Problem Statement:

Comcast Telecom Consumer Complaints analysis

1.To provide the trend chart for the number of complaints at monthly and daily granularity levels.

2.To provide a table with the frequency of complaint types.

3.To find which complaint types are maximum i.e., around internet, network issues, or across any other domains.

4.To create a new categorical variable with value as Open and Closed. Open & Pending is to be categorized as Open and Closed & Solved is to be categorized as Closed.

5.To Provide state wise status of complaints in a stacked bar chart. Use the categorized variable from Q3. Provide insights on:

6.To find which state has the maximum complaints

7.To find which state has the highest percentage of unresolved complaints

8.To Provide the percentage of complaints resolved till date, which were received through the Internet and customer care calls.

In [1]:
```
from pandas import *
import matplotlib.pyplot as plt
```

In [2]:
```
file=read_csv(r"C:\Users\User\Desktop\Comcast_telecom_complaints_data.csv")
```

In [3]:
```
file.head(2)
```

Out[3]:

	Ticket #	Customer Complaint	Date	Date_month_year	Time	Received Via	City	State	Zip code	Status	Filing on Behalf of Someone
0	250635	Comcast Cable Internet Speeds	22-04-15	22-Apr-15	3:53:50 PM	Customer Care Call	Abingdon	Maryland	21009	Closed	No
1	223441	Payment disappear - service got disconnected	04-08-15	04-Aug-15	10:22:56 AM	Internet	Acworth	Georgia	30102	Closed	No

In [4]:
```
file.shape
```

Out[4]:
```
(2224, 11)
```

1.To Provide the trend chart for the number of complaints at monthly and daily granularity levels.

In [5]:
```
file.Date=to_datetime(file.Date)
file=file.set_index('Date')
file.head(2)
```

Out[5]:

Date	Ticket #	Customer Complaint	Date_month_year	Time	Received Via	City	State	Zip code	Status	Filing on Behalf of Someone

Date	Ticket #	Customer Complaint	Date_month_year	Time	Received Via	City	State	Zip code	Status	Filing on Behalf of Someone
2015-04-22	250635	Comcast Cable Internet Speeds	22-Apr-15	3:53:50 PM	Customer Care Call	Abingdon	Maryland	21009	Closed	No
2015-04-08	223441	Payment disappear - service got disconnected	04-Aug-15	10:22:56 AM	Internet	Acworth	Georgia	30102	Closed	No

In [6]:
```
file.columns
```

Out[6]:
```
Index(['Ticket #', 'Customer Complaint', 'Date_month_year', 'Time',
       'Received Via', 'City', 'State', 'Zip code', 'Status',
       'Filing on Behalf of Someone'],
      dtype='object')
```

In [7]:
```
file.columns=['Ticket', 'Customer_Complaint', 'Date_month_year', 'Time',
       'Received_Via', 'City', 'State', 'Zip_code', 'Status',
       'Filing_on_Behalf_of_Someone']
```

In [8]:
```
file.columns
```

Out[8]:
```
Index(['Ticket', 'Customer_Complaint', 'Date_month_year', 'Time',
       'Received_Via', 'City', 'State', 'Zip_code', 'Status',
       'Filing_on_Behalf_of_Someone'],
      dtype='object')
```

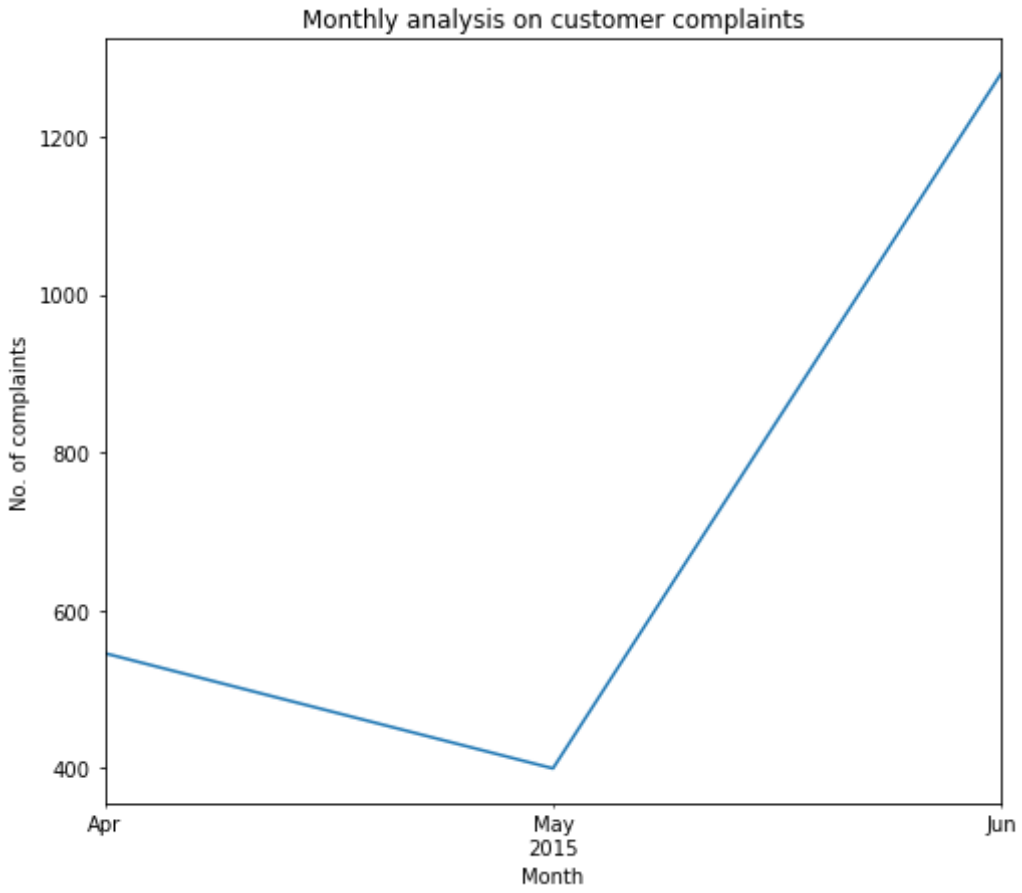
In [9]:
```
file.Customer_Complaint.resample('M').count()
```

