkill	NY
## 76	Software	110	Clifton Park	NY
## 77	Human Resources	107	New York	NY
## 78	Business Products & Services	106	New York	NY
## 79	Telecommunications	105	Victor	NY
## 80	Advertising & Marketing	104	New York	NY
## 81	Financial Services	102	Long Island City	NY
## 82	Education	100	New York	NY
## 83	Consumer Products & Services	100	new york	NY
## 84	Education	100	New York	NY
## 85	Media	99	New York	NY
## 86	Business Products & Services	96	Rochester	NY
## 87	IT Services	95	Hauppauge	NY
## 88	Engineering	94	New York	NY
## 89	Energy	90	Oneonta	NY
## 90	Business Products & Services	90	White Plains	NY
## 91	Advertising & Marketing	89	New York	NY
## 92	IT Services	89	New York	NY
## 93	Advertising & Marketing	87	New York	NY
## 94	Consumer Products & Services	87	Albany	NY
## 95	Telecommunications	85	Fairport	NY
## 96	Consumer Products & Services	85	Schenectady	NY
## 97	Food & Beverage	84	Yonkers	NY
## 98	Financial Services	81	Holbrook	NY
## 99	Software	80	Staten Island	NY
## 100	IT Services	80	New York	NY
## 101	Engineering	80	New York	NY
## 102	Advertising & Marketing	79	New York	NY
## 103	Manufacturing	77	New York	NY
## 104	Advertising & Marketing	75	New York	NY
## 105	Retail	75	New York	NY
## 106	Retail	75	Cheektowaga	NY

## 107	Advertising & Marketing	74	New York	NY
## 108	Advertising & Marketing	73	Rochester	NY
## 109	IT Services	73	New York	NY
## 110	Financial Services	70	New York	NY
## 111	Education	70	New York	NY
## 112	Logistics & Transportation	70	Jamaica	NY
## 113	Construction	68	Walden	NY
## 114	Health	67	New York	NY
## 115	Manufacturing	67	Lancaster	NY
## 116	Advertising & Marketing	65	New York	NY
## 117	Consumer Products & Services	64	Henrietta	NY
## 118	Advertising & Marketing	64	Binghamton	NY
## 119	Advertising & Marketing	63	New York	NY
## 120	Food & Beverage	63	Brooklyn	NY
## 121	Software	63	Schenectady	NY
## 122	Consumer Products & Services	62	Castleton	NY
## 123	Retail	61	New York	NY
## 124	Travel & Hospitality	61	Ronkonkoma	NY
## 125	Education	61	Castleton	NY
## 126	Environmental Services	60	New York	NY
## 127	Telecommunications	59	New York	NY
## 128	Food & Beverage	56	Pleasant Valley	NY
## 129	Human Resources	56	New York	NY
## 130	Consumer Products & Services	55	Brooklyn	NY
## 131	Education	55	Port Chester	NY
## 132	Advertising & Marketing	55	westbury	NY
## 133	Advertising & Marketing	55	New York	NY
## 134	IT Services	54	Victor	NY
## 135	Human Resources	53	Fairport	NY
## 136	IT Services	52	Rochester	NY
## 137	Consumer Products & Services	51	New York	NY
## 138	Advertising & Marketing	51	Saratoga Springs	NY
## 139	Advertising & Marketing	51	New York	NY
## 140	Education	51	Huntington	NY
## 141	Business Products & Services	51	New York	NY
## 142	Insurance	50	St James	NY
## 143	Health	50	Utica	NY
## 144	Education	50	New York	NY
## 145	Business Products & Services	48	New York	NY
## 146	IT Services	48	Buffalo	NY
## 147	IT Services	47	Latham	NY
## 148	IT Services	47	New York	NY
## 149	Advertising & Marketing	47	New York	NY
## 150	Advertising & Marketing	46	New York	NY
## 151	Media	46	New York	NY
## 152	IT Services	46	Scarsdale	NY
## 153	Software	46	new york	NY
## 154	Advertising & Marketing	45	Brooklyn	NY
## 155	Media	45	New York	NY
## 156	Business Products & Services	45	New York	NY
## 157	Health	45	Farmingdale	NY
## 158	Advertising & Marketing	44	New York	NY
## 159	Computer Hardware	44	New York	NY
## 160	Financial Services	43	Clifton Park	NY

## 161	Advertising & Marketing	42	New York	NY
## 162	Travel & Hospitality	42	Brooklyn	NY
## 163	Advertising & Marketing	41	New York	NY
## 164	Food & Beverage	41	Canastota	NY
## 165	Advertising & Marketing	40	New York	NY
## 166	IT Services	40	New York	NY
## 167	Manufacturing	40	New York	NY
## 168	Education	40	New York	NY
## 169	Health	40	New York	NY
## 170	Security	40	Hicksville	NY
## 171	IT Services	39	Long Island City	NY
## 172	Advertising & Marketing	38	IRVINGTON	NY
## 173	Health	37	White Plains	NY
## 174	Advertising & Marketing	37	New York	NY
## 175	Advertising & Marketing	35	New York	NY
## 176	Advertising & Marketing	35	New York	NY
## 177	Financial Services	35	New York	NY
## 178	Business Products & Services	34	Brooklyn	NY
## 179	Financial Services	33	New York	NY
## 180	IT Services	33	Brooklyn	NY
## 181	Financial Services	32	Rock Hill	NY
## 182	Business Products & Services	32	Honeoye Falls	NY
## 183	Advertising & Marketing	32	New York	NY
## 184	Advertising & Marketing	32	New York	NY
## 185	Advertising & Marketing	32	New York	NY
## 186	Business Products & Services	32	Cohoes	NY
## 187	Telecommunications	31	Latham	NY
## 188	Health	31	New York	NY
## 189	Human Resources	30	New York	NY
## 190	Real Estate	30	New York	NY
## 191	Business Products & Services	30	New York	NY
## 192	Food & Beverage	30	Brooklyn	NY
## 193	Travel & Hospitality	30	plainview	NY
## 194	Manufacturing	30	Clarence Center	NY
## 195	Business Products & Services	30	new york	NY
## 196	Engineering	29	New York	NY
## 197	Telecommunications	28	New York	NY
## 198	Advertising & Marketing	28	Melville	NY
## 199	Advertising & Marketing	28	New York	NY
## 200	Advertising & Marketing	28	New York	NY
## 201	Software	28	Forest Hills	NY
## 202	Advertising & Marketing	27	New York	NY
## 203	IT Services	27	New York	NY
## 204	Business Products & Services	27	Buffalo	NY
## 205	IT Services	26	New York	NY
## 206	Manufacturing	26	blauvelt	NY
## 207	Consumer Products & Services	25	Brooklyn	NY
## 208	Telecommunications	25	New York	NY
## 209	Advertising & Marketing	25	new york	NY
## 210	Software	25	New York	NY
## 211	Construction	25	Bronx	NY
## 212	Education	25	New York	NY
## 213	Security	25	Massapequa	NY
## 214	Logistics & Transportation	25	Amherst	NY

