In [ ]:

```
#To perform these tasks, you can use any of the different Python libraries such
 as NumPy, SciPy, Pandas, scikit-learn, matplotlib, and BeautifulSoup.

#- Import data into Python environment.
#- Provide the trend chart for the number of complaints at monthly and daily gra
nularity levels.
#- Provide a table with the frequency of complaint types.

#Which complaint types are maximum i.e., around internet, network issues, or acr
oss any other domains.
#- Create a new categorical variable with value as Open and Closed. Open & Pendi
ng is to be categorized as Open and Closed & Solved is to be categorized as Clos
ed.
#- Provide state wise status of complaints in a stacked bar chart. Use the categ
orized variable from Q3. Provide insights on:

#Which state has the maximum complaints
#Which state has the highest percentage of unresolved complaints
#- Provide the percentage of complaints resolved till date, which were received
 through the Internet and customer care calls.

#The analysis results to be provided with insights wherever applicable.
```

In [1]:

```
pwd
```

Out[1]:

```
'/Users/pragyamohapatra/Documents/python session codes/Comcast_proje
ct'
```

In [2]:

```
ll
```

```
total 267960
-rw-r--r--@ 1 pragyamohapatra  staff      70991 Oct 10 22:51 1568699
544_comcast_telecom_complaints_data.zip
-rw-r--r--@ 1 pragyamohapatra  staff     471821 Oct 10 00:32 Comcast
intro and details.pptx
-rwxr-xr-x@ 1 pragyamohapatra  staff     266718 Sep 17 11:21 Comcast
_telecom_complaints_data.csv*
-rw-r--r--@ 1 pragyamohapatra  staff  122365697 Oct  9 22:52 Project
Mentoring Session Python for Data Science-20190916 1404-1.arf
-rw-r--r--@ 1 pragyamohapatra  staff    1260706 Oct 10 00:33 TOPIC M
ODELLING.pptx
-rw-r--r--  1 pragyamohapatra  staff        937 Oct 12 14:18 Untitle
d.ipynb
-rw-r--r--@ 1 pragyamohapatra  staff     808062 Oct 10 00:33 liveDem
o.ipynb
-rw-r--r--  1 pragyamohapatra  staff          0 Oct 12 14:16 untitle
d
```

In [189]:

```
import pandas as pd
import numpy as np
import random
```

In [190]:

```
data=pd.read_csv('Comcast_telecom_complaints_data.csv')
```

In [191]:

```
data.head()
```

Out[191]:

	Ticket #	Customer Complaint	Date	Date_month_year	Time	Received Via	City	State	Z co
0	250635	Comcast Cable Internet Speeds	22-04-15	22-Apr-15	3:53:50 PM	Customer Care Call	Abingdon	Maryland	210
1	223441	Payment disappear - service got disconnected	04-08-15	04-Aug-15	10:22:56 AM	Internet	Acworth	Georgia	301
2	242732	Speed and Service	18-04-15	18-Apr-15	9:55:47 AM	Internet	Acworth	Georgia	301
3	277946	Comcast Imposed a New Usage Cap of 300GB that ...	05-07-15	05-Jul-15	11:59:35 AM	Internet	Acworth	Georgia	301
4	307175	Comcast not working and no service to boot	26-05-15	26-May-15	1:25:26 PM	Internet	Acworth	Georgia	301

In [192]:

```
data['Date_index']=pd.to_datetime(data['Date'])
data['Date_month_year']=pd.to_datetime(data['Date_month_year'])
```

In [193]:

```
data1=data.set_index(data['Date_index'])
```

In [194]:

```
data1.head()
```

Out[194]:

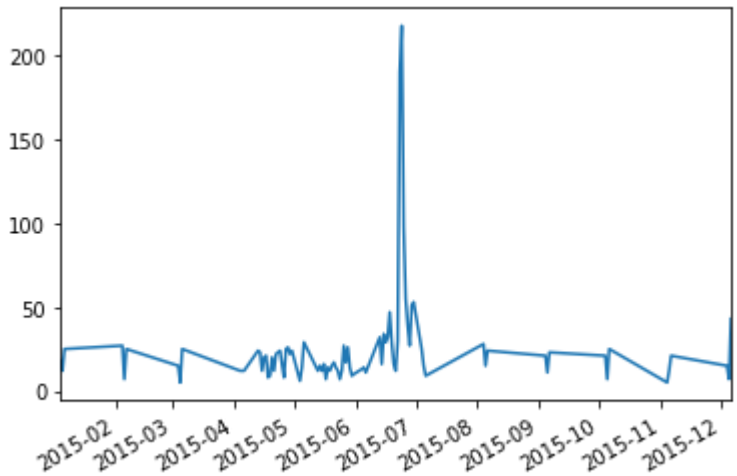
Date_index	Ticket #	Customer Complaint	Date	Date_month_year	Time	Received Via	City	State
2015-04-22	250635	Comcast Cable Internet Speeds	22-04-15	2015-04-22	3:53:50 PM	Customer Care Call	Abingdon	Mary
2015-04-08	223441	Payment disappear - service got disconnected	04-08-15	2015-08-04	10:22:56 AM	Internet	Acworth	Geo
2015-04-18	242732	Speed and Service	18-04-15	2015-04-18	9:55:47 AM	Internet	Acworth	Geo
2015-05-07	277946	Comcast Imposed a New Usage Cap of 300GB that ...	05-07-15	2015-07-05	11:59:35 AM	Internet	Acworth	Geo
2015-05-26	307175	Comcast not working and no service to boot	26-05-15	2015-05-26	1:25:26 PM	Internet	Acworth	Geo