Out[9]:
```
Date
2015-04-30     545
2015-05-31     399
2015-06-30    1280
Freq: M, Name: Customer_Complaint, dtype: int64
```

In [10]:
```
%matplotlib inline
plt.figure(figsize=(8,7))
file.Customer_Complaint.resample('M').count().plot()
plt.xlabel("Month")
```

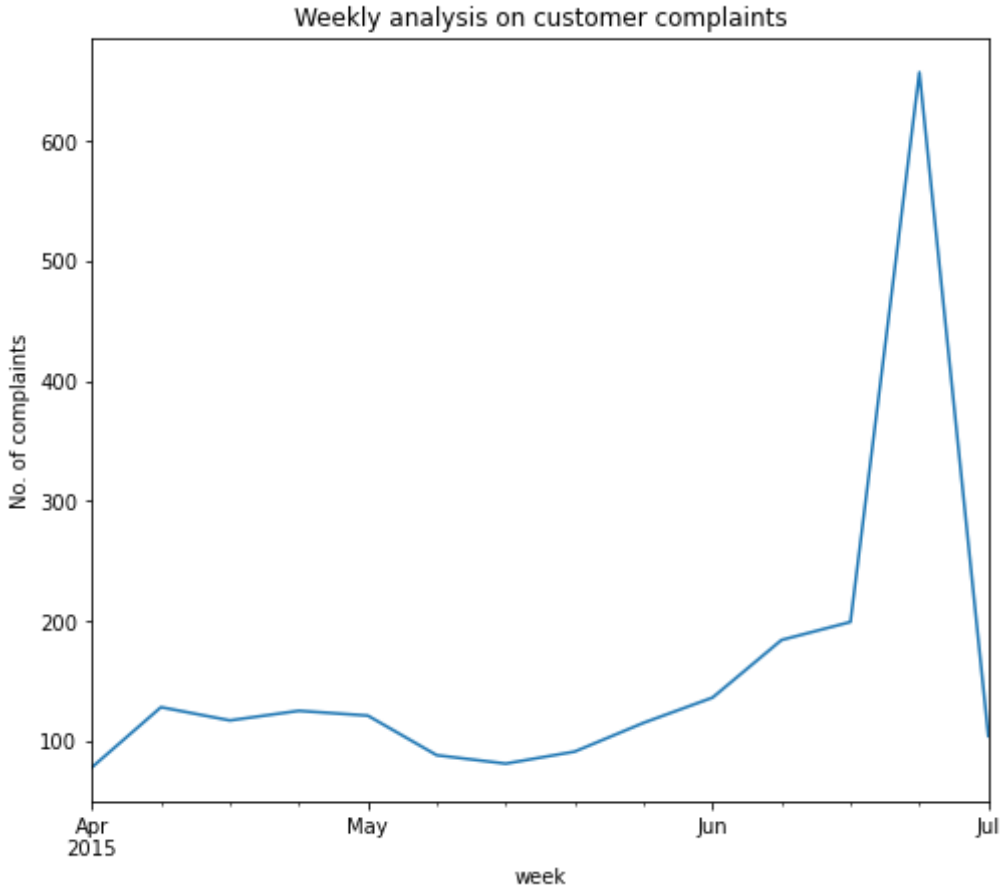
```
plt.ylabel("No. of complaints")
plt.title("Monthly analysis on customer complaints")
```

Out[10]: Text(0.5, 1.0, 'Monthly analysis on customer complaints')