## 215	IT Services	25	New York	NY
## 216	Security	25	buffalo	NY
## 217	IT Services	25	Rensselaer	NY
## 218	Construction	24	Woodhaven	NY
## 219	IT Services	24	New York	NY
## 220	Advertising & Marketing	24	New York	NY
## 221	Education	24	Jamesville	NY
## 222	IT Services	23	Rochester	NY
## 223	Consumer Products & Services	23	New York	NY
## 224	IT Services	23	New York	NY
## 225	Education	22	New York	NY
## 226	Retail	22	Brooklyn	NY
## 227	Advertising & Marketing	22	West Islip	NY
## 228	Logistics & Transportation	22	Melville	NY
## 229	Telecommunications	22	Fairport	NY
## 230	Manufacturing	22	Freeport	NY
## 231	Software	21	Saratoga Springs	NY
## 232	Education	21	White Plains	NY
## 233	Advertising & Marketing	21	New York	NY
## 234	Telecommunications	21	New York	NY
## 235	Real Estate	21	New York	NY
## 236	Consumer Products & Services	20	Garden City	NY
## 237	Construction	20	Buffalo	NY
## 238	Health	20	New York	NY
## 239	Telecommunications	20	New York	NY
## 240	Advertising & Marketing	19	New York	NY
## 241	Education	19	New York City	NY
## 242	Consumer Products & Services	18	Brooklyn	NY
## 243	IT Services	18	Lake Success	NY
## 244	Telecommunications	18	Rochester	NY
## 245	Advertising & Marketing	18	New York	NY
## 246	Consumer Products & Services	17	New York	NY
## 247	Retail	17	Hewlett	NY
## 248	Government Services	17	Nyack	NY
## 249	Consumer Products & Services	16	Brooklyn	NY
## 250	Media	16	New York	NY
## 251	Manufacturing	16	Rochester	NY
## 252	Advertising & Marketing	16	Pleasantville	NY
## 253	Advertising & Marketing	15	New York	NY
## 254	Real Estate	15	Goshen	NY
## 255	IT Services	15	Scarsdale	NY
## 256	Advertising & Marketing	15	Great Neck	NY
## 257	Retail	15	Inwood	NY
## 258	Business Products & Services	15	Monsey	NY
## 259	Advertising & Marketing	15	New York	NY
## 260	Telecommunications	15	Roslyn Heights	NY
## 261	Advertising & Marketing	15	Pleasantville	NY
## 262	Retail	15	New York	NY
## 263	Software	15	New York	NY
## 264	Insurance	15	Long Island City	NY
## 265	Media	14	New York	NY
## 266	Food & Beverage	14	Brooklyn	NY
## 267	Financial Services	14	Oakland Gardens	NY
## 268	IT Services	14	New York	NY

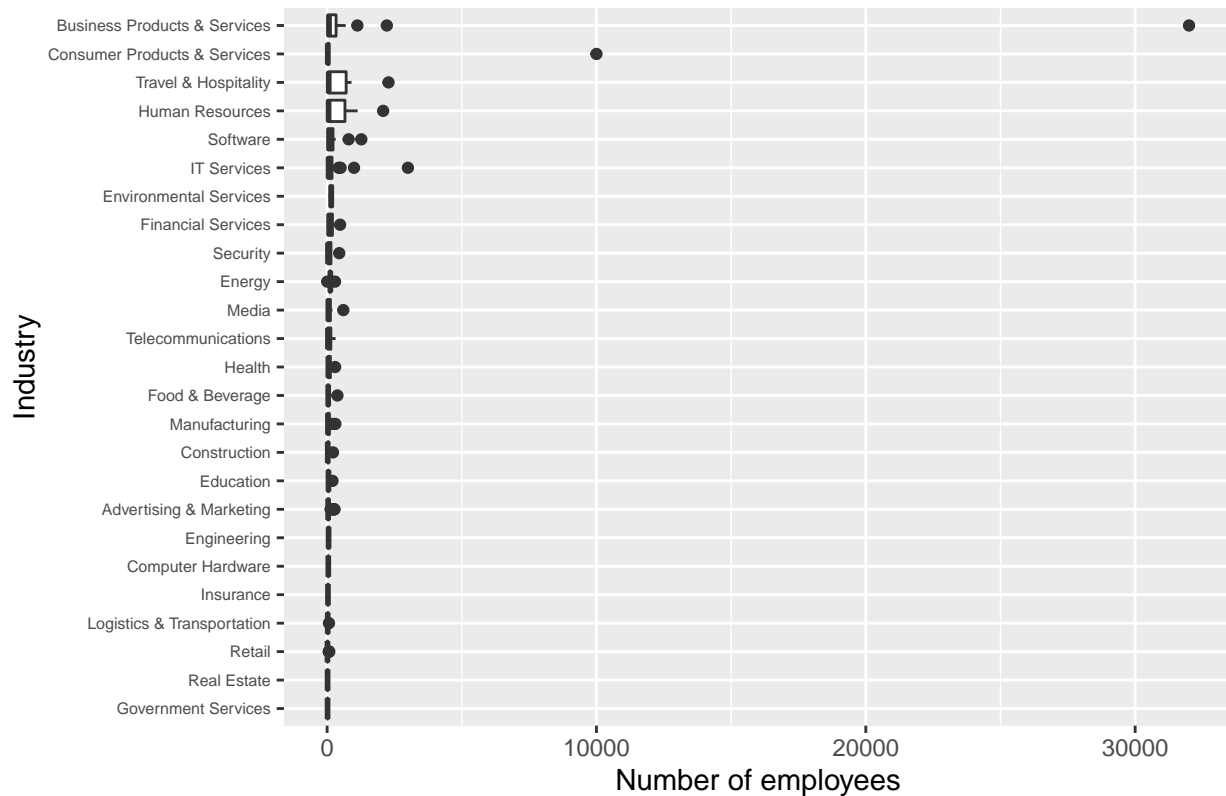


## 269	IT Services	13	Holbrook	NY
## 270	Manufacturing	13	Buffalo	NY
## 271	IT Services	13	New York	NY
## 272	Manufacturing	12	Ronkonkoma	NY
## 273	Advertising & Marketing	12	New York	NY
## 274	Advertising & Marketing	12	New York	NY
## 275	Human Resources	12	Fairport	NY
## 276	Retail	12	Brooklyn	NY
## 277	Business Products & Services	12	New York	NY
## 278	Retail	12	New York	NY
## 279	Food & Beverage	12	Menands	NY
## 280	Advertising & Marketing	12	New York	NY
## 281	Manufacturing	11	New York	NY
## 282	Retail	11	ASTORIA	NY
## 283	Business Products & Services	11	Brooklyn	NY
## 284	Engineering	11	Ithaca	NY
## 285	Consumer Products & Services	10	Long Island City	NY
## 286	Advertising & Marketing	10	New York	NY
## 287	Retail	10	New York	NY
## 288	Retail	10	New York	NY
## 289	Construction	10	Holbrook	NY
## 290	Consumer Products & Services	9	New York	NY
## 291	Advertising & Marketing	9	New York	NY
## 292	Retail	9	New York	NY
## 293	Media	9	New York	NY
## 294	Advertising & Marketing	8	new york	NY
## 295	Human Resources	8	New York	NY
## 296	IT Services	8	New York	NY
## 297	Media	7	New York	NY
## 298	Human Resources	7	New York	NY
## 299	Real Estate	7	Syosset	NY
## 300	Telecommunications	6	colden	NY
## 301	Health	6	New York	NY
## 302	Travel & Hospitality	6	New York	NY
## 303	Consumer Products & Services	5	Lindenhurst	NY
## 304	Energy	5	New York	NY
## 305	Food & Beverage	5	New York	NY
## 306	Business Products & Services	4	New York	NY
## 307	Media	4	New York	NY
## 308	Retail	3	Brooklyn	NY
## 309	Health	2	New York	NY
## 310	Advertising & Marketing	2	New York	NY
## 311	Logistics & Transportation	1	Farmingdale	NY