In [195]:

```
import matplotlib.pyplot as plt
```

In [196]:

```
data['Date_month_year'].value_counts().plot()
plt.show()
```



In [28]:

```
#from the graph, we can analyze that the maximum number of complaints has been r
eceived during JUlY 2015
```

In [30]:

```
#for daily granularity lets take a random sample of 15 complaints
```

In [197]:

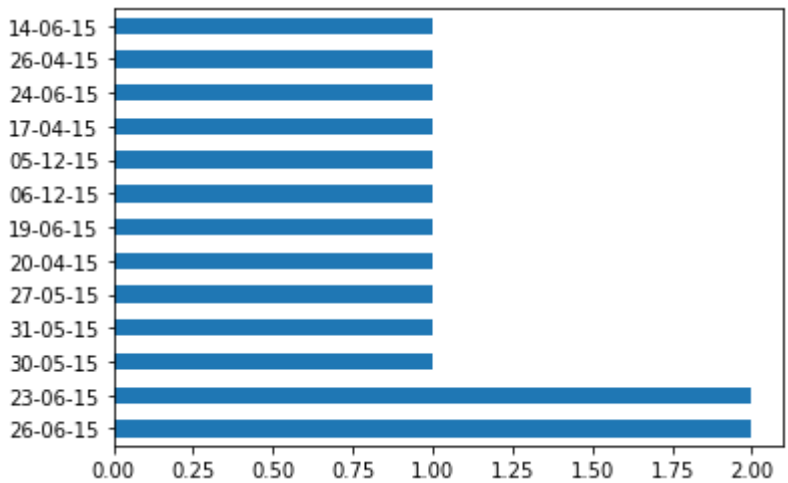
```
np.random.seed(1)
data2=data1.sample(n=15,replace=False)
data2=data2.sort_values('Date',ascending=True)
```

In [198]:

```
data2['Date'].value_counts().plot(kind='barh')
```

Out[198]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x10fc95da0>
```



In [ ]:

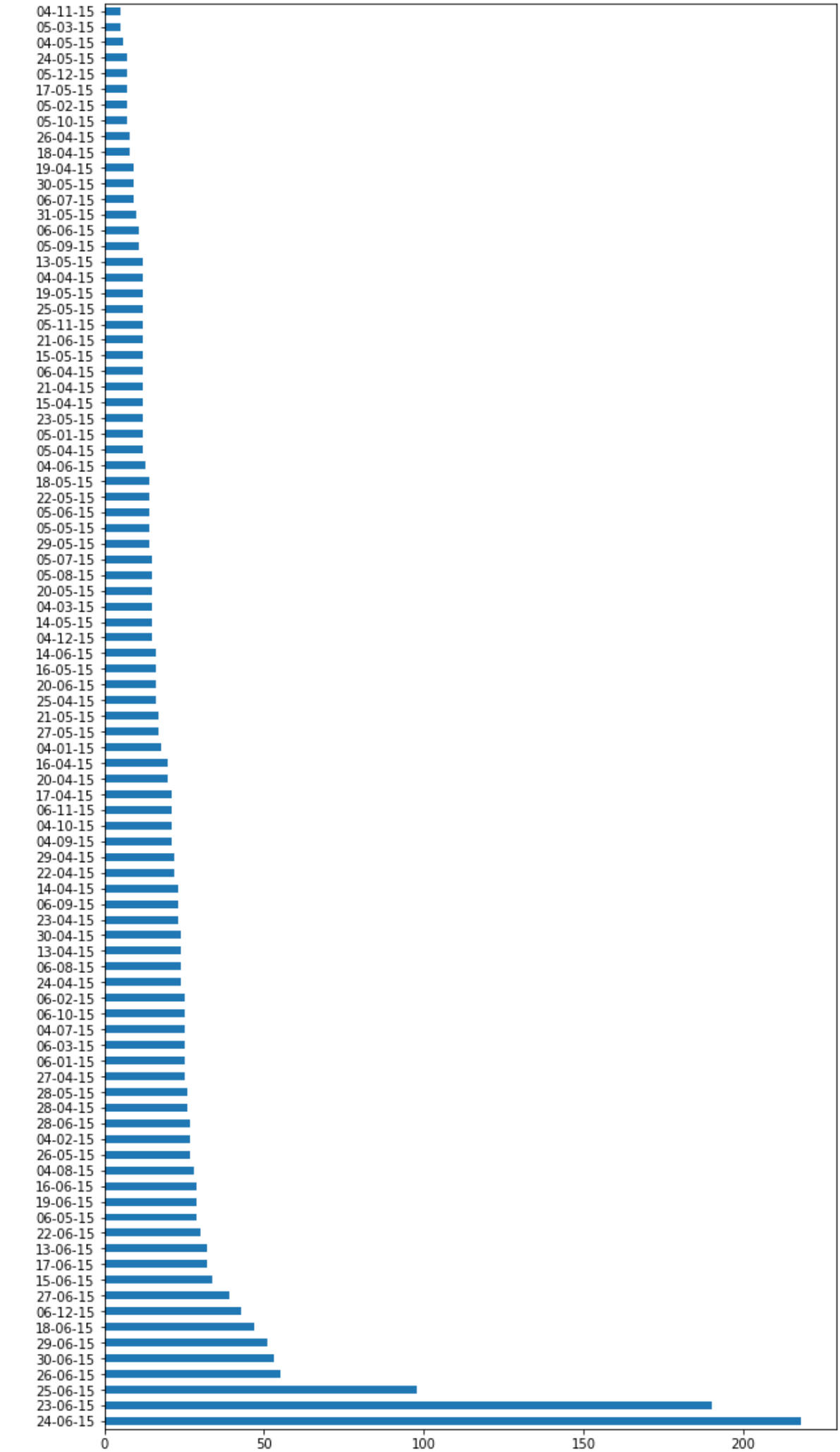
```
#from the above graph of a 15 samples,we can analyze that comcast has received t
he most complaints on 23and26th june 2015
```

In [199]:

```
p=data.sort_values('Date',ascending=True)
p['Date'].value_counts().plot(kind='barh',figsize=(10,20))
```

Out[199]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x10fc95e80>
```


04-11-15
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26-04-15
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150
200

In [95]:

```
#from the population, we can analyze comcast has received the most complaints on
23 and 24th of june 2015.
```

In [200]:

```
data.rename({'Customer Complaint':'Customr_complaint'},axis=1,inplace=True)
```

In [124]:

```
data.Customr_complaint.value_counts()
```

Out[124]:

```
Comcast
83
Comcast Internet
18
Comcast Data Cap
17
comcast
13
Data Caps
11
Comcast Data Caps
11
Comcast Billing
11
Unfair Billing Practices
9
Comcast data caps
8
Comcast internet
8
Data Cap
8
Internet speed
8
Comcast data cap
8
Comcast/Xfinity
8
Comcast billing
6
Billing
6
COMCAST
6
Comcast Service
6
Comcast service
6
Internet Speed
5
Comcast complaint
5
Comcast Internet Service
5
Comcast Complaint
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availabilty
4
Internet service
4
Comcast Internet Complaint
4
Comcast Issues
4
comcast data cap
4
Billing Dispute
4
Comcast internet service
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4

..
bait & switch
1
Poor internet quality
1
service not disconnected as requested. overcharged and overpaid as a
result.     1
Comcast Data Usage Cap
1
300GB/month Data Cap
1
Comcast deceptive advertising, overage charges
1
Poor service from Xfinity
1
Lies and deception
1
Comcast Monopoly and Abuse
1
Comcast fraudualent billing
1
Being charged incorrect price
1
Unfair bundles
1
double billing after change of service
1
Customer Service & Billing
1
Comcast Xfinity Monopoly Abuses
1
Misleading and deceptive sale of Internet service
1
Comcast: Xfinity Slamming
1
Comcast bill
1
Comcast throttles internet
1
Billed for service never received
1
overbilled
1
Comcast's Terrible Service - How are they still in business?
1
Low wifi
1
Excessive early termination fees due immediately after 10+ years of
service      1
Speed for internet nowhere close to claims
1
Frequent disconnects
1
comcast are crooks
1
price inflation due to monopoly of Comcast
1
Internet Availability and Speed
1
```

```
Unethical Behavior: Comcast Requesting Credit Check or Deposit
1
Name: Customr_complaint, Length: 1841, dtype: int64
```

In [128]:

```
#from the abov table, we analyzed that comcast has the highest frequency among t
he complaints that have been received from the customers
```

In [201]:

```
p=data['New_status']=['Open' if (Status=='Open' or Status=='Pending') else 'Clos
ed'
for Status in data['Status']]
p
```

Out[201]:

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 ...]
```

In [202]:

```
pd.crosstab(data.New_status,[data.Customr_complaint,data.Date])
```

Out[202]:

Customr_complaint	(Comcast is not my complaint!) Cyber Tele-marketing is my complaint!	10 Days No Service - 12 Appointments Comcast Hasn't Shown Up - Comcast Has Not Fixed Home Infinity X1 - In 10 Days- Cannot Make 911 Calls	2 months and Comcast has not fixed problem	2+ Day Degraded Services	300 GB monthly allowance	300 gb cap	300GB/n Data Cap
Date	**27-06-15**	**27-06-15**	**21-06-15**	**22-06-15**	**25-04-15**	**29-06-15**	**06-09-15**
New_status							
Closed	1	0	1	1	1	0	
Open	0	1	0	0	0	1	

2 rows × 2134 columns

In [217]:

```
data.groupby(['State']).size().sort_values(ascending=False).to_frame().reset_ind
ex().rename({0:'Count'},axis=1)
```

Out[217]:

	State	Count
0	Georgia	288
1	Florida	240
2	California	220
3	Illinois	164
4	Tennessee	143
5	Pennsylvania	130
6	Michigan	115
7	Washington	98
8	Colorado	80
9	Maryland	78
10	New Jersey	75
11	Texas	71
12	Massachusetts	61
13	Virginia	60
14	Indiana	59
15	Oregon	49
16	Mississippi	39
17	Minnesota	33
18	Alabama	26
19	Utah	22
20	Arizona	20
21	South Carolina	18
22	District Of Columbia	16
23	New Mexico	15
24	Louisiana	13
25	New Hampshire	12
26	Connecticut	12
27	Delaware	12
28	West Virginia	11
29	Kentucky	7
30	New York	6
31	Arkansas	6
32	Maine	5
33	Missouri	4
34	North Carolina	3
35	Vermont	3

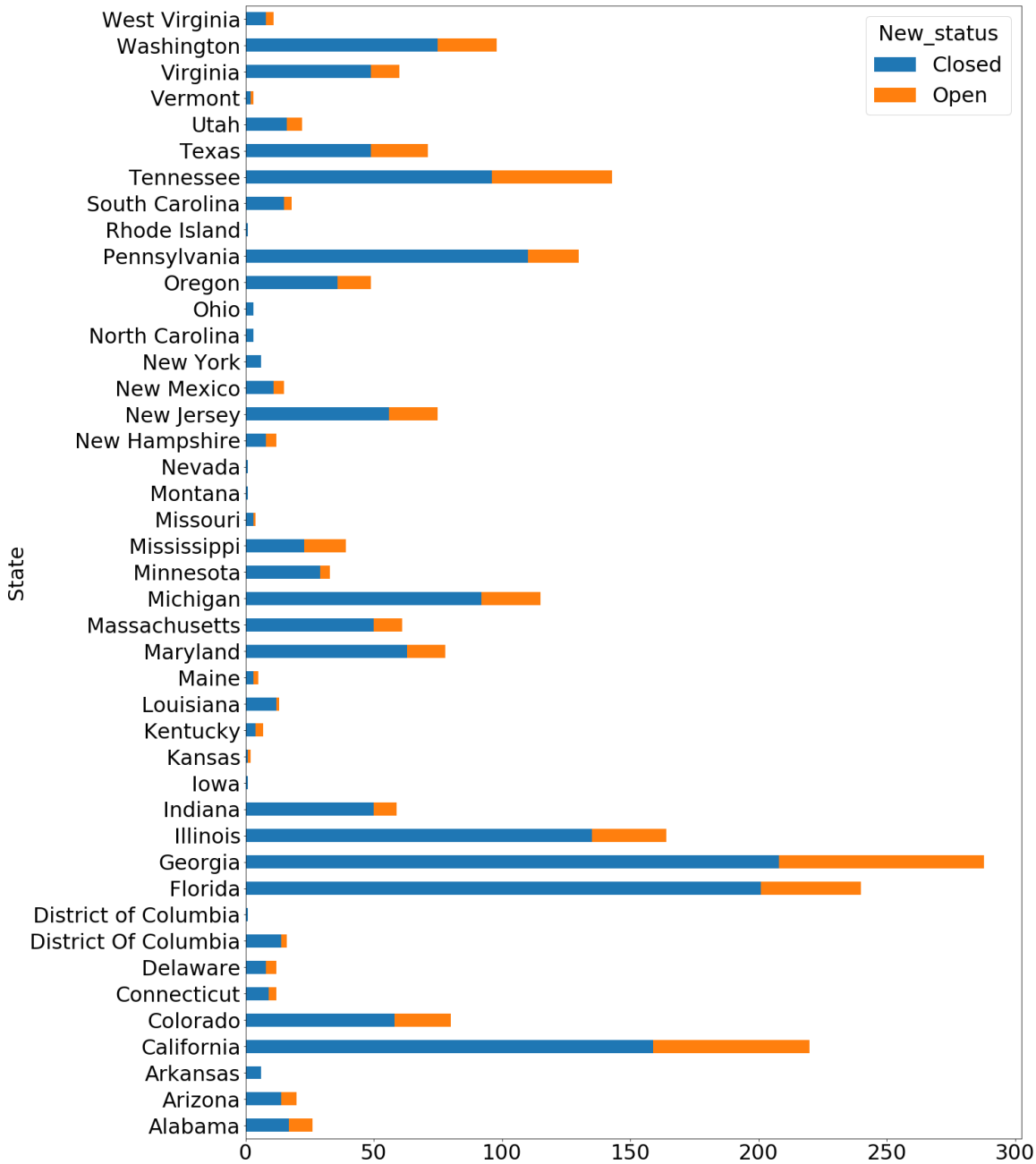
	State	Count
36	Ohio	3
37	Kansas	2
38	District of Columbia	1
39	Rhode Island	1
40	Montana	1
41	Iowa	1
42	Nevada	1

In [226]:

```
status_complaints=data.groupby(['State','New_status']).size().unstack().fillna(0
)
```

In [236]:

```
status_complaints.plot(kind='barh',figsize=(20,30),stacked=True)
plt.rcParams.update({'font.size':30})
```


New_status
Closed
Open
State
West Virginia
Washington
Virginia
Vermont
Utah
Texas
Tennessee
South Carolina
Rhode Island
Pennsylvania
Oregon
Ohio
North Carolina
New York
New Mexico
New Jersey
New Hampshire
Nevada
Montana
Missouri
Mississippi
Minnesota
Michigan
Massachusetts
Maryland
Maine
Louisiana
Kentucky
Kansas
Iowa
Indiana
Illinois
Georgia
Florida
District of Columbia
District Of Columbia
Delaware
Connecticut
Colorado
California
Arkansas
Arizona
Alabama
0
50
100
150
200
250
300

In [238]:

```
#from the graph, we can analyze that the maximum of complaints has been received
from the Georgia
#most of the cases received from Georgis are still opened(unresolved) and needs
 to get closed.
```

In [300]:

```
pd.crosstab(data['Received Via']=='Internet',data.New_status,)
```

Out[300]:

New_status	Closed	Open
Received Via		
False	864	255
True	843	262

In [293]:

```
data[data['Customr_complaint']=='Internet']
```

Out[293]:

	Ticket #	Customr_complaint	Date	Date_month_year	Time	Received Via	City	
1366	363200	Internet	24-06-15	2015-06-24	6:57:24 PM	Customer Care Call	Nanticoke	Penr
1744	344563	Internet	16-06-15	2015-06-16	9:18:26 PM	Customer Care Call	Salisbury	M

In [354]:

```
pd.crosstab(data['State'],data['New_status']).sum()/2224*100
```

Out[354]:

```
New_status
Closed    76.753597
Open      23.246403
dtype: float64
```

In [368]:

```
pd.crosstab(data['State'],data['New_status'])
```

Out[368]:

New_status	Closed	Open
State		
Alabama	17	9
Arizona	14	6
Arkansas	6	0
California	159	61
Colorado	58	22
Connecticut	9	3
Delaware	8	4
District Of Columbia	14	2
District of Columbia	1	0
Florida	201	39
Georgia	208	80
Illinois	135	29
Indiana	50	9
Iowa	1	0
Kansas	1	1
Kentucky	4	3
Louisiana	12	1
Maine	3	2
Maryland	63	15
Massachusetts	50	11
Michigan	92	23
Minnesota	29	4
Mississippi	23	16
Missouri	3	1
Montana	1	0
Nevada	1	0
New Hampshire	8	4
New Jersey	56	19
New Mexico	11	4
New York	6	0
North Carolina	3	0
Ohio	3	0
Oregon	36	13
Pennsylvania	110	20
Rhode Island	1	0

New_status	Closed	Open
State		
South Carolina	15	3
Tennessee	96	47
Texas	49	22
Utah	16	6
Vermont	2	1
Virginia	49	11
Washington	75	23
West Virginia	8	3

In [372]:

```
#as we can see we received the highest number of complaints from Georgia
#Georgia has the highest percentage of unresolved complaints i.e 15%
```

In [381]:

```
Received=pd.crosstab(data['Received Via'],data['New_status'])
Received
```

Out[381]:

New_status	Closed	Open
Received Via		
Customer Care Call	864	255
Internet	843	262

In [380]:

```
Received.sum()/2224*100
```

Out[380]:

```
New_status
Closed    76.753597
Open      23.246403
dtype: float64
```

In [382]:

```
#76.75% of the TOTAL complaints received through internet and customer care call
has been resolved till date
```

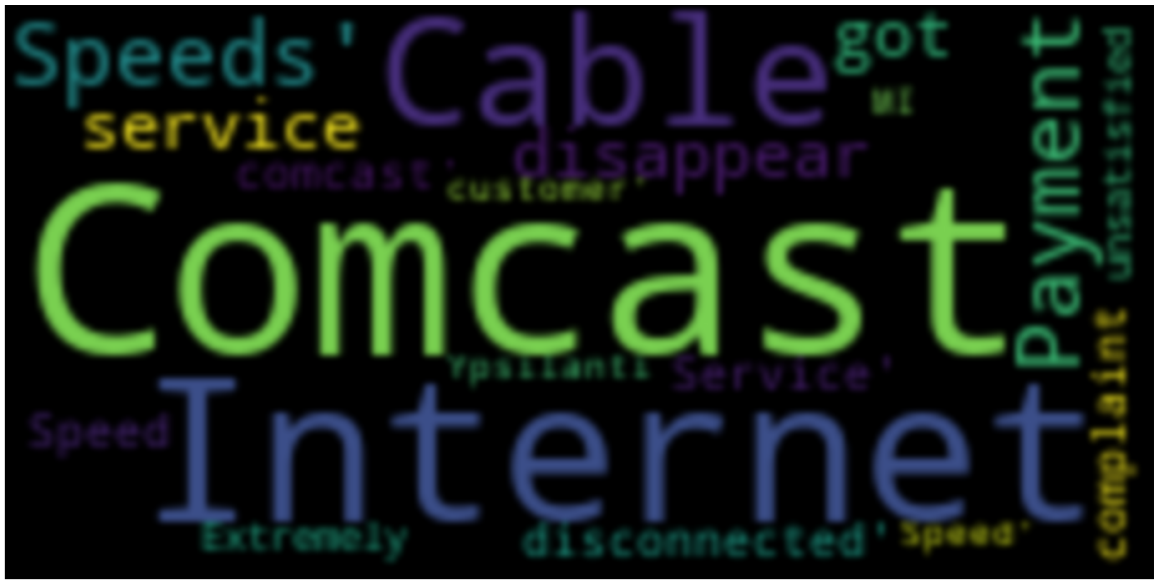
In [386]:

```
!pip install wordcloud
from wordcloud import WordCloud,STOPWORDS
```

```
Collecting wordcloud
  Downloading https://files.pythonhosted.org/packages/c7/07/e43a7094
a58e602e85a09494d9b99e7b5d71ca4789852287386e21e74c33/wordcloud-1.5.0
-cp37-cp37m-macosx_10_6_x86_64.whl (157kB)
    |████████████████████████████████| 163kB 172kB/s eta 0:00:01
Requirement already satisfied: pillow in /Applications/anaconda3/li
b/python3.7/site-packages (from wordcloud) (6.1.0)
Requirement already satisfied: numpy>=1.6.1 in /Applications/anacond
a3/lib/python3.7/site-packages (from wordcloud) (1.16.4)
Installing collected packages: wordcloud
Successfully installed wordcloud-1.5.0
```

In [396]:

```
txt=data['Customr_complaint'].values
wc=WordCloud(width=200,height=100,background_color='black',stopwords=STOPWORDS).
generate(str(txt))
fig=plt.figure(figsize=(20,20))
plt.imshow(wc,interpolation='bicubic')
plt.axis('off')
plt.tight_layout()
plt.show()
```



In [408]:

```
import nltk
nltk.download('stopwords')
from nltk.corpus import stopwords
from nltk.stem.wordnet import WordNetLemmatizer
import string

stop= set(stopwords.words('english'))
exclude=set(string.punctuation)
lemma=WordNetLemmatizer()
```

```
[nltk_data] Downloading package stopwords to
[nltk_data]     /Users/pragyamohapatra/nltk_data...
[nltk_data]   Unzipping corpora/stopwords.zip.
```

In [428]:

```
def clean(doc):
    stop_free=" ".join([i for i in doc.lower().split() if i not in stop])
    punc_free="".join([ch for ch in stop_free if ch not in exclude])
    normalised=" ".join([lemma.lemmatize(word) for word in punc_free.split()])
    return normalised
```

In [424]:

```
import nltk
nltk.download('wordnet')
```

```
[nltk_data] Downloading package wordnet to
[nltk_data]     /Users/pragyamohapatra/nltk_data...
[nltk_data]   Package wordnet is already up-to-date!
```

Out[424]:

```
True
```

In [429]:

```
doc_complete=data['Customr_complaint'].tolist()
doc_clean=[clean(doc).split() for doc in doc_complete]
```

In [425]:

```
import gensim
from gensim import corpora
```

In [423]:

```
!pip install gensim
```

```
Collecting gensim
  Downloading https://files.pythonhosted.org/packages/b3/54/1d729467
2110d5c0565cabc4b99ed952ced9a2dc2ca1d59ad1b34303a6de/gensim-3.8.1-cp
37-cp37m-macosx_10_6_intel.macosx_10_9_intel.macosx_10_9_x86_64.maco
sx_10_10_intel.macosx_10_10_x86_64.whl (24.7MB)
     |████████████████████████████████| 24.7MB 140kB/s eta 0:00:01
|████████                        | 5.6MB 227kB/s eta 0:01:24     |██
████████████▌                   | 13.4MB 216kB/s eta 0:00:52
Requirement already satisfied: scipy>=0.18.1 in /Applications/anacon
da3/lib/python3.7/site-packages (from gensim) (1.3.0)
Requirement already satisfied: numpy>=1.11.3 in /Applications/anacon
da3/lib/python3.7/site-packages (from gensim) (1.16.4)
Requirement already satisfied: six>=1.5.0 in /Applications/anaconda
3/lib/python3.7/site-packages (from gensim) (1.12.0)
Collecting smart-open>=1.8.1 (from gensim)
  Downloading https://files.pythonhosted.org/packages/37/c0/25d19bad
c495428dec6a4bf7782de617ee0246a9211af75b302a2681dea7/smart_open-1.8.
4.tar.gz (63kB)
     |████████████████████████████████| 71kB 417kB/s eta 0:00:01
Requirement already satisfied: boto>=2.32 in /Applications/anaconda
3/lib/python3.7/site-packages (from smart-open>=1.8.1->gensim) (2.4
9.0)
Requirement already satisfied: requests in /Applications/anaconda3/l
ib/python3.7/site-packages (from smart-open>=1.8.1->gensim) (2.22.0)
Collecting boto3 (from smart-open>=1.8.1->gensim)
  Downloading https://files.pythonhosted.org/packages/8c/49/cc8d900d
f85f69bce673510aacd0473aba958244516829d422720f584632/boto3-1.9.248-p
y2.py3-none-any.whl (128kB)
     |████████████████████████████████| 133kB 278kB/s eta 0:00:01
Requirement already satisfied: urllib3!=1.25.0,!=1.25.1,<1.26,>=1.2
1.1 in /Applications/anaconda3/lib/python3.7/site-packages (from req
uests->smart-open>=1.8.1->gensim) (1.24.2)
Requirement already satisfied: certifi>=2017.4.17 in /Applications/a
naconda3/lib/python3.7/site-packages (from requests->smart-open>=1.
8.1->gensim) (2019.6.16)
Requirement already satisfied: idna<2.9,>=2.5 in /Applications/anaco
nda3/lib/python3.7/site-packages (from requests->smart-open>=1.8.1->
gensim) (2.8)
Requirement already satisfied: chardet<3.1.0,>=3.0.2 in /Application
s/anaconda3/lib/python3.7/site-packages (from requests->smart-open>=
1.8.1->gensim) (3.0.4)
Collecting s3transfer<0.3.0,>=0.2.0 (from boto3->smart-open>=1.8.1->
gensim)
  Downloading https://files.pythonhosted.org/packages/16/8a/1fc3dba0
c4923c2a76e1ff0d52b305c44606da63f718d14d3231e21c51b0/s3transfer-0.2.
1-py2.py3-none-any.whl (70kB)
     |████████████████████████████████| 71kB 385kB/s eta 0:00:01
Collecting botocore<1.13.0,>=1.12.248 (from boto3->smart-open>=1.8.1
->gensim)
  Downloading https://files.pythonhosted.org/packages/50/5c/922cc8c2
cdcb905e96bd73dc2064939bc9157e9e1d4c44e54e775cd2cddc/botocore-1.12.2
48-py2.py3-none-any.whl (5.7MB)
     |████████████████████████████████| 5.7MB 221kB/s eta 0:00:01
Collecting jmespath<1.0.0,>=0.7.1 (from boto3->smart-open>=1.8.1->ge
nsim)
  Downloading https://files.pythonhosted.org/packages/83/94/7179c383
2a6d45b266ddb2aac329e101367fbdb11f425f13771d27f225bb/jmespath-0.9.4-
py2.py3-none-any.whl
Requirement already satisfied: python-dateutil<3.0.0,>=2.1; python_v
ersion >= "2.7" in /Applications/anaconda3/lib/python3.7/site-packag
es (from botocore<1.13.0,>=1.12.248->boto3->smart-open>=1.8.1->gensi
```

```
m) (2.8.0)
Requirement already satisfied: docutils<0.16,>=0.10 in /Application
s/anaconda3/lib/python3.7/site-packages (from botocore<1.13.0,>=1.1
2.248->boto3->smart-open>=1.8.1->gensim) (0.14)
Building wheels for collected packages: smart-open
  Building wheel for smart-open (setup.py) ... done
  Stored in directory: /Users/pragyamohapatra/Library/Caches/pip/whe
els/5f/ea/fb/5b1a947b369724063b2617011f1540c44eb00e28c3d2ca8692
Successfully built smart-open
Installing collected packages: jmespath, botocore, s3transfer, boto
3, smart-open, gensim
Successfully installed boto3-1.9.248 botocore-1.12.248 gensim-3.8.1
jmespath-0.9.4 s3transfer-0.2.1 smart-open-1.8.4
```

In [430]:

```
dictionary=corpora.Dictionary(doc_clean)
print(dictionary)
```

```
Dictionary(1412 unique tokens: ['cable', 'comcast', 'internet', 'spe
ed', 'disappear']...)
```

In [435]:

```
doc_term_matrix=[dictionary.doc2bow(doc) for doc in doc_clean]
doc_term_matrix
```

Out[435]:

```
[[(0, 1), (1, 1), (2, 1), (3, 1)],
 [(4, 1), (5, 1), (6, 1), (7, 1), (8, 1)],
 [(3, 1), (8, 1)],
 [(1, 1), (9, 1), (10, 1), (11, 1), (12, 1), (13, 1), (14, 1), (15,
1)],
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 [(1, 1), (33, 1), (34, 1), (35, 1), (36, 1)],
 [(5, 1), (8, 1), (37, 1), (38, 1)],
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1)],
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(105, 1)],
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```

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    [(3, 1), (82, 1)],
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    [(60, 1), (141, 1), (142, 1), (143, 1), (144, 1)],
    [(1, 1),
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     (147, 1),
     (148, 1),
     (149, 1),
     (150, 1)],
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 ...]
```

In [439]:

```
from gensim.models import LdaModel
```

In [442]:

```
NUM_TOPICS=9
ldamodel=LdaModel(doc_term_matrix,num_topics=NUM_TOPICS,id2word=dictionary,passe
s=30)
topics=ldamodel.show_topics()
for topic in topics:
    print(topic)
    print()
```

```
(0, '0.099*"comcast" + 0.082*"charge" + 0.044*"service" + 0.027*"con
nection" + 0.024*"equipment" + 0.022*"bill" + 0.020*"monopolistic" +
0.019*"credit" + 0.016*"account" + 0.016*"month"')

(1, '0.074*"comcast" + 0.066*"data" + 0.058*"usage" + 0.033*"terribl
e" + 0.033*"paying" + 0.027*"fee" + 0.026*"access" + 0.024*"limit" +
0.018*"overage" + 0.016*"lack"')

(2, '0.040*"help" + 0.033*"charged" + 0.029*"phone" + 0.023*"low" +
0.022*"contract" + 0.022*"please" + 0.017*"bandwidth" + 0.017*"throt
tle" + 0.017*"regarding" + 0.016*"comcast"')

(3, '0.224*"comcast" + 0.086*"complaint" + 0.052*"service" + 0.045
*"throttling" + 0.022*"without" + 0.022*"false" + 0.018*"switch" +
0.018*"promised" + 0.018*"deceptive" + 0.016*"show"')

(4, '0.110*"comcast" + 0.077*"price" + 0.059*"bill" + 0.052*"cable"
+ 0.041*"comcastxfinity" + 0.032*"high" + 0.032*"monopoly" + 0.032
*"fraudulent" + 0.025*"monthly" + 0.020*"increased"')

(5, '0.170*"cap" + 0.165*"data" + 0.137*"comcast" + 0.045*"xfinity"
+ 0.017*"home" + 0.016*"cramming" + 0.015*"incorrect" + 0.014*"payme
nt" + 0.012*"2" + 0.012*"issue"')

(6, '0.154*"billing" + 0.144*"comcast" + 0.062*"practice" + 0.054*"u
nfair" + 0.026*"bill" + 0.019*"outage" + 0.016*"charging" + 0.016*"w
ithout" + 0.014*"modem" + 0.013*"broadband"')

(7, '0.194*"service" + 0.113*"comcast" + 0.082*"internet" + 0.038*"b
illing" + 0.035*"customer" + 0.026*"issue" + 0.019*"poor" + 0.013*"p
roblem" + 0.012*"day" + 0.010*"xfinity"')

(8, '0.318*"internet" + 0.157*"speed" + 0.093*"comcast" + 0.051*"slo
w" + 0.033*"pricing" + 0.021*"issue" + 0.018*"connectivity" + 0.012
*"several" + 0.010*"one" + 0.009*"advertised"')
```

In [447]:

```
word_dict={}
for i in range(num_topics):
    words=ldamodel.show_topic(i,topn=20)
    word_dict['Topic#'+"{}".format(i)]=[ i[0] for i in words]
```

In [448]:

```
pd.DataFrame(word_dict)
```

Out[448]:

	Topic#0	Topic#1	Topic#2	Topic#3	Topic#4	Topic#5	T
0	comcast	comcast	help	comcast	comcast	cap	
1	charge	data	charged	complaint	price	data	c
2	service	usage	phone	service	bill	comcast	p
3	connection	terrible	low	throttling	cable	xfinity	
4	equipment	paying	contract	without	comcastxfinity	home	
5	bill	fee	please	false	high	cramming	
6	monopolistic	access	bandwidth	switch	monopoly	incorrect	cl
7	credit	limit	throttle	promised	fraudulent	payment	
8	account	overage	regarding	deceptive	monthly	2	r
9	month	lack	comcast	show	increased	issue	bro
10	installation	mb	speed	advertising	charge	slowing	
11	issue	plan	extremely	appointment	option	availability	
12	email	charged	term	bait	higher	throttled	
13	unreliable	300gb	improper	rate	install	tucson	
14	xfinitycomcast	mbps	resolution	shitty	u	provider	
15	said	isp	wont	lied	refund	security	
16	unauthorized	agreement	misrepresentation	provided	ask	atlanta	
17	12	getting	inconsistent	pricing	2	communication	
18	people	month	way	promotion	repeatedly	system	b
19	change	transfer	paid	request	increase	lack	

In [ ]:

```
```