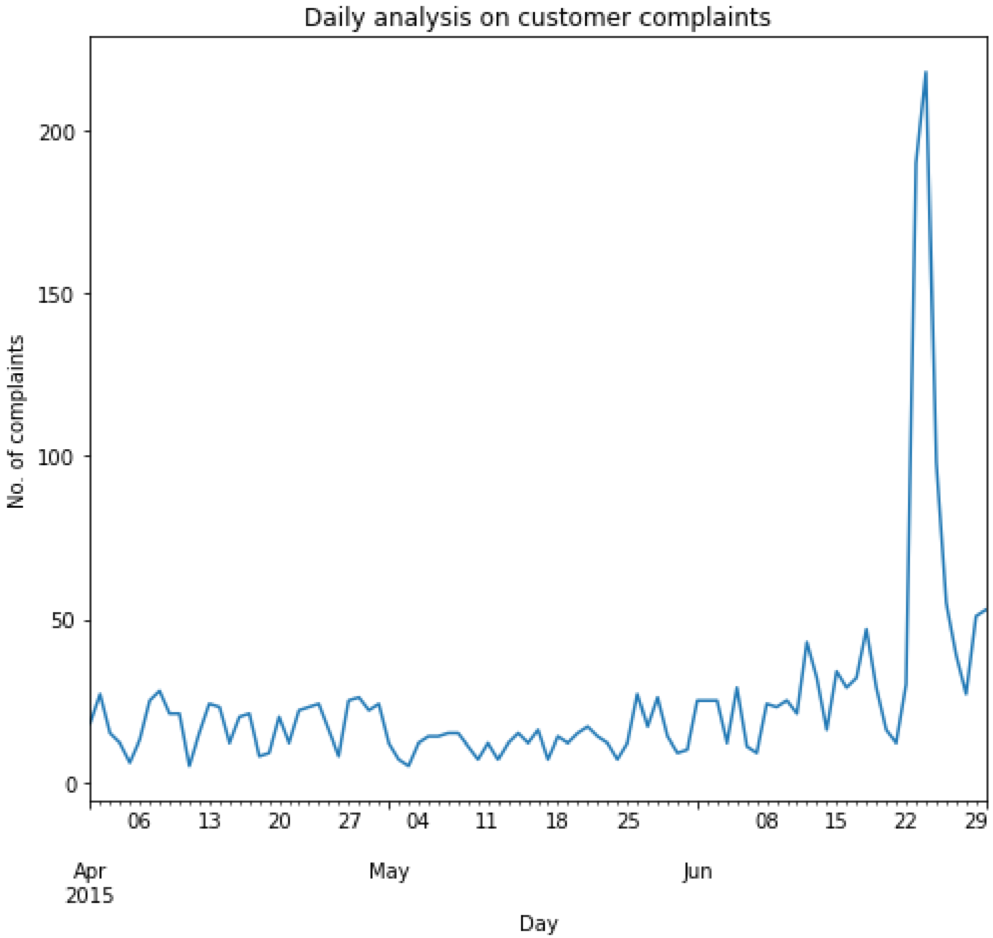
In [11]:
```
plt.figure(figsize=(8,7))
file.Customer_Complaint.resample('W').count().plot()
plt.xlabel("week")
plt.ylabel("No. of complaints")
plt.ylabel("No. of complaints")
plt.title("Weekly analysis on customer complaints")
```

Out[11]: Text(0.5, 1.0, 'Weekly analysis on customer complaints')



In [12]:
```
plt.figure(figsize=(8,7))
file.Customer_Complaint.resample('D').count().plot()
plt.xlabel("Day")
plt.ylabel("No. of complaints")
plt.title("Daily analysis on customer complaints")
```

Out[12]:
```
Text(0.5, 1.0, 'Daily analysis on customer complaints')
```



2. To Provide a table with the frequency of complaint types.

In [13]:
```
complaint_frequency=file.Customer_Complaint.value_counts()
complaint_frequency
```

Out[13]:
```
Comcast                                                          83
Comcast Internet                                                 18
Comcast Data Cap                                                 17
comcast                                                          13
Comcast Data Caps                                                11
```

```
                                                                    ..
Possible Internet Speed Throttling by my Comcast Internet Provider     1
Poor customer service                                                  1
Robber Barron Billing Practices                                        1
Comcast Xfinity barely ever works and speed sucks                      1
Comcast poor service or throttling                                     1
Name: Customer_Complaint, Length: 1841, dtype: int64
```

In [14]:
```
complaint_frequency_df=DataFrame(complaint_frequency)
complaint_frequency_df.head(3)
```

Out[14]:

	Customer_Complaint
Comcast	83
Comcast Internet	18
Comcast Data Cap	17

In [15]:
```
complaint_frequency_df.index_name='type_of_complaint'
complaint_frequency_df.columns=['frequency']
complaint_frequency_df
```