*# Plot based on number of employees without eliminating outliers*

```
ggplot(data = visualize4, aes(x = Employees, y = reorder(Industry, Employees))) +
  geom_boxplot() +
  labs(title = "Boxplot # 1 - Employment by industry in NY state", x = "Number of employees", y = "Indus")
  theme(axis.text.y = element_text(size = 6)) +
  theme(plot.title = element_text(hjust = 0.5))
```

Boxplot # 1 – Employment by industry in NY state



*# Eliminate outliers in the underlying data and then plot*

```
visualize5 <- inc[complete.cases(inc[, c('State')]),] %>%
  filter(State == "NY" & Industry != "Consumer Products & Services" & Industry != "Business Products & Services")
  arrange(desc(Employees))
```

visualize5

##	Rank	Name	Growth_Rate	Revenue
## 1	4716	Westcon Group	0.44	3.800e+09
## 2	3899	Denihan Hospitality Group	0.71	2.808e+08
## 3	1499	Sterling Infosystems	2.66	2.149e+08
## 4	4465	OpenLink	0.52	3.043e+08
## 5	3136	FSO Onsite Outsourcing	1.05	5.530e+07
## 6	2995	Pride Technologies	1.13	2.310e+08
## 7	3387	Mitchell/Martin	0.92	1.453e+08
## 8	4747	TravelClick	0.43	2.571e+08
## 9	2964	DataArt	1.14	3.070e+07
## 10	4153	Everyday Health	0.62	1.464e+08
## 11	4003	Ovation Travel Group	0.67	5.860e+07
## 12	1640	BlueWolf	2.38	9.040e+07
## 13	2971	ConServe	1.14	5.270e+07
## 14	4727	Arrow Security	0.44	1.400e+07
## 15	3584	Infusion	0.84	6.790e+07
## 16	4535	Capital Access Network	0.49	1.516e+08
## 17	3500	Magnolia Bakery	0.88	2.360e+07

## 18	1069	Systems Made Simple	3.94	1.671e+08
## 19	3704	Infinity Consulting Solutions	0.79	3.570e+07
## 20	3021	Linium	1.11	4.590e+07
## 21	2218	Globo Mobile	1.67	4.500e+06
## 22	2896	Telx	1.18	2.143e+08
## 23	4820	Aluf Plastics	0.40	1.029e+08
## 24	2436	Shinetech Software	1.48	1.200e+07
## 25	3871	eTransMedia Technology	0.72	2.590e+07
## 26	1190	Usablenet	3.52	5.900e+07
## 27	2556	Precision Pipeline Solutions	1.39	3.120e+07
## 28	4732	Mycroft	0.43	2.640e+07
## 29	4552	Paradysz	0.49	4.100e+07
## 30	4738	McMurry/TMG	0.43	9.140e+07
## 31	3009	5Linx Enterprises	1.12	1.036e+08
## 32	1565	Droga5	2.54	6.730e+07
## 33	2997	Fibertech Networks	1.13	1.423e+08
## 34	3661	Environmental Products & Services of Vermont	0.81	4.510e+07
## 35	1895	nrastructure	2.00	5.320e+07
## 36	1371	Impelsys	2.94	1.290e+07
## 37	3054	DDS Companies	1.09	5.250e+07
## 38	275	Technical Solutions	15.85	1.630e+07
## 39	3262	Striven Systems	0.98	2.530e+07
## 40	890	Payoneer	5.00	4.040e+07
## 41	701	Thrillist Media Group	6.52	5.250e+07
## 42	3787	Optimax Systems	0.76	2.010e+07
## 43	4335	New York Kids Club	0.56	1.250e+07
## 44	497	RCS Capital	9.19	2.875e+08
## 45	4595	Numerix	0.48	5.640e+07
## 46	3153	Juice Pharma Worldwide	1.04	5.380e+07
## 47	2173	PM Pediatrics	1.70	1.410e+07
## 48	1091	Blue Fountain Media	3.85	1.420e+07
## 49	2678	Treo Solutions	1.31	2.760e+07
## 50	3891	Net@Work	0.72	2.930e+07
## 51	660	OnDeck	6.98	3.670e+07
## 52	750	Livestream	6.13	1.890e+07
## 53	3632	Integrated Systems Management	0.83	4.600e+06
## 54	883	Envisage Information Systems	5.04	1.700e+07
## 55	4611	Inergex	0.47	1.740e+07
## 56	4422	BPA International	0.53	5.400e+06
## 57	609	SmartWatt Energy	7.54	3.880e+07
## 58	2751	IOMedia	1.27	1.350e+07
## 59	3592	Liberty Pumps	0.84	6.080e+07
## 60	2805	LeadDog Marketing Group	1.23	3.290e+07
## 61	2828	D4	1.22	1.430e+07
## 62	661	Quality In Real Time	6.94	2.900e+06
## 63	1985	U.S. Energy Development	1.89	1.408e+08
## 64	219	Novisync Solutions	19.28	7.500e+06
## 65	4352	Kitware	0.55	2.130e+07
## 66	3168	Atrium Staffing	1.03	9.700e+07
## 67	3924	Finger Lakes Technologies Group	0.70	2.310e+07
## 68	4544	ePromos Promotional Products	0.49	2.840e+07
## 69	717	Merchant Industry	6.42	2.240e+07
## 70	752	Private Prep	6.12	2.500e+06
## 71	1982	Imagine Swimming	1.89	5.100e+06

## 72	174	Refinery29	23.01	1.660e+07
## 73	2981	Flexible Systems	1.13	2.960e+07
## 74	4474	Sam Schwartz Engineering	0.51	1.680e+07
## 75	935	Ioxus	4.67	5.400e+06
## 76	38	Conductor	67.02	7.100e+06
## 77	4605	QED National	0.47	6.700e+06
## 78	1423	Media6Degrees	2.82	3.670e+07
## 79	2526	Soleo Communications	1.40	1.410e+07
## 80	4755	Greyston Bakery	0.42	1.010e+07
## 81	3764	American Portfolios Financial Services	0.77	1.170e+08
## 82	2280	Celerant Technology	1.60	1.820e+07
## 83	3401	Alphaserve Technologies	0.92	1.640e+07
## 84	4896	Rand Engineering & Architecture	0.38	9.800e+06
## 85	30	Sailthru	73.22	8.100e+06
## 86	2067	Signature Systems Group	1.81	8.100e+07
## 87	70	33Across	44.99	2.790e+07
## 88	922	Rebecca Minkoff	4.75	5.890e+07
## 89	2179	Christmas Central	1.69	1.650e+07
## 90	2399	Rain	1.51	1.070e+07
## 91	3289	Butler/Till	0.97	1.236e+08
## 92	4774	The Lloyd Group	0.42	9.900e+06
## 93	656	ForwardThink Group	7.01	2.170e+07
## 94	3351	Bespoke Education	0.94	2.600e+06
## 95	4891	Express Air Freight Unlmted	0.38	2.860e+07
## 96	4639	American Petroleum Equipment & Construction	0.46	1.040e+07
## 97	2795	Onco360	1.24	1.122e+08
## 98	4934	Buffalo Filter	0.37	1.500e+07
## 99	1129	Likeable Media	3.72	5.000e+06
## 100	4652	SaveAround	0.46	6.900e+06
## 101	2405	Sullivan	1.50	9.900e+06
## 102	4569	Bogota Latin Bistro	0.48	3.800e+06
## 103	4632	Transfinder	0.47	7.800e+06
## 104	1259	Decorplanet.com	3.25	1.380e+07
## 105	2142	Liberty Jet Management	1.73	8.900e+06
## 106	3864	ClassBook.com	0.73	9.600e+06
## 107	4170	Creative Environment Solutions	0.62	5.300e+06
## 108	4000	Send Word Now	0.67	1.660e+07
## 109	522	Rockhedge Herb Farms	8.70	5.100e+06
## 110	2336	BountyJobs	1.56	3.080e+07
## 111	3383	Graduationsource	0.92	5.300e+06
## 112	4166	Motivators.com	0.62	1.320e+07
## 113	4839	Makovsky	0.40	1.430e+07
## 114	4602	Brite Computers	0.47	1.990e+07
## 115	3358	HR Works	0.93	4.300e+06
## 116	2475	Systems Management/Planning	1.45	5.200e+07
## 117	815	Fingerpaint	5.55	9.500e+06
## 118	1293	Madison Logic	3.14	1.490e+07
## 119	3943	Gersh Academy	0.70	8.600e+06
## 120	1442	Global Warranty Group	2.78	2.810e+07
## 121	2542	The Fortus Group	1.39	6.200e+06
## 122	3210	Dance With Me	1.01	4.000e+06
## 123	3685	Eminent Technology Solutions	0.80	6.300e+06
## 124	1755	Deep Blue Communications	2.19	5.600e+06
## 125	4245	Computer Resources of America	0.59	7.700e+06