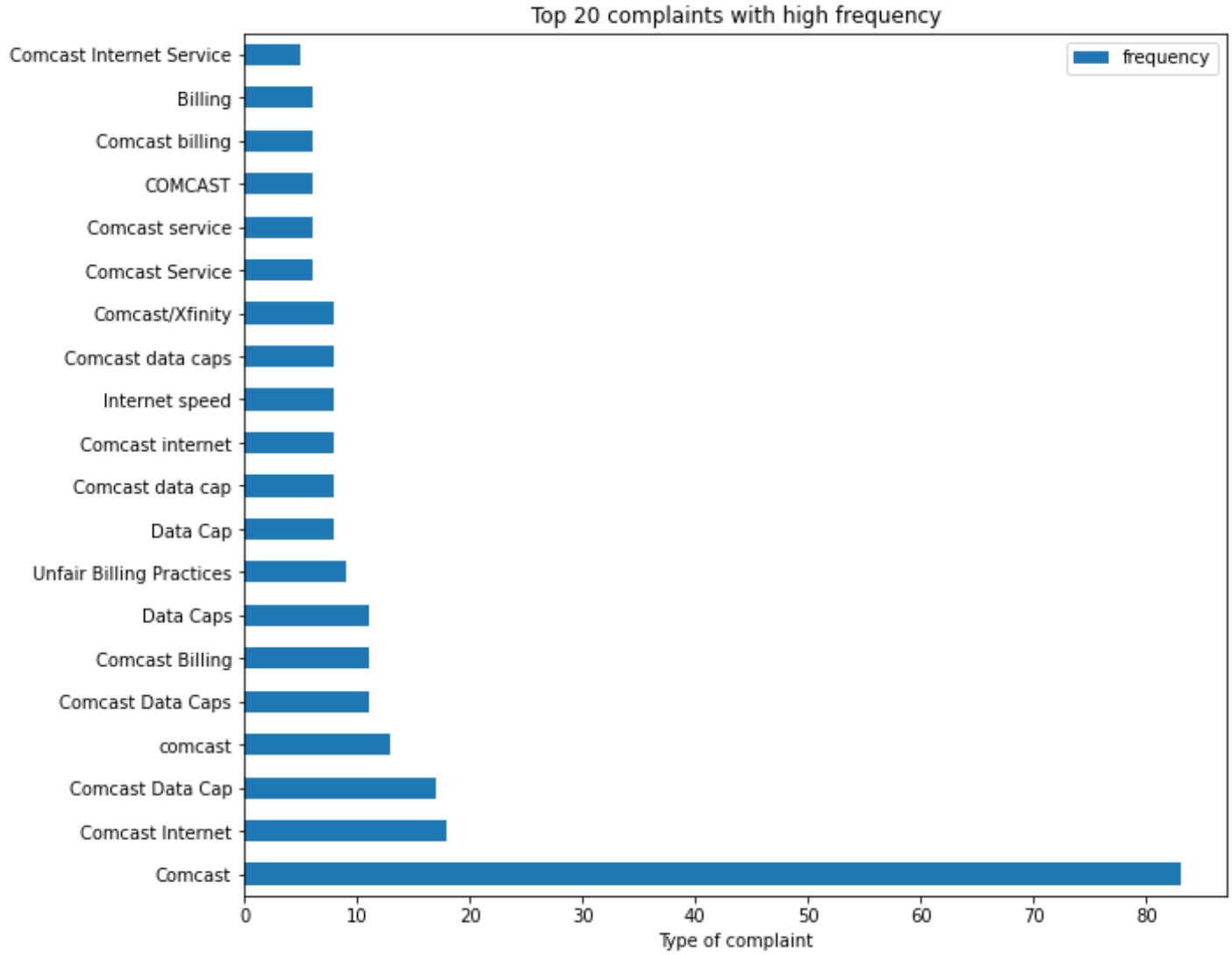
Out[15]:

	frequency
Comcast	83
Comcast Internet	18
Comcast Data Cap	17
comcast	13
Comcast Data Caps	11
...	...
Possible Internet Speed Throttling by my Comcast Internet Provider	1
Poor customer service	1
Robber Barron Billing Practices	1
Comcast Xfinity barely ever works and speed sucks	1
Comcast poor service or throttling	1

1841 rows × 1 columns

In [16]:
```
complaint_frequency_df.head(20).plot(kind='barh',figsize=(10,9))
plt.title('Top 20 complaints with high frequency')
plt.xlabel('Type of complaint')
```

Out[16]:
```
Text(0.5, 0, 'Type of complaint')
```



3.To find which complaint types are maximum i.e., around internet, network issues, or across any other domains.

In [17]:
```
Highest=complaint_frequency_df['frequency'].idxmax()
```

In [18]:
```
print('complaint types,which are maximum:    ',+complaint_frequency_df.loc[Highest])
```

```
complaint types,which are maximum:    frequency    83
Name: Comcast, dtype: int64
```

4.To Create a new categorical variable with value as Open and Closed. Open & Pending is to be categorized as Open . Closed & Solved is to be categorized as Closed.

In [19]:
```
file.Status.value_counts()
```

Out[19]:
```
Solved     973
Closed     734
Open       363
Pending    154
Name: Status, dtype: int64
```

In [20]:
```
  def function(x):
        if(x=='Pending' or x=='Open'):
            return ('Open')
        if(x=='Solved' or x=='Closed'):
            return('Closed')
```

In [21]:
```
file['Status_categorical']=file.Status.apply(function)
```

In [22]:
```
file.head(2)
```

Out[22]:

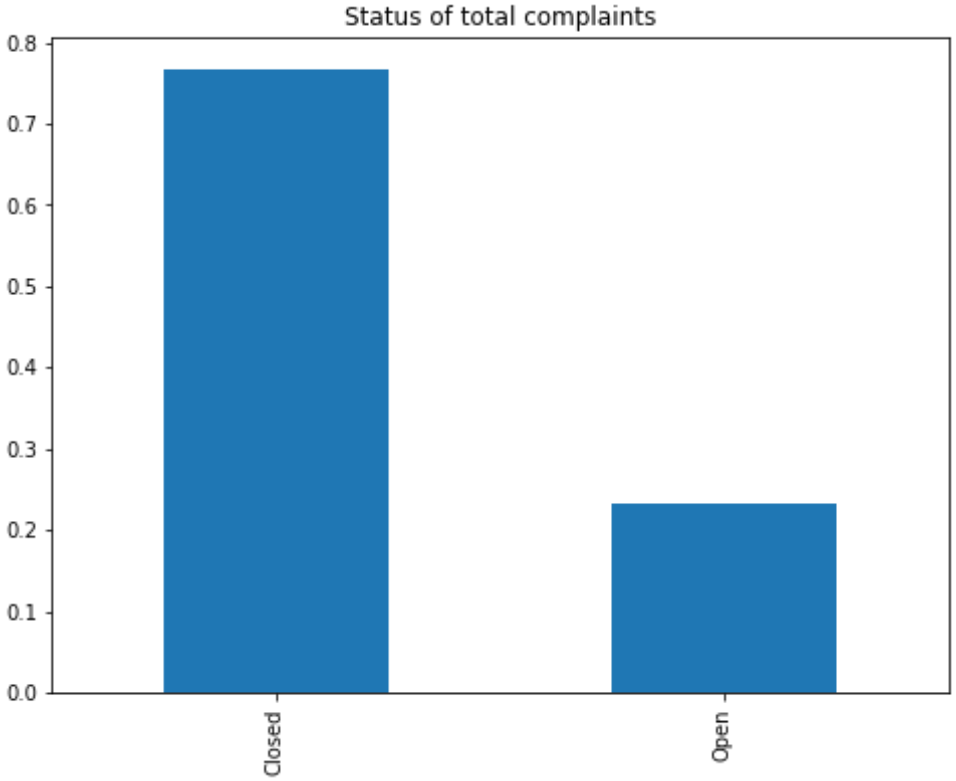
Date	Ticket	Customer_Complaint	Date_month_year	Time	Received_Via	City	State	Zip_code	Status	Filing_on_Behalf_of_Someone
2015-04-22	250635	Comcast Cable Internet Speeds	22-Apr-15	3:53:50 PM	Customer Care Call	Abingdon	Maryland	21009	Closed	No
2015-04-08	223441	Payment disappear - service got disconnected	04-Aug-15	10:22:56 AM	Internet	Acworth	Georgia	30102	Closed	No

In [23]:
```
file['Status_categorical'].value_counts()
```

Out[23]:
```
Closed    1707
Open       517
Name: Status_categorical, dtype: int64
```

In [24]:
```
plt.figure(figsize=(8,6))
file['Status_categorical'].value_counts(normalize=True).plot(kind='bar')
plt.title("Status of total complaints")
```

Out[24]:
```
Text(0.5, 1.0, 'Status of total complaints')
```



5.To provide state wise status of complaints in a stacked bar chart.

In [25]:
```
x=file.groupby(["State","Status_categorical"]).size()
x
```

Out[25]:
```
State          Status_categorical
Alabama        Closed                17
               Open                   9
Arizona        Closed                14
               Open                   6
Arkansas       Closed                 6
                                     ..
Virginia       Open                  11
Washington     Closed                75
               Open                  23
West Virginia  Closed                 8
               Open                   3
Length: 77, dtype: int64
```

In [26]:
```
x=file.groupby(["State","Status_categorical"]).size().unstack().fillna(0)
```

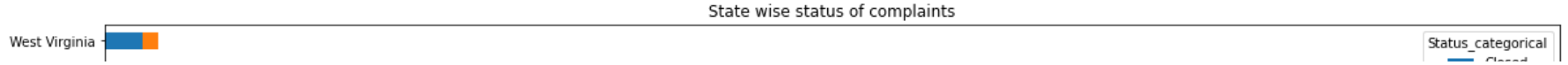
In [27]:
```
x.head()
```

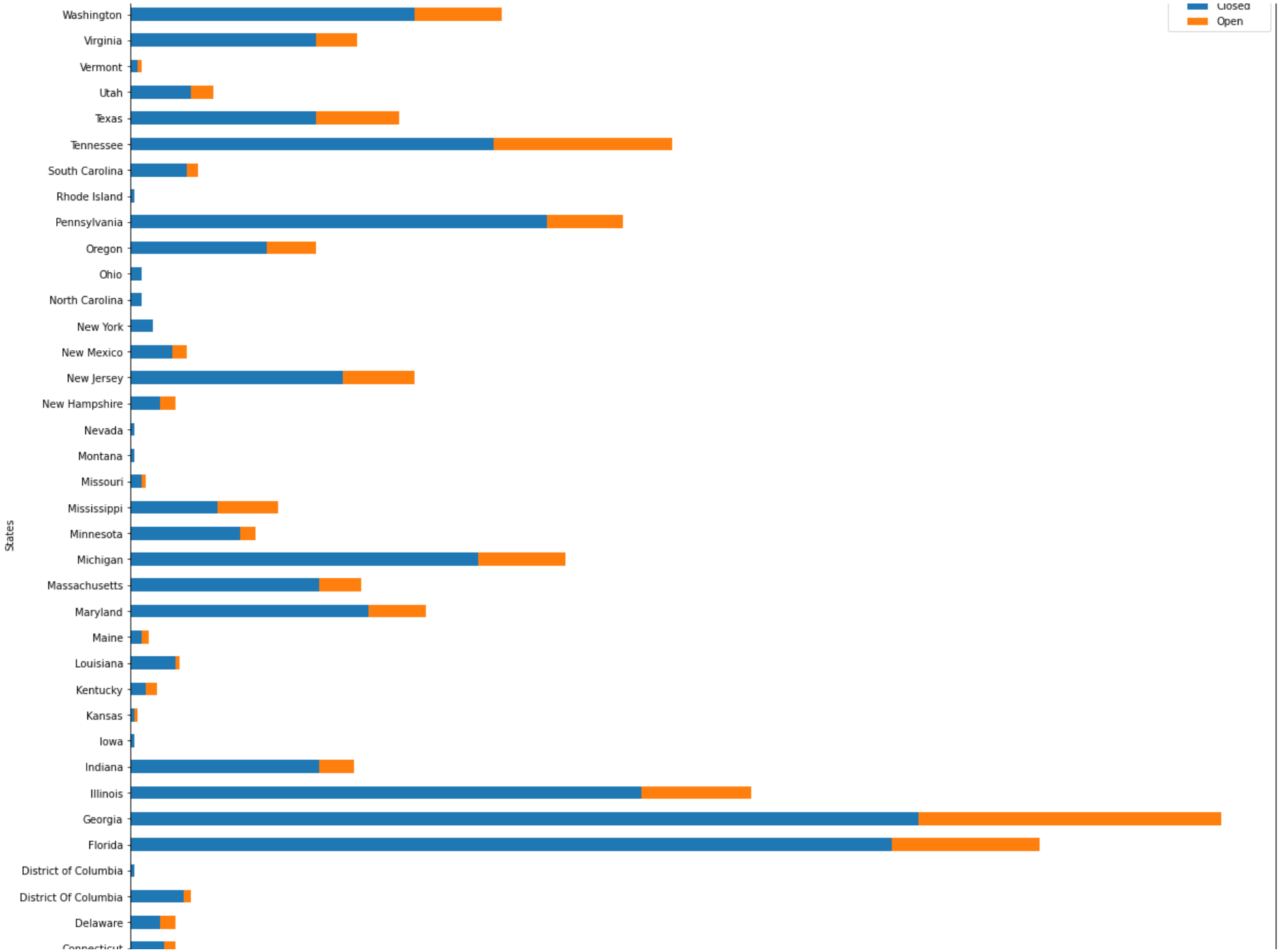
Out[27]:

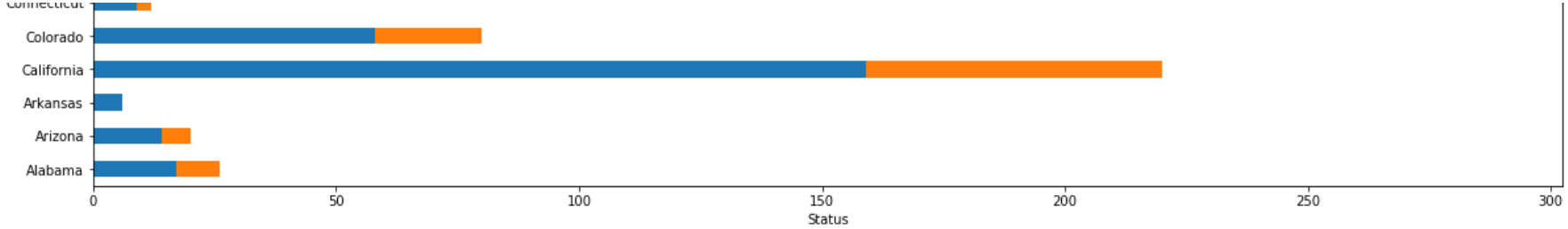
Status_categorical	Closed	Open
State		
Alabama	17.0	9.0
Arizona	14.0	6.0
Arkansas	6.0	0.0
California	159.0	61.0
Colorado	58.0	22.0

In [28]:
```
x.plot(kind="barh",stacked=True, figsize=(20,20))
plt.title("State wise status of complaints")
plt.xlabel("Status")
plt.ylabel("States")
```

Out[28]:
```
Text(0, 0.5, 'States')
```







5.To find which state has the maximum complaints

In [29]:
```
maximum_complaints_state_index=x.idxmax()
```

In [30]:
```
maximum_complaints_state=x.loc[maximum_complaints_state_index]
```

In [31]:
```
print(("The state which has maximum number of complaintsis :\n{}").format(maximum_complaints_state))
```

```
The state which has maximum number of complaintsis :
Status_categorical  Closed  Open
State
Georgia              208.0  80.0
Georgia              208.0  80.0
```