## 126 4399	Direct Agents	0.54 2.270e+07
## 127 285	SET	15.28 2.370e+07
## 128 669	Touchstorm	6.84 6.700e+06
## 129 2506	QueBIT	1.42 1.470e+07
## 130 4336	Cyrus Innovation	0.56 5.900e+06
## 131 450	Carrot Creative	10.24 7.200e+06
## 132 1048	Curbed Media	4.06 5.100e+06
## 133 4008	Nutricap Labs	0.67 3.000e+07
## 134 2209	inVNT	1.67 2.550e+07
## 135 2877	Myriad Supply	1.19 2.290e+07
## 136 4849	GTM Payroll Services	0.40 6.700e+06
## 137 71	LiveIntent	44.85 6.900e+06
## 138 153	Regal Wings	25.13 1.540e+07
## 139 1706	MKG	2.27 2.090e+07
## 140 1876	Servomation	2.03 5.500e+06
## 141 830	Launchpad Advertising	5.40 6.600e+06
## 142 1036	Enstoa	4.11 7.000e+06
## 143 1119	Adafruit	3.75 8.700e+06
## 144 1382	City Sounds of NY	2.92 2.000e+06
## 145 4007	Spear Physical Therapy	0.67 5.200e+06
## 146 4560	Sentry Communications & Security	0.48 6.000e+06
## 147 3424	Stemp Systems Group	19.37 6.800e+06
## 148 1503	AdCorp Media Group	2.65 6.800e+06
## 149 1451	Professional Data Systems	2.76 6.300e+06
## 150 3117	Team Epiphany	1.06 8.200e+06
## 151 1609	Enter:Marketing	2.47 6.500e+06
## 152 2831	Taylor Creative	1.22 9.200e+06
## 153 3603	Gerstein Fisher	0.84 9.700e+06
## 154 2116	Charter School Business Management	1.76 3.800e+06
## 155 3663	Liquid Technology	0.81 1.000e+07
## 156 48	Cinium Financial Services	53.65 5.900e+06
## 157 2372	DiGennaro Communications	1.52 4.700e+06
## 158 2718	CreativeFeed	1.29 9.700e+06
## 159 3594	Post Beam	0.84 5.900e+06
## 160 515	Integra Networks	8.83 1.660e+07
## 161 4565	EquipSystems	0.48 3.000e+06
## 162 309	Ivy Exec	14.01 2.200e+06
## 163 854	Hipercept	5.23 4.200e+06
## 164 2452	Cafe Grumpy	1.46 2.200e+06
## 165 3789	Xtreme Trips	0.76 6.700e+06
## 166 4162	JR Products	0.62 4.900e+06
## 167 4475	Presentation Products	0.51 9.700e+06
## 168 124	Quantum Networks	29.44 1.150e+07
## 169 709	Driven Local	6.45 7.500e+06
## 170 1010	Resolute Digital	4.26 7.100e+06
## 171 1181	Sub Rosa	3.56 9.500e+06
## 172 4128	Cvision Technologies	0.63 5.200e+06
## 173 37	YellowHammer	67.40 1.800e+07
## 174 1203	InRhythm	3.47 3.200e+06
## 175 2656	TekScape	1.32 1.360e+07
## 176 2702	Ryan Printing	1.30 7.300e+06
## 177 490	MASS Communications	9.33 9.800e+06
## 178 568	LocalResponse	7.94 3.900e+06
## 179 1559	ModiFace	2.55 2.100e+06

## 180 1879	Durante Rentals	2.03 4.800e+06
## 181 1954	CleanEdison	1.94 3.500e+06
## 182 2292	IntraLogic Solutions	1.59 3.700e+06
## 183 2889	Logistic Dynamics	1.18 3.960e+07
## 184 3925	Sinu	0.70 3.000e+06
## 185 4782	Life Safety Engineered Systems	0.42 7.100e+06
## 186 4800	Documentation Strategies	0.41 2.300e+06
## 187 3532	The Urban Group	0.86 5.700e+06
## 188 3544	Proactive Technologies	0.86 4.000e+06
## 189 3549	Influence Graphics	0.86 4.100e+06
## 190 4671	Webucator	0.45 4.600e+06
## 191 1646	New York Technology Partners - Rochester	2.37 3.200e+06
## 192 4559	Tabush	0.48 3.900e+06
## 193 232	Rethink Autism	18.27 4.100e+06
## 194 744	BulbAmerica	6.16 6.300e+06
## 195 1067	Dionysus Consulting	3.96 3.400e+06
## 196 1622	LJM Consultants	2.43 4.200e+06
## 197 1877	MaeTec Power	2.03 1.010e+07
## 198 3193	Access Display Group	1.02 4.100e+06
## 199 2784	SportsSignup	1.25 3.300e+06
## 200 2799	School Choice International	1.24 2.800e+06
## 201 3146	Verge Marketing	1.04 4.000e+06
## 202 4154	Business Communications Management	0.62 1.090e+07
## 203 4447	Select Office Suites	0.52 7.600e+06
## 204 1723	Spicer Group	2.25 5.600e+06
## 205 2549	Central Park West Dentistry	1.39 3.100e+06
## 206 2747	Stage 2 Networks	1.27 9.200e+06
## 207 418	Grok	10.77 9.400e+06
## 208 971	Imagine Easy Solutions	4.45 3.600e+06
## 209 3716	LISS Consulting	0.79 2.400e+06
## 210 4670	VarData	0.45 1.480e+07
## 211 4853	Affect	0.39 2.600e+06
## 212 126	Renegade Furniture Group	29.26 9.800e+06
## 213 1485	Cipher Tech Solutions	2.69 2.700e+06
## 214 3313	MyDailyMoment.com	0.96 5.900e+06
## 215 4250	NiCoForm	0.59 2.100e+06
## 216 4954	Premium Productions	0.36 6.800e+06
## 217 250	Gravity Media	17.24 1.240e+07
## 218 809	The Ruby Group	5.57 1.100e+07
## 219 818	Salzinger & Company	5.53 3.900e+06
## 220 1210	Trepoint	3.43 4.300e+06
## 221 1540	Gaffos.com	2.58 4.400e+06
## 222 2089	React2Media	1.78 5.600e+06
## 223 2562	Advantage Communications Group	1.38 5.600e+06
## 224 2706	Primary Wave Media	1.30 3.000e+06
## 225 3115	MyOTCStore.com	1.06 3.140e+07
## 226 4158	Edulence	0.62 2.000e+06
## 227 4728	DurAmerica Brokerage	0.43 2.700e+06
## 228 526	Surface Magazine	8.63 3.900e+06
## 229 769	Peeled Snacks	5.94 5.800e+06
## 230 1920	Reliance Star Payment Services	1.97 2.000e+06
## 231 2585	Primary Support	1.36 2.300e+06
## 232 2234	WorkCompEDI	1.66 2.900e+06
## 233 2432	Bear Metal Works	1.48 2.400e+06

## 234	4471	KJ Technology Consulting	0.51	4.000e+06
## 235	299	Ultraflex Power Technologies	14.54	2.200e+06
## 236	502	Largetail	9.10	3.700e+06
## 237	728	Vector Media Group	6.30	2.100e+06
## 238	1020	BarkerGilmore	4.22	2.100e+06
## 239	1458	Dynomighty Design	2.74	4.000e+06
## 240	2503	Marvin Traub Associates	1.42	3.800e+06
## 241	2666	Adventure in Food Trading	1.32	2.600e+06
## 242	4432	C2C Outdoor	0.53	2.770e+07
## 243	1214	ALAC International	3.42	5.650e+07
## 244	1234	Berricle	3.34	2.200e+06
## 245	4645	DatapointLabs	0.46	2.500e+06
## 246	3056	VHMnetwork	1.09	4.500e+06
## 247	3060	Nasty Pig	1.09	2.000e+06
## 248	4731	PlayScripts	0.43	2.600e+06
## 249	4950	Colorspec Coatings International	0.36	3.300e+06
## 250	3251	Modus Associates	0.99	2.300e+06
## 251	4307	ItsHot.com	0.57	5.700e+06
## 252	4467	Blue Telescope	0.52	3.400e+06
## 253	896	Optimatic	4.97	8.700e+06
## 254	1612	Andiamo Partners	2.46	6.200e+06
## 255	4054	BUMI	0.65	2.300e+06
## 256	280	RosettaBooks	15.49	3.200e+06
## 257	1443	Oliver Staffing	2.78	4.600e+06
## 258	2561	1st Equity	1.38	2.100e+06
## 259	388	Odyssey Telecommunications	11.40	3.300e+06
## 260	400	Forward Health	11.07	1.050e+07
## 261	832	In the Know Experiences	5.39	4.300e+06
## 262	2675	Cedar Petrochemcials	1.31	2.037e+08
## 263	3542	SweetRiot	0.86	2.000e+06
## 264	267	NUE Agency	16.04	4.500e+06
## 265	1986	Medical Supply Depot	1.89	2.600e+06
## 266	632	Armadale Capital	7.27	3.600e+06
## 267	1095	UpSurge Media Group	3.84	3.600e+06
## 268	1028	Direct Transport Systems	4.15	2.800e+06
##		Industry Employees		City State
## 1		IT Services	3000	Tarrytown NY
## 2		Travel & Hospitality	2280	New York NY
## 3		Human Resources	2081	New York NY
## 4		Software	1271	Uniondale NY
## 5		Human Resources	1134	New York NY
## 6		Human Resources	1000	New York NY
## 7		IT Services	1000	New York NY
## 8		Travel & Hospitality	906	New York NY
## 9		Software	800	New York NY
## 10		Media	602	New York NY
## 11		Travel & Hospitality	509	New York NY
## 12		IT Services	500	New York NY
## 13		Financial Services	483	Fairport NY
## 14		Security	450	New York NY
## 15		IT Services	432	New York NY
## 16		Financial Services	425	New York NY
## 17		Food & Beverage	383	New York NY
## 18		IT Services	382	Syracuse NY

## 19	Human Resources	325	New York	NY
## 20	IT Services	322	New York	NY
## 21	Software	320	New York	NY
## 22	Telecommunications	316	New York	NY
## 23	Manufacturing	307	Orangeburg	NY
## 24	IT Services	300	New York	NY
## 25	Health	298	Troy	NY
## 26	IT Services	295	New York	NY
## 27	Energy	294	New Windsor	NY
## 28	IT Services	275	New York	NY
## 29	Advertising & Marketing	270	New York	NY
## 30	Advertising & Marketing	269	New York City	NY
## 31	Telecommunications	268	Rochester	NY
## 32	Advertising & Marketing	250	New York	NY
## 33	Telecommunications	250	ROCHESTER	NY
## 34	Environmental Services	250	Syracuse	NY
## 35	IT Services	237	Clifton Park	NY
## 36	Software	220	New York	NY
## 37	Construction	219	Rochester	NY
## 38	Telecommunications	213	Walden	NY
## 39	IT Services	210	Melville	NY
## 40	Financial Services	207	New York	NY
## 41	Media	200	New York	NY
## 42	Manufacturing	200	Ontario	NY
## 43	Education	200	New York	NY
## 44	Financial Services	198	New York	NY
## 45	Software	198	New York	NY
## 46	Advertising & Marketing	186	New York	NY
## 47	Health	181	Lake Success	NY
## 48	Advertising & Marketing	180	New York	NY
## 49	Health	166	troy	NY
## 50	IT Services	156	New York	NY
## 51	Financial Services	153	New York	NY
## 52	Media	146	New York	NY
## 53	IT Services	144	Tarrytown	NY
## 54	IT Services	142	Ithaca	NY
## 55	IT Services	140	Buffalo	NY
## 56	Telecommunications	139	Carle Place	NY
## 57	Energy	137	Ballston Lake	NY
## 58	Advertising & Marketing	133	New York	NY
## 59	Manufacturing	132	Bergen	NY
## 60	Advertising & Marketing	131	New York	NY
## 61	IT Services	125	Rochester	NY
## 62	Health	121	Floral Park	NY
## 63	Energy	120	Getzville	NY
## 64	IT Services	119	Fishkill	NY
## 65	Software	110	Clifton Park	NY
## 66	Human Resources	107	New York	NY
## 67	Telecommunications	105	Victor	NY
## 68	Advertising & Marketing	104	New York	NY
## 69	Financial Services	102	Long Island City	NY
## 70	Education	100	New York	NY
## 71	Education	100	New York	NY
## 72	Media	99	New York	NY



## 73	IT Services	95	Hauppauge	NY
## 74	Engineering	94	New York	NY
## 75	Energy	90	Oneonta	NY
## 76	Advertising & Marketing	89	New York	NY
## 77	IT Services	89	New York	NY
## 78	Advertising & Marketing	87	New York	NY
## 79	Telecommunications	85	Fairport	NY
## 80	Food & Beverage	84	Yonkers	NY
## 81	Financial Services	81	Holbrook	NY
## 82	Software	80	Staten Island	NY
## 83	IT Services	80	New York	NY
## 84	Engineering	80	New York	NY
## 85	Advertising & Marketing	79	New York	NY
## 86	Manufacturing	77	New York	NY
## 87	Advertising & Marketing	75	New York	NY
## 88	Retail	75	New York	NY
## 89	Retail	75	Cheektowaga	NY
## 90	Advertising & Marketing	74	New York	NY
## 91	Advertising & Marketing	73	Rochester	NY
## 92	IT Services	73	New York	NY
## 93	Financial Services	70	New York	NY
## 94	Education	70	New York	NY
## 95	Logistics & Transportation	70	Jamaica	NY
## 96	Construction	68	Walden	NY
## 97	Health	67	New York	NY
## 98	Manufacturing	67	Lancaster	NY
## 99	Advertising & Marketing	65	New York	NY
## 100	Advertising & Marketing	64	Binghamton	NY
## 101	Advertising & Marketing	63	New York	NY
## 102	Food & Beverage	63	Brooklyn	NY
## 103	Software	63	Schenectady	NY
## 104	Retail	61	New York	NY
## 105	Travel & Hospitality	61	Ronkonkoma	NY
## 106	Education	61	Castleton	NY
## 107	Environmental Services	60	New York	NY
## 108	Telecommunications	59	New York	NY
## 109	Food & Beverage	56	Pleasant Valley	NY
## 110	Human Resources	56	New York	NY
## 111	Education	55	Port Chester	NY
## 112	Advertising & Marketing	55	westbury	NY
## 113	Advertising & Marketing	55	New York	NY
## 114	IT Services	54	Victor	NY
## 115	Human Resources	53	Fairport	NY
## 116	IT Services	52	Rochester	NY
## 117	Advertising & Marketing	51	Saratoga Springs	NY
## 118	Advertising & Marketing	51	New York	NY
## 119	Education	51	Huntington	NY
## 120	Insurance	50	St James	NY
## 121	Health	50	Utica	NY
## 122	Education	50	New York	NY
## 123	IT Services	48	Buffalo	NY
## 124	IT Services	47	Latham	NY
## 125	IT Services	47	New York	NY
## 126	Advertising & Marketing	47	New York	NY

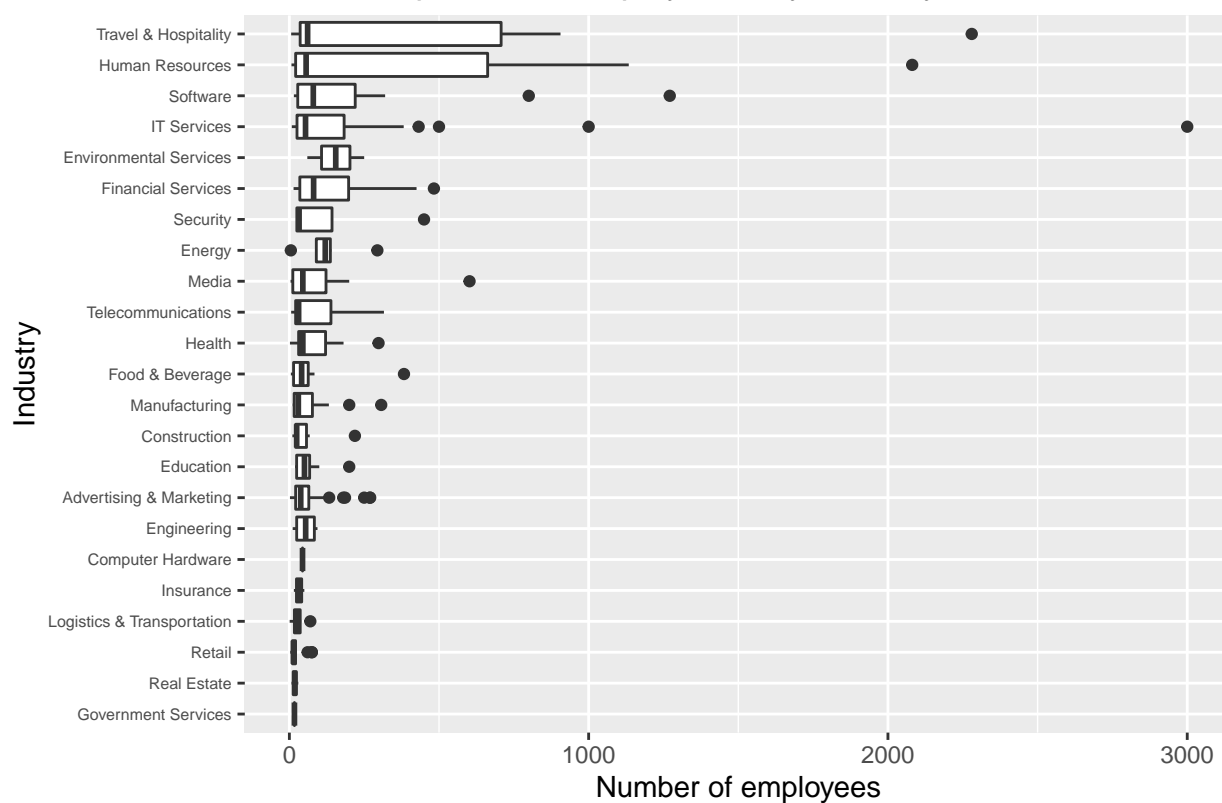
## 127	Advertising & Marketing	46	New York	NY
## 128	Media	46	New York	NY
## 129	IT Services	46	Scarsdale	NY
## 130	Software	46	new york	NY
## 131	Advertising & Marketing	45	Brooklyn	NY
## 132	Media	45	New York	NY
## 133	Health	45	Farmingdale	NY
## 134	Advertising & Marketing	44	New York	NY
## 135	Computer Hardware	44	New York	NY
## 136	Financial Services	43	Clifton Park	NY
## 137	Advertising & Marketing	42	New York	NY
## 138	Travel & Hospitality	42	Brooklyn	NY
## 139	Advertising & Marketing	41	New York	NY
## 140	Food & Beverage	41	Canastota	NY
## 141	Advertising & Marketing	40	New York	NY
## 142	IT Services	40	New York	NY
## 143	Manufacturing	40	New York	NY
## 144	Education	40	New York	NY
## 145	Health	40	New York	NY
## 146	Security	40	Hicksville	NY
## 147	IT Services	39	Long Island City	NY
## 148	Advertising & Marketing	38	IRVINGTON	NY
## 149	Health	37	White Plains	NY
## 150	Advertising & Marketing	37	New York	NY
## 151	Advertising & Marketing	35	New York	NY
## 152	Advertising & Marketing	35	New York	NY
## 153	Financial Services	35	New York	NY
## 154	Financial Services	33	New York	NY
## 155	IT Services	33	Brooklyn	NY
## 156	Financial Services	32	Rock Hill	NY
## 157	Advertising & Marketing	32	New York	NY
## 158	Advertising & Marketing	32	New York	NY
## 159	Advertising & Marketing	32	New York	NY
## 160	Telecommunications	31	Latham	NY
## 161	Health	31	New York	NY
## 162	Human Resources	30	New York	NY
## 163	Real Estate	30	New York	NY
## 164	Food & Beverage	30	Brooklyn	NY
## 165	Travel & Hospitality	30	plainview	NY
## 166	Manufacturing	30	Clarence Center	NY
## 167	Engineering	29	New York	NY
## 168	Telecommunications	28	New York	NY
## 169	Advertising & Marketing	28	Melville	NY
## 170	Advertising & Marketing	28	New York	NY
## 171	Advertising & Marketing	28	New York	NY
## 172	Software	28	Forest Hills	NY
## 173	Advertising & Marketing	27	New York	NY
## 174	IT Services	27	New York	NY
## 175	IT Services	26	New York	NY
## 176	Manufacturing	26	blauvelt	NY
## 177	Telecommunications	25	New York	NY
## 178	Advertising & Marketing	25	new york	NY
## 179	Software	25	New York	NY
## 180	Construction	25	Bronx	NY