6. Which state has the highest percentage of unresolved complaints

In [32]:
```
x.columns=['Closed','Open']
```

In [33]:
```
y=x.Open.sum()
y
```

Out[33]:
```
517.0
```

In [34]:
```
z=(x.Open/y)*100
z
```

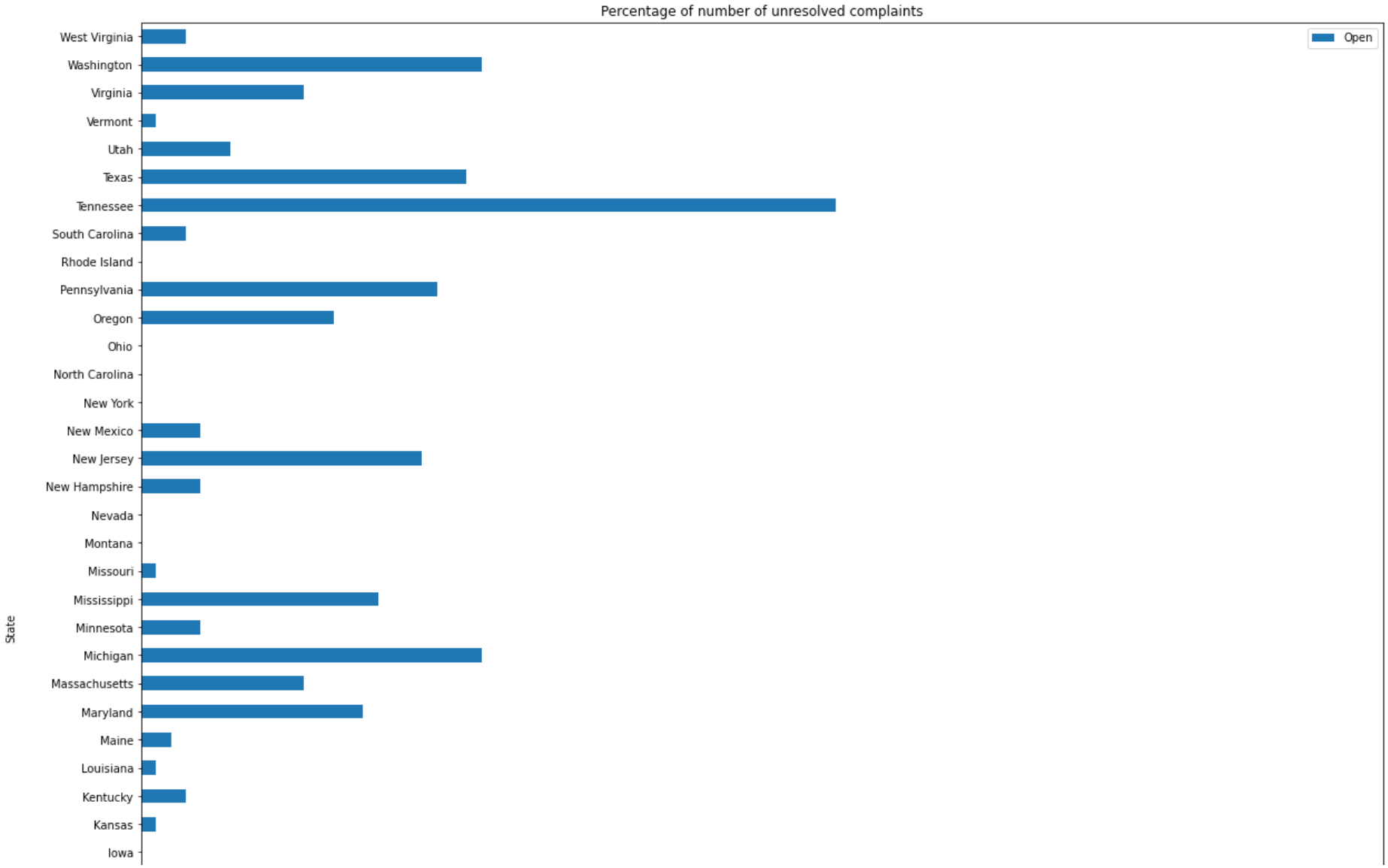
Out[34]:
```
State
Alabama                 1.740812
```