## 181	Education	25	New York	NY
## 182	Security	25	Massapequa	NY
## 183	Logistics & Transportation	25	Amherst	NY
## 184	IT Services	25	New York	NY
## 185	Security	25	buffalo	NY
## 186	IT Services	25	Rensselaer	NY
## 187	Construction	24	Woodhaven	NY
## 188	IT Services	24	New York	NY
## 189	Advertising & Marketing	24	New York	NY
## 190	Education	24	Jamesville	NY
## 191	IT Services	23	Rochester	NY
## 192	IT Services	23	New York	NY
## 193	Education	22	New York	NY
## 194	Retail	22	Brooklyn	NY
## 195	Advertising & Marketing	22	West Islip	NY
## 196	Logistics & Transportation	22	Melville	NY
## 197	Telecommunications	22	Fairport	NY
## 198	Manufacturing	22	Freeport	NY
## 199	Software	21	Saratoga Springs	NY
## 200	Education	21	White Plains	NY
## 201	Advertising & Marketing	21	New York	NY
## 202	Telecommunications	21	New York	NY
## 203	Real Estate	21	New York	NY
## 204	Construction	20	Buffalo	NY
## 205	Health	20	New York	NY
## 206	Telecommunications	20	New York	NY
## 207	Advertising & Marketing	19	New York	NY
## 208	Education	19	New York City	NY
## 209	IT Services	18	Lake Success	NY
## 210	Telecommunications	18	Rochester	NY
## 211	Advertising & Marketing	18	New York	NY
## 212	Retail	17	Hewlett	NY
## 213	Government Services	17	Nyack	NY
## 214	Media	16	New York	NY
## 215	Manufacturing	16	Rochester	NY
## 216	Advertising & Marketing	16	Pleasantville	NY
## 217	Advertising & Marketing	15	New York	NY
## 218	Real Estate	15	Goshen	NY
## 219	IT Services	15	Scarsdale	NY
## 220	Advertising & Marketing	15	Great Neck	NY
## 221	Retail	15	Inwood	NY
## 222	Advertising & Marketing	15	New York	NY
## 223	Telecommunications	15	Roslyn Heights	NY
## 224	Advertising & Marketing	15	Pleasantville	NY
## 225	Retail	15	New York	NY
## 226	Software	15	New York	NY
## 227	Insurance	15	Long Island City	NY
## 228	Media	14	New York	NY
## 229	Food & Beverage	14	Brooklyn	NY
## 230	Financial Services	14	Oakland Gardens	NY
## 231	IT Services	14	New York	NY
## 232	IT Services	13	Holbrook	NY
## 233	Manufacturing	13	Buffalo	NY
## 234	IT Services	13	New York	NY

## 235	Manufacturing	12	Ronkonkoma	NY
## 236	Advertising & Marketing	12	New York	NY
## 237	Advertising & Marketing	12	New York	NY
## 238	Human Resources	12	Fairport	NY
## 239	Retail	12	Brooklyn	NY
## 240	Retail	12	New York	NY
## 241	Food & Beverage	12	Menands	NY
## 242	Advertising & Marketing	12	New York	NY
## 243	Manufacturing	11	New York	NY
## 244	Retail	11	ASTORIA	NY
## 245	Engineering	11	Ithaca	NY
## 246	Advertising & Marketing	10	New York	NY
## 247	Retail	10	New York	NY
## 248	Retail	10	New York	NY
## 249	Construction	10	Holbrook	NY
## 250	Advertising & Marketing	9	New York	NY
## 251	Retail	9	New York	NY
## 252	Media	9	New York	NY
## 253	Advertising & Marketing	8	new york	NY
## 254	Human Resources	8	New York	NY
## 255	IT Services	8	New York	NY
## 256	Media	7	New York	NY
## 257	Human Resources	7	New York	NY
## 258	Real Estate	7	Syosset	NY
## 259	Telecommunications	6	colden	NY
## 260	Health	6	New York	NY
## 261	Travel & Hospitality	6	New York	NY
## 262	Energy	5	New York	NY
## 263	Food & Beverage	5	New York	NY
## 264	Media	4	New York	NY
## 265	Retail	3	Brooklyn	NY
## 266	Health	2	New York	NY
## 267	Advertising & Marketing	2	New York	NY
## 268	Logistics & Transportation	1	Farmingdale	NY

```
ggplot(data = visualize5, aes(x = Employees, y = reorder(Industry, Employees))) +
  geom_boxplot() +
  labs(title = "Boxplot # 2 - Employment by Industry in NY state", x = "Number of employees", y = "Indu
  theme(axis.text.y = element_text(size = 6)) +
  theme(plot.title = element_text(hjust = 0.5))
```

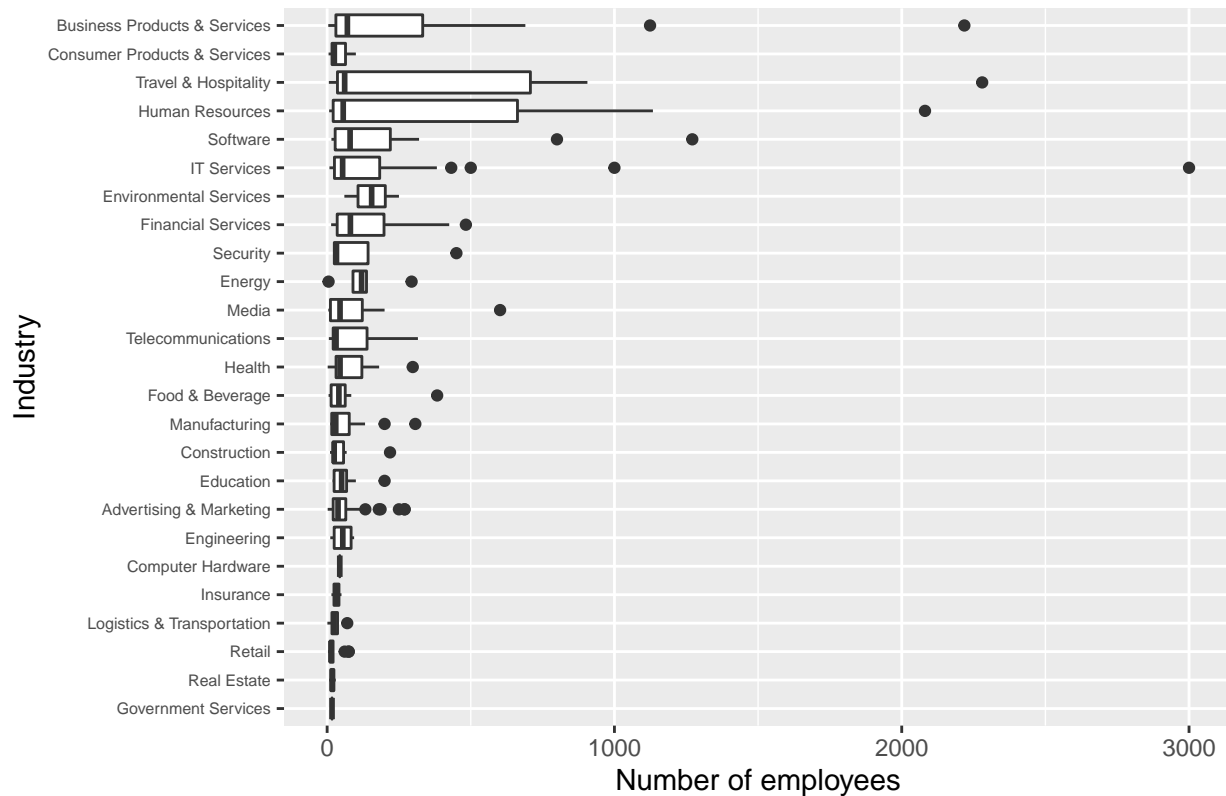
Boxplot # 2 – Employment by Industry in NY state



*# Eliminate outliers in the plot but not underlying data*

```
ggplot(data = visualize4, aes(x = Employees, y = reorder(Industry, Employees))) +
  geom_boxplot() +
  labs(title = "Boxplot # 3 - Employment by industry in NY state", x = "Number of employees", y = "Indus") +
  coord_cartesian(xlim = c(0, 3000)) +
  theme(axis.text.y = element_text(size = 6)) +
  theme(plot.title = element_text(hjust = 0.5))
```

Boxplot # 3 – Employment by industry in NY state



# Calculate mean, median and standard deviation of employees

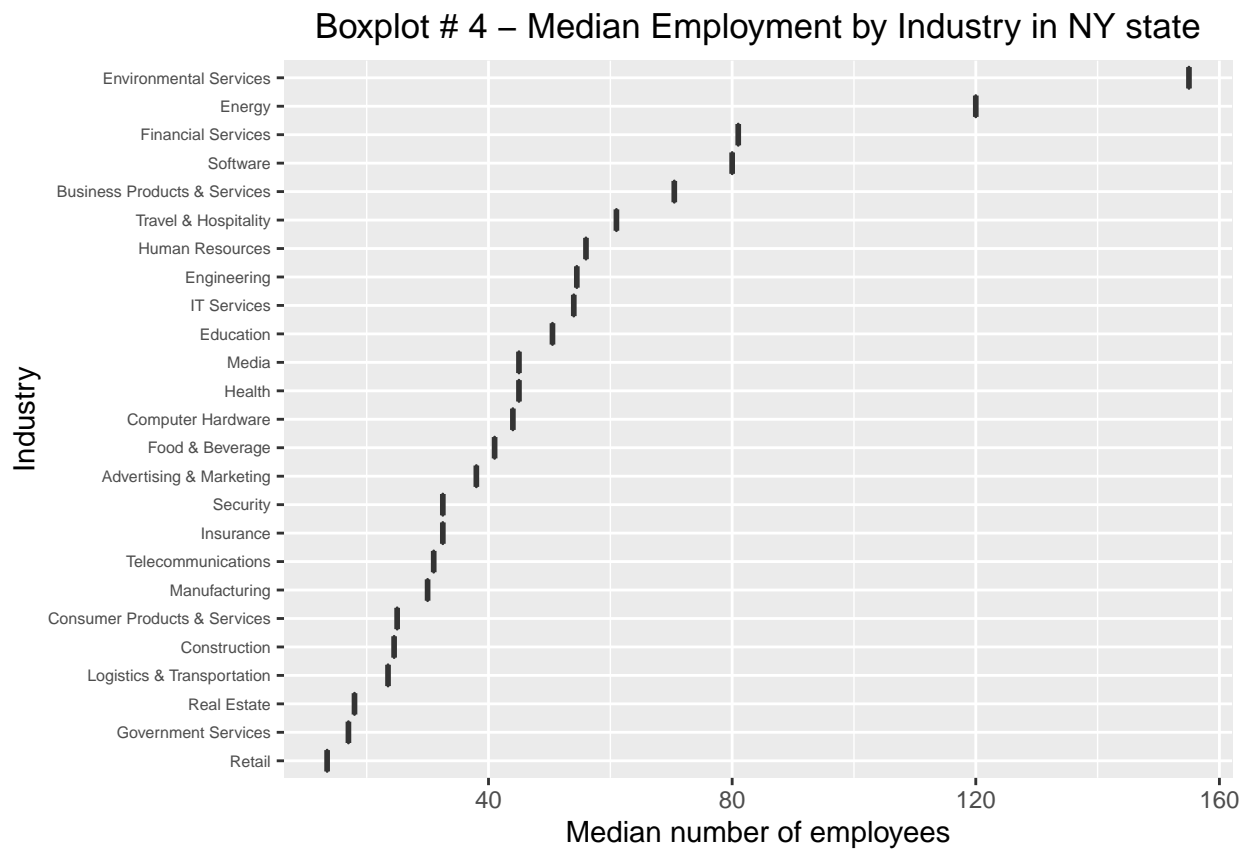
```
visualize6 <- visualize4 %>%
  group_by(Industry) %>%
  summarise(mean_Employees = mean(Employees), median_Employees = median(Employees), sd_Employees = sd(Employees))
  arrange(desc(median_Employees))

visualize6
```

```
## # A tibble: 25 x 4
##   Industry          mean_Employees median_Employees sd_Employees
##   <chr>              <dbl>          <dbl>      <dbl>
## 1 Environmental Services    155            155        134.
## 2 Energy                  129.           120         105.
## 3 Financial Services       144.            81         152.
## 4 Software                246.            80         375.
## 5 Business Products & Services 1492.           70.5       6241.
## 6 Travel & Hospitality     548.            61         835.
## 7 Human Resources         438.            56         681.
## 8 Engineering              53.5           54.5         39.8
## 9 IT Services             204.            54         473.
## 10 Education               59.9           50.5         48.6
## # ... with 15 more rows
```

# Plot median number of employees

```
ggplot(data = visualize6, aes(x = median_Employees, y = reorder(Industry, median_Employees))) +
  geom_boxplot() +
  labs(title = "Boxplot # 4 - Median Employment by Industry in NY state", x = "Median number of employees") +
  theme(axis.text.y = element_text(size = 6)) +
  theme(plot.title = element_text(hjust = 0.5))
```



### Question 3

Now imagine you work for an investor and want to see which industries generate the most revenue per employee. Create a chart that makes this information clear. Once again, the distribution per industry should be shown.

#### Solution:

It is clear from the chart that the Computer Hardware industry generates the most revenue per employee while the Human Resources industry generates the least revenue per employee.

*# Answer Question 3 here*

```
revenue <- inc %>%
  group_by(Industry) %>%
  summarize(TotalRev = sum(Revenue), TotalEmp = sum(Employees), RevPerEmp = TotalRev/TotalEmp) %>%
  arrange(desc(RevPerEmp)) %>%
  na.omit()
```

```
ggplot(data = revenue, aes(x = reorder(Industry, RevPerEmp), y = RevPerEmp)) +
  geom_bar(stat = "identity") +
  labs(title = "Revenue per Employee by Industry", x = "Industry", y = "Revenue per Employee") +
  theme(plot.title = element_text(hjust = 0.5)) +
  theme(axis.text.x = element_text(size = 6)) +
  coord_flip()
```