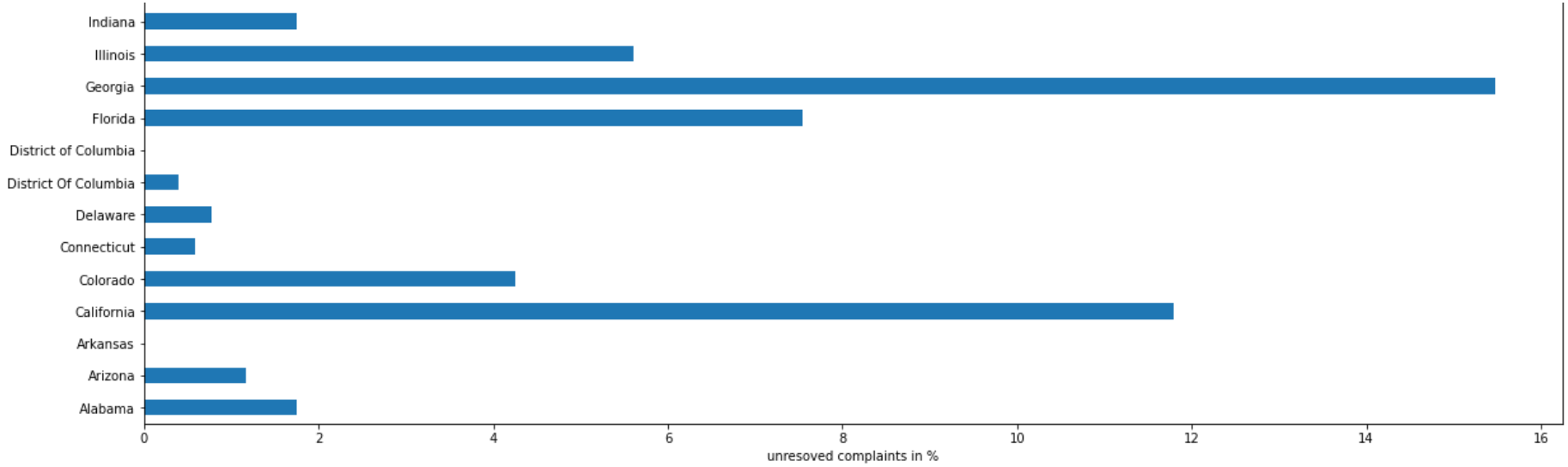
```
Arizona                 1.160542
Arkansas                0.000000
California             11.798839
Colorado                4.255319
Connecticut             0.580271
Delaware                0.773694
District Of Columbia    0.386847
District of Columbia    0.000000
Florida                 7.543520
Georgia                15.473888
Illinois                5.609284
Indiana                 1.740812
Iowa                    0.000000
Kansas                  0.193424
Kentucky                0.580271
Louisiana               0.193424
Maine                   0.386847
Maryland                2.901354
Massachusetts           2.127660
Michigan                4.448743
Minnesota               0.773694
Mississippi             3.094778
Missouri                0.193424
Montana                 0.000000
Nevada                  0.000000
New Hampshire           0.773694
New Jersey              3.675048
New Mexico              0.773694
New York                0.000000
North Carolina          0.000000
Ohio                    0.000000
Oregon                  2.514507
Pennsylvania            3.868472
Rhode Island            0.000000
South Carolina          0.580271
Tennessee               9.090909
Texas                   4.255319
Utah                    1.160542
Vermont                 0.193424
Virginia                2.127660
Washington              4.448743
West Virginia           0.580271
Name: Open, dtype: float64
```

In [35]:
```
z.plot(kind='barh', figsize=(20,20))
```

```
plt.title('Percentage of number of unresolved complaints')
plt.xlabel('unresoved complaints in %')
plt.ylabel('State')
plt.legend()
```

Out[35]: <matplotlib.legend.Legend at 0x1f2f1994d90>





In [36]:
```
max_Open=z.round(1).max()
```

In [37]:
```
max_Open_index=z.round(1).idxmax()
```

In [38]:
```
print("State which has the highest percentage of unresolved complaints is {} with {}%" .format(max_Open_index,max_Ope
```

```
State which has the highest percentage of unresolved complaints is Georgia with 15.5%
```

7.To Provide the percentage of complaints resolved till date, which were received through the Internet and customer care calls.

In [39]:
```
file.head()
```

Out[39]:

Date	Ticket	Customer_Complaint	Date_month_year	Time	Received_Via	City	State	Zip_code	Status	Filing_on_Behalf_of_Someone
2015-04-22	250635	Comcast Cable Internet Speeds	22-Apr-15	3:53:50 PM	Customer Care Call	Abingdon	Maryland	21009	Closed	No

Date	Ticket	Customer_Complaint	Date_month_year	Time	Received_Via	City	State	Zip_code	Status	Filing_on_Behalf_of_Someone
2015-04-08	223441	Payment disappear - service got disconnected	04-Aug-15	10:22:56 AM	Internet	Acworth	Georgia	30102	Closed	No
2015-04-18	242732	Speed and Service	18-Apr-15	9:55:47 AM	Internet	Acworth	Georgia	30101	Closed	Yes
2015-05-07	277946	Comcast Imposed a New Usage Cap of 300GB that ...	05-Jul-15	11:59:35 AM	Internet	Acworth	Georgia	30101	Open	Yes
2015-05-26	307175	Comcast not working and no service to boot	26-May-15	1:25:26 PM	Internet	Acworth	Georgia	30101	Solved	No

In [40]:
```
file.Received_Via.value_counts()
```

Out[40]:
```
Customer Care Call    1119
Internet              1105
Name: Received_Via, dtype: int64
```

In [41]:
```
list=(file.Status_categorical.value_counts(normalize=True).mul(100).round(1).astype(str)+'%')
```

In [42]:
```
list
```

Out[42]:
```
Closed    76.8%
Open      23.2%
Name: Status_categorical, dtype: object
```

In [43]:
```
print("Percentage of complaints resolved till date, which were received through the Internet and customer care calls=
      +list[0])
```

```
Percentage of complaints resolved till date, which were received through the Internet and customer care calls=76.8%
```

In [ ]: