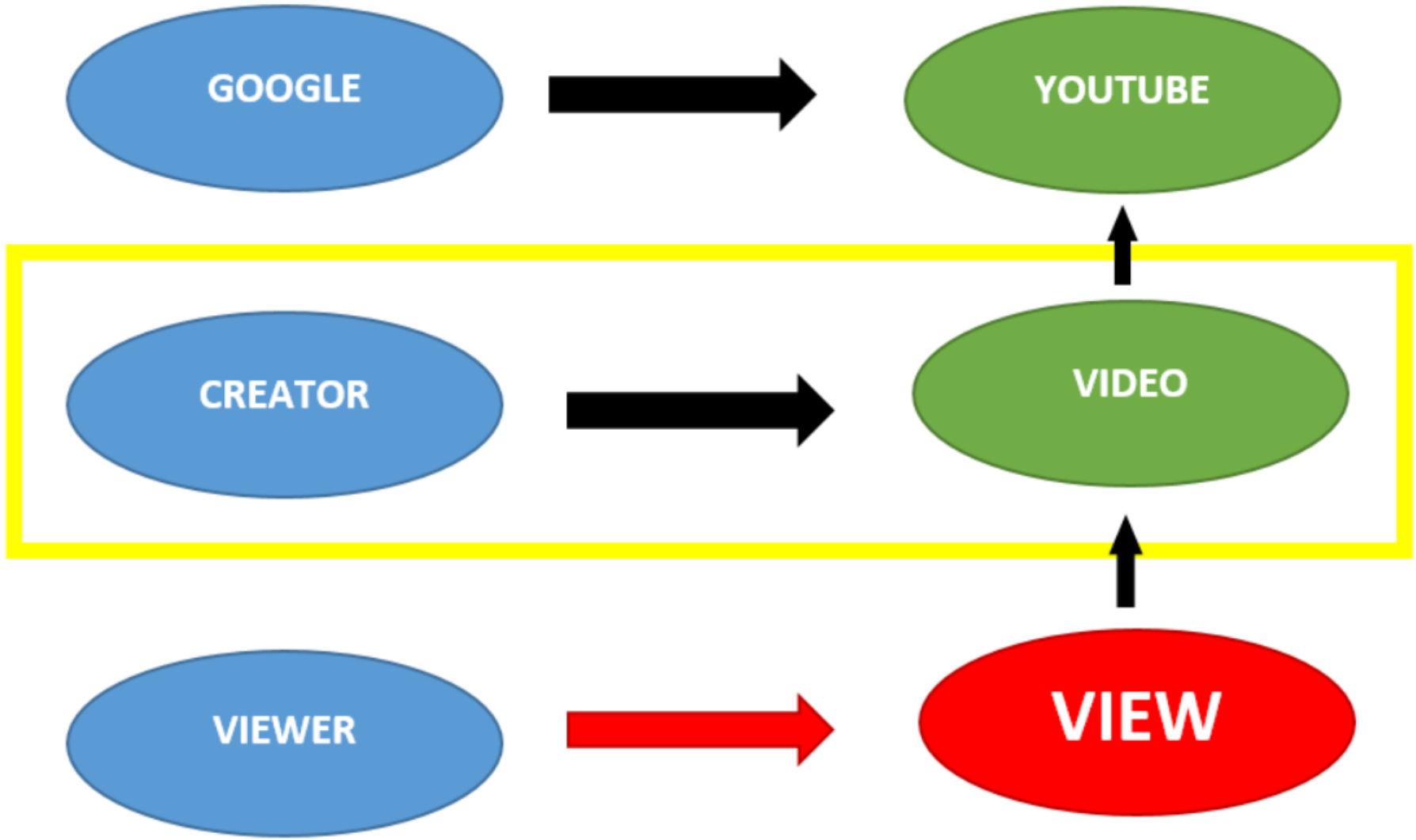
"Trends on Trends" - An Analysis of the Youtube Creator's influence on video trendability.

This project will explore how the Youtube creator affects the path from viewer to view, within the Youtube platform (excluding outside factors).

In [169]:
```
from IPython.display import Image
Image(filename='Youtube Relationship - Diagram.PNG')
```

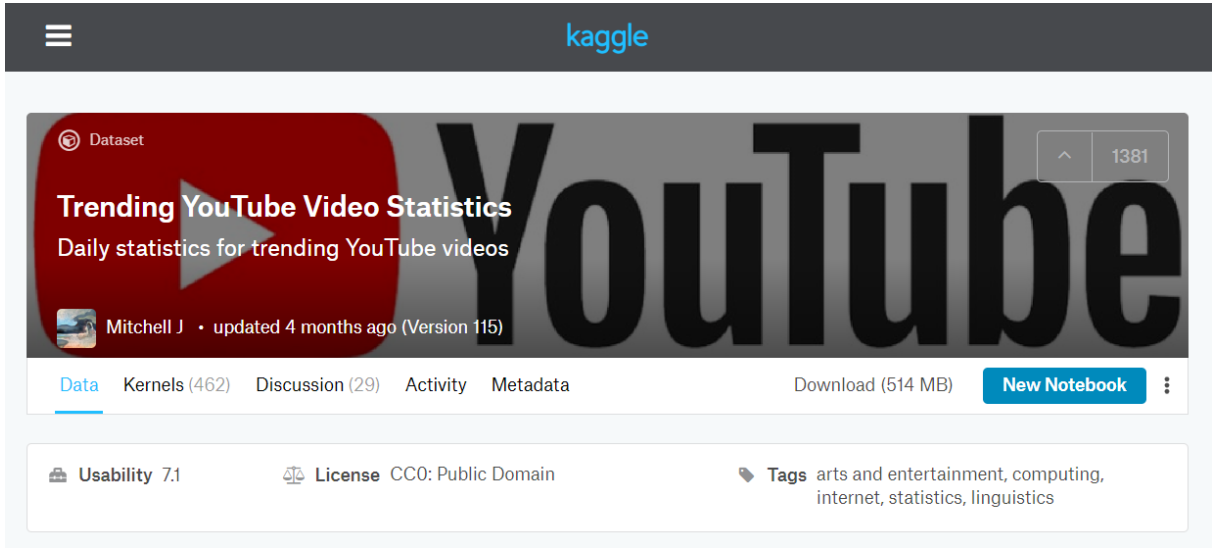
Out[169]:



DATA BACKGROUND & PREVIEW

What data is available?

- Source: https://www.kaggle.com/datasnaek/youtube-new
- "Daily Record of the Top Trending Youtube Videos"
- Up to 200 trending videos per day
- Two dataframes with the same columns (19).
  - 'df' should contain one line per video with final numbers
  - "df_all_timestamps" should contain snapshots throughout the day.



Limitations

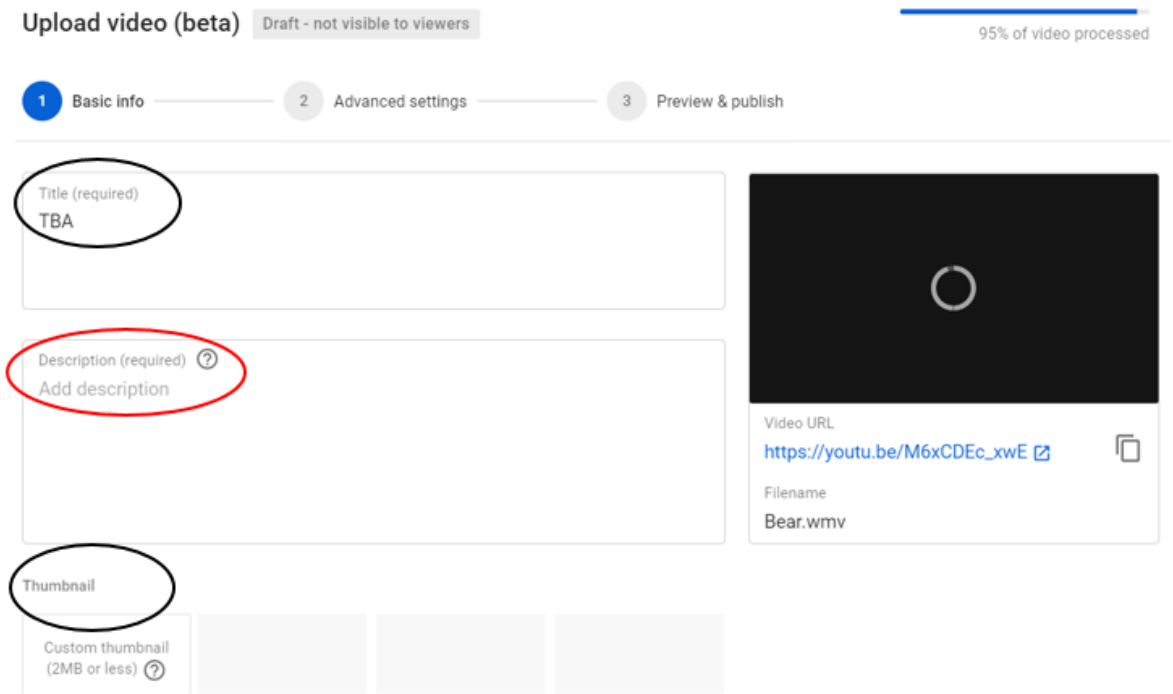
- No data on the viewers or path to arrive to video.
- Only 1 property of channel to be attributed to Youtube creator. More information on creator could lead to further insights.

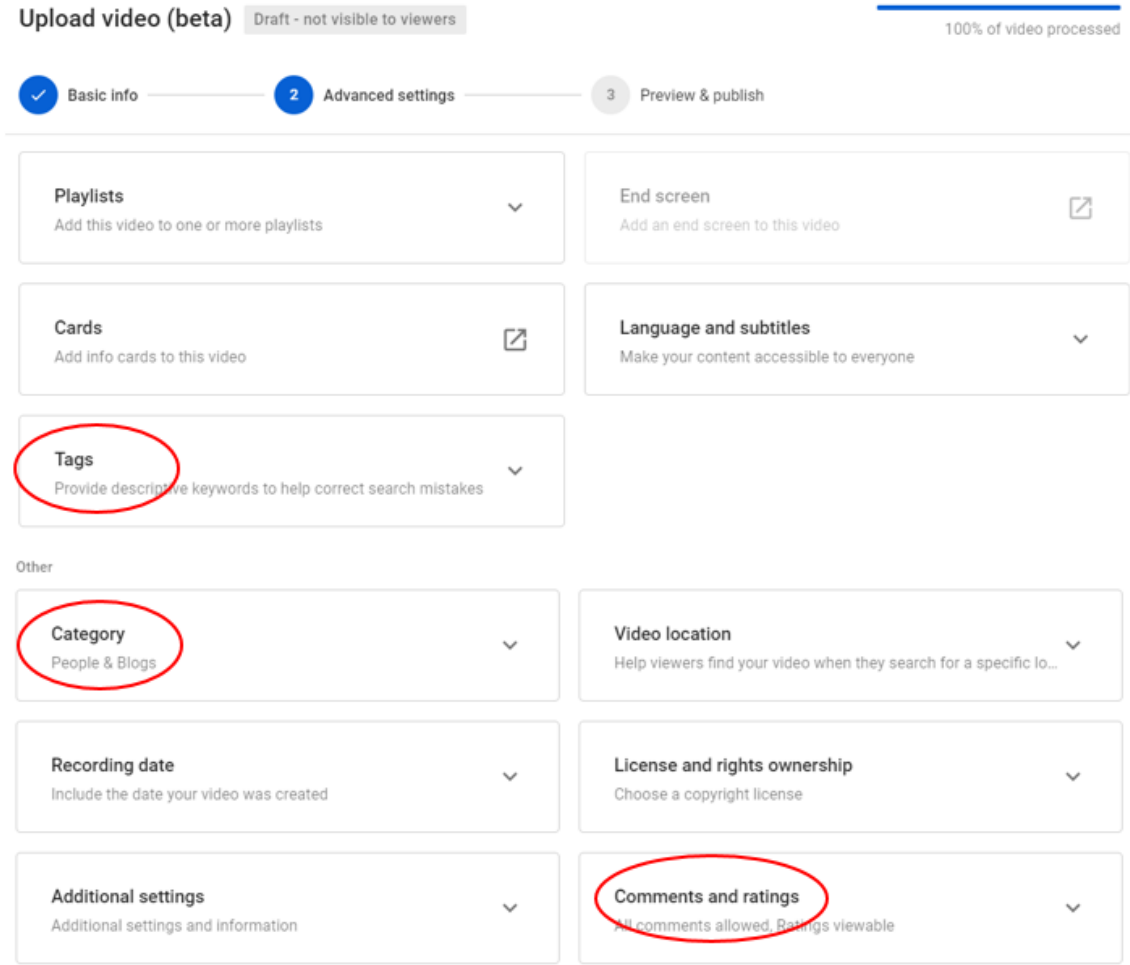
Unsanswered Questions

- What defines "trending"?
  - What is the metric? Assumption: Unknown internal measure (Top X videos by views / time_unit)
  - Dynamic - Constantly changes throughout day (e.g. Jan 3 - 184, Jan 4 - 828, Jan 5 - 875).
  - Does it change by viewer's geographical region?
- What is "country"?

EFFECT OF CONTENT

The Youtube Creator has a lot of control over the properties of the channel and video. The following properties within dataframe are manually entered by the creator: Title, Description, Thumbnail, Tags, Category, Comments Disabled, and Ratings Disabled. This section will explore if the content properties from the creator have any correlation with trendability.





REQUIRED

- Title
- Description

REQUIRED & PRE-FILLED

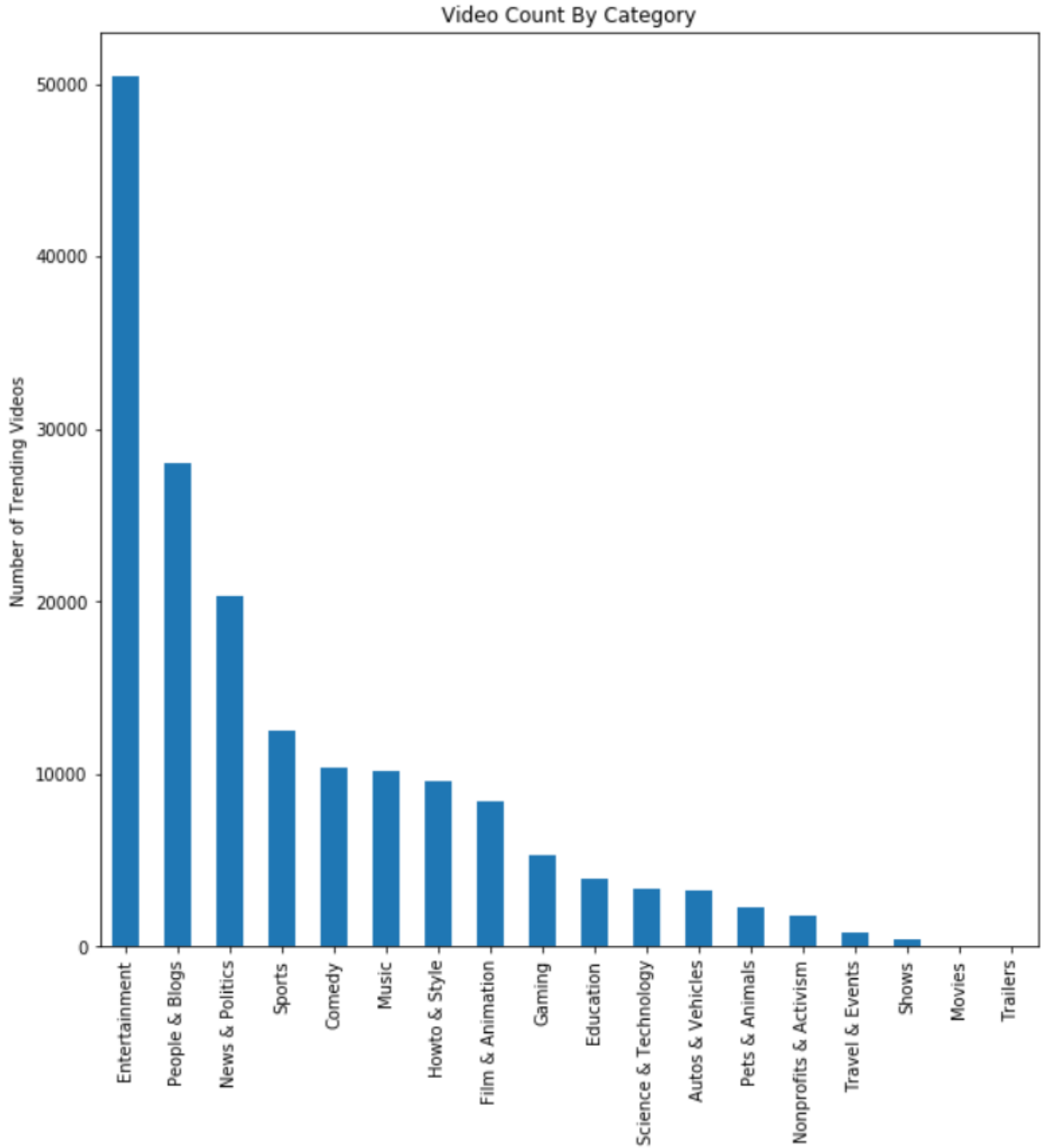
- Category
- Allow Comments
- Users can view ratings

••• CATEGORY •••

```
category_count = df['category'].value_counts()
print(category_count)
```

```
Entertainment            50468
People & Blogs           28045
News & Politics          20327
Sports                   12561
Comedy                   10358
Music                    10145
Howto & Style             9580
Film & Animation          8460
Gaming                    5318
Education                 3897
Science & Technology      3404
Autos & Vehicles          3274
Pets & Animals            2271
Nonprofits & Activism     1779
Travel & Events            812
Shows                      435
Movies                      12
Trailers                     3
Name: category, dtype: int64
```

```
fig = plt.figure(figsize=(10,10))
ax = fig.gca()
category_count.plot(kind = 'bar', ax = ax)
ax.set_title('Video Count By Category') # Give the plot a main title
ax.set_xlabel('category') # Set text for the x axis
ax.set_ylabel('Number of Trending Videos')# Set text for y axis
```



In [82]:
```
# Is Entertainment category more popular OR is it used very leniently, based on US?
# Qualitative Assessment - Are the Top 5 US videos properly categorized into Entertainment?

entertainment = df['category'] == 'Entertainment'
US = df['country'] == 'US'
df[entertainment & US].head()
```

Out[86]:

	video_id	trending_date	title	channel_title	category_id	category	publish_date	publish_time	tags
322	zYWt2mnalP8	2017-11-14	How To Do Thanksgiving Makeup That Has Nothing...	Sailor J	24	~~Entertainment~~ Howto and Style	2017-11-08	00:03:47	Thanksgiving|"Tutorial"|"Makeup"
666	cOc3tsFWoRs	2017-11-14	Jason Momoa & Lisa Bonet: Love at First Sight	The Late Late Show with James Corden	24	~~Entertainment~~ Comedy	2017-11-10	09:35:00	James Corden|"The Late Late Show"|"Colbert"|"l...
672	F-j_6IuaYfw	2017-11-14	I Miss the Old Taylor	Wong Fu Productions	24	Entertainment	2017-11-08	21:05:20	taylor swift|"swiftie"|"reputation"|"ready for...
674	Y6eKxjMA9ek	2017-11-14	Dropping And CATCHING A Paper Airplane At 2,00...	Tucker Gott	24	Entertainment	2017-11-09	16:00:09	paramotor|"tucker"|"gott"|"tucker gott"|"param...
675	zy0b9e40tK8	2017-11-14	Dark | Official Trailer [HD] | Netflix	Netflix	24	~~Entertainment~~ Movies OR Trailers	2017-11-09	09:00:07	Netflix|"Baran Bo Odar"|"Jantje Friese"|"DARK"...

- Category is subjectively chosen by the creator.
- Although 'Entertainment' is the most popular category, a closer looks shows that it is used broadly instead of better matching categories
- With this in mind, is a better solution to make categories more descriptive for Youtube OR should the creator play around this?
- If 'Entertainment' videos trend better and assuming category is used in suggestion algorithms, the Youtube creator should consider if he/she would prefer to use a wider category that may reach more people but might not fit what the viewer is looking for OR if they prefer to select the category that better matches their video, targets less viewers, is less competitive, and perhaps it is more relevant to what the viewer is looking for.

••• DESCRIPTION LENGTH •••

In [104]:
```
df['description_length'] = None
df['description_length'] = df['description'].str.len()
```

In [110]:
```
df.head()
```

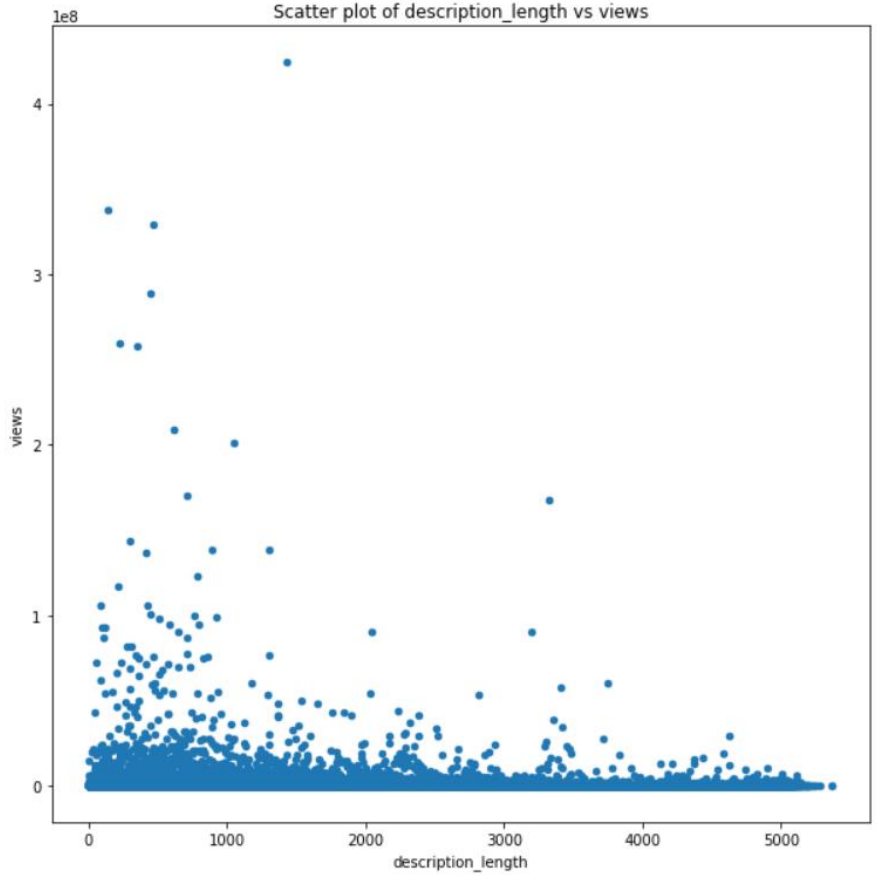
Out[110]:

log_comment_count	tag_count	publish_day	trending_day	Time_Live	Days_Live	description_length
5.375278	44	Sunday	Tuesday	1 days 06:01:03	1	288

```
fig = plt.figure(figsize=(10, 10))
ax = fig.gca()
df.plot(kind = 'scatter', x = 'description_length', y = 'views', ax = ax)
ax.set_title('Scatter plot of description_length vs views')
ax.set_xlabel('description_length')
ax.set_ylabel('views')
```

```
df['description_length'].describe()
```

```
count    171149.000000
mean        800.058656
std         835.311361
min           1.000000
25%         225.000000
50%         536.000000
75%        1065.000000
max        5369.000000
Name: description_length, dtype: float64
```



- Description length count does not correlate with views but we can see patterns on how long are the descriptions 'trending' views tend to have.
- Assuming description factor into Youtube search algorithms, we can make recommendations on description_length.
- The average description_length of trending videos is 536 characters and it should be kept within 225 and 536 (the range followed by 50% of trending videos).

••• TAG COUNT •••

In [23]:
```
# every video has tags

no_tags = df['tags'] == None
df[no_tags]
```

Out[23]:

video_id	trending_date	title	channel_title	cate

```
# make new column called tag_count

df['tag_count'] = None
```

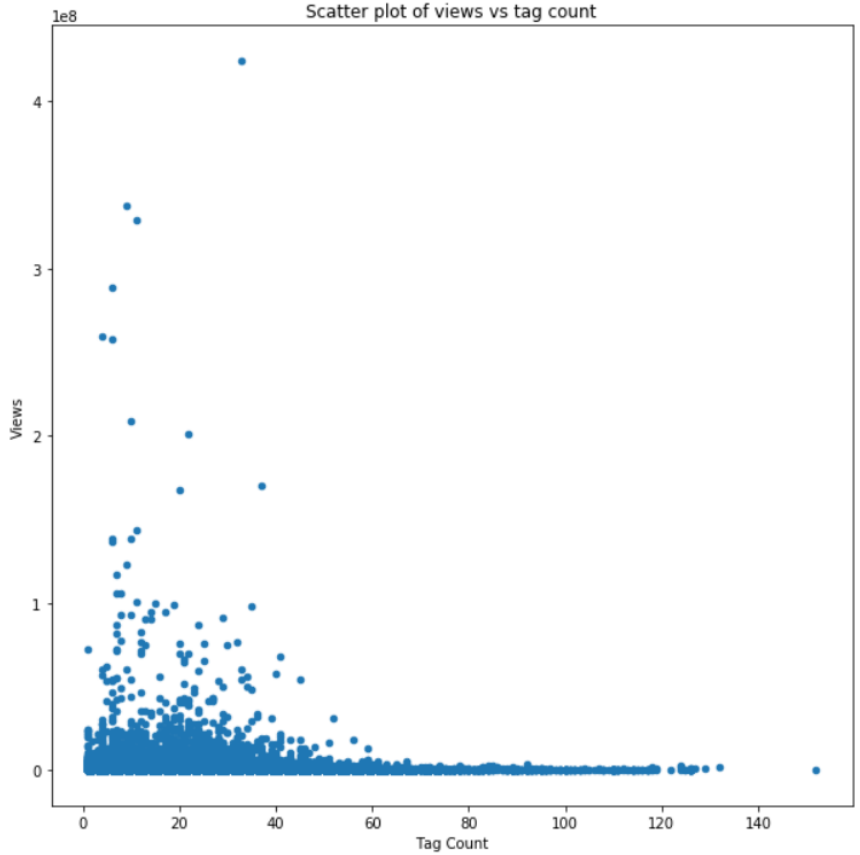
```
# put data into the column

df['tag_count'] = df['tags'].str.split(r'|')
df.loc[:,'tag_count'] = df['tag_count'].apply(lambda x: len(x))
```

t	tag_count
3	44

```
df['tag_count'].describe()
```

```
count    171149.000000
mean         17.148222
std          13.284787
min           1.000000
25%           7.000000
50%          15.000000
75%          25.000000
max         152.000000
Name: tag_count, dtype: float64
```




```
fig = plt.figure(figsize=(10, 10))
ax = fig.gca()
df.plot(kind = 'scatter', x = 'tag_count', y = 'views', ax = ax)
ax.set_title('Scatter plot of views vs tag count')
ax.set_xlabel('Tag Count')
ax.set_ylabel('Views')
```

- Tag count does not directly correlate with views but we can see patterns on how many tags 'trending' views tend to have.
- Assuming tags factor into Youtube search algorithms, we can make recommendations on tag_count.
- The average tag count of trending videos is 17 and it should be kept within 7 and 25 (the range followed by 50% of trending videos). Every trending video has at least 1 so it should be not left blank.

••• OPENNESS TO FEEDBACK (COMMENTS & RATINGS) •••

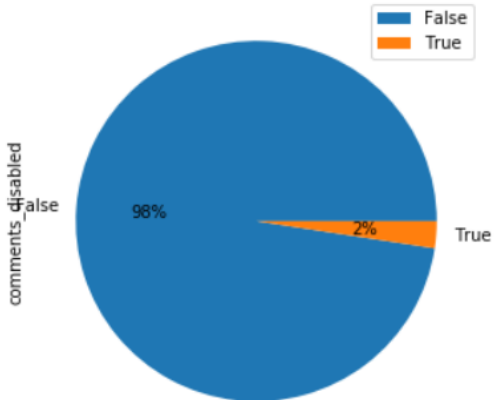
```
# open to comments? - count

comments_disabled_count = df['comments_disabled'].value_counts()
print(comments_disabled_count)
```

```
False    167027
True       4122
Name: comments_disabled, dtype: int64
```

```
# open to comments? - proportion

df2 = pd.DataFrame(comments_disabled_count)
plot = df2.plot.pie(y='comments_disabled', figsize=(5, 5), autopct='%1.0f%%')
```



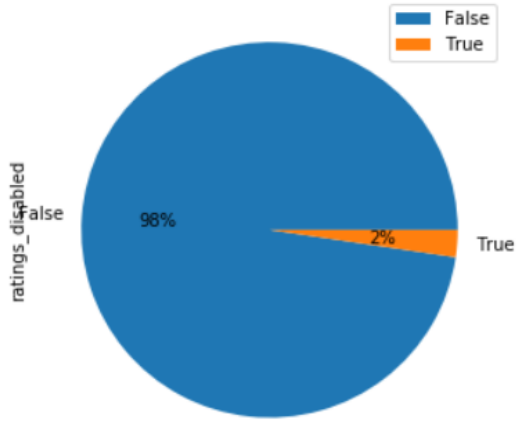

```
# open to ratings? - count

ratings_disabled_count = df['ratings_disabled'].value_counts()
print(ratings_disabled_count)
```

```
False    167159
True       3990
Name: ratings_disabled, dtype: int64
```

```
# open to ratings? - proportion

df3 = pd.DataFrame(ratings_disabled_count)
plot = df3.plot.pie(y='ratings_disabled', figsize=(5, 5), autopct='%1.0f%%')
```




```
# What is the overlap? Closed to both comments are ratings.

df4 = df[(df.ratings_disabled == True) & (df.comments_disabled == True)]

len(df4)
```

```
1153
```

```
# closed videos / total videos
# as a percentage

(len(df4)/len(df))*100
```

```
0.6736819963891113
```

- The grand majority of videos are open to feedback with 98% open to comments and 98% open to ratings
- Less than 1 percent (0.67%) are closed to both ratings and comments.
- For Youtube creators: it is important to note that trending videos overwhelming tend to be open to feedback and if trendability/popularity is the goat, their videos should follow this pattern.

EFFECT OF TIME

Some video properties stem from the Youtube Creator's actions: particularly publish time and frequency of uploads. This section will explore possibly opportunities related to the timeline of video uploads.

PROCESSING DONE

Click "Publish" to make your video live.

Publish

Draft saved.

Publish on Sat Sep 28 2019

Draft saved.

Basic info | Translations | Advanced settings

Butterfly

Description

Tags (e.g., albert einstein, flying pig, mashup)

New! Premieres

Make it a moment! Build the hype and get fans excited about your next video.

- Schedule your Premiere
- Share your watch page URL with your fans
- Chat with fans before and during the Premiere
- Watch the Premiere with fans in real time

Learn more

Premiere

Public

New! Premieres

Make it a moment! Build the hype and get fans excited about your next video.

- Schedule your Premiere
- Share your watch page URL with your fans
- Chat with fans before and during the Premiere
- Watch the Premiere with fans in real time

Learn more

Premiere

Scheduled

Sep 28, 2019

6:30 AM

(GMT-0400) Local Time

••• PUBLISH DATE •••

```
df['publish_day'] = None
```

```
df['publish_day'] = df['publish_timestamp'].dt.dayofweek
```

```
df.head(50)
```

country	publish_timestamp	trending_timestamp	log_views	log_likes	log_dislikes	log_comment_count	tag_count	publish_day
FR	2017-11-12 17:58:57	2017-11-14	9.877554	7.375882	3.178054	5.375278	44	6

```
publish_day_count = df['publish_day'].value_counts()
print(publish_day_count)
```

```
4    26978
3    25624
0    24920
1    23992
2    23868
6    23233
5    22534
Name: publish_day, dtype: int64
```

```
def dayofweek(row):
    if row['publish_day'] == 0:
        return 'Monday'
    elif row['publish_day'] == 1:
        return 'Tuesday'
    elif row['publish_day'] == 2:
        return 'Wednesday'
    elif row['publish_day'] == 3:
        return 'Thursday'
    elif row['publish_day'] == 4:
        return 'Friday'
    elif row['publish_day'] == 5:
        return 'Saturday'
    elif row['publish_day'] == 6:
        return 'Sunday'

df.loc[:,'publish_day'] = df.apply(dayofweek, axis=1)

df.head()
```

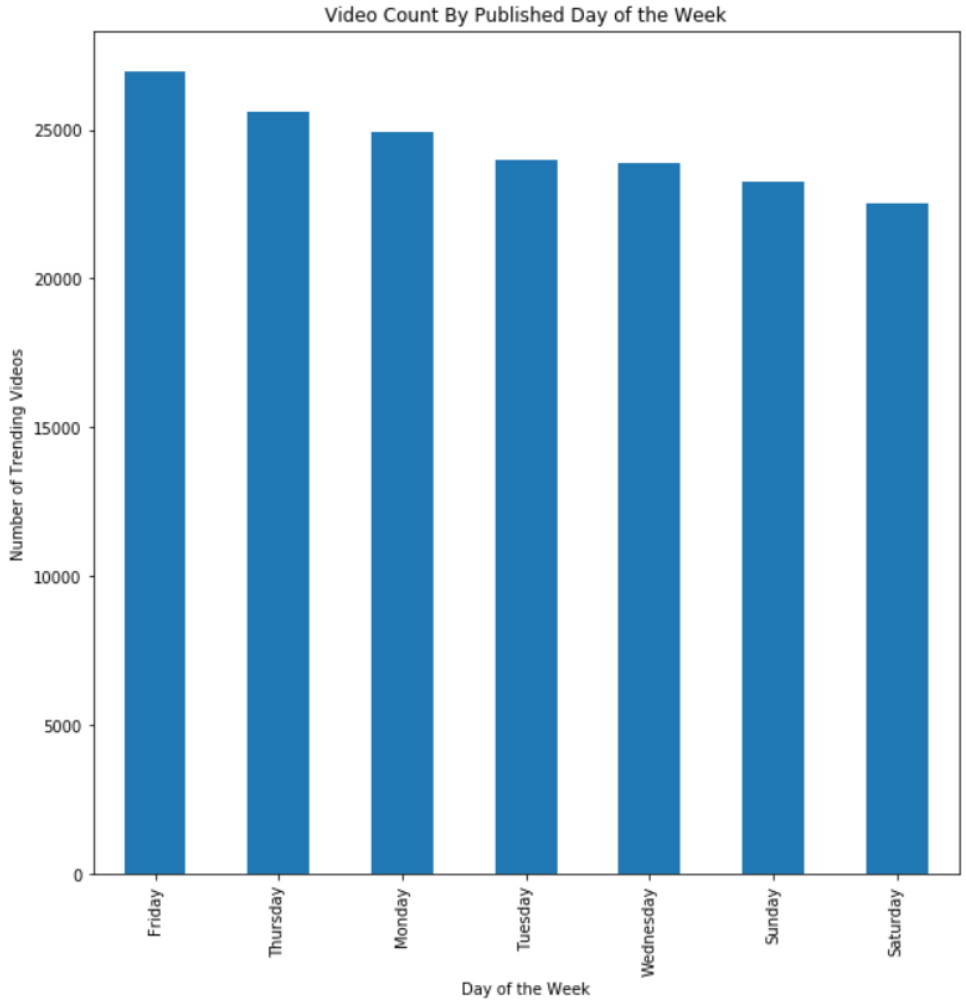
country	publish_timestamp	trending_timestamp	log_views	log_likes	log_dislikes	log_comment_count	tag_count	publish_day
FR	2017-11-12 17:58:57	2017-11-14	9.877554	7.375882	3.178054	5.375278	44	Sunday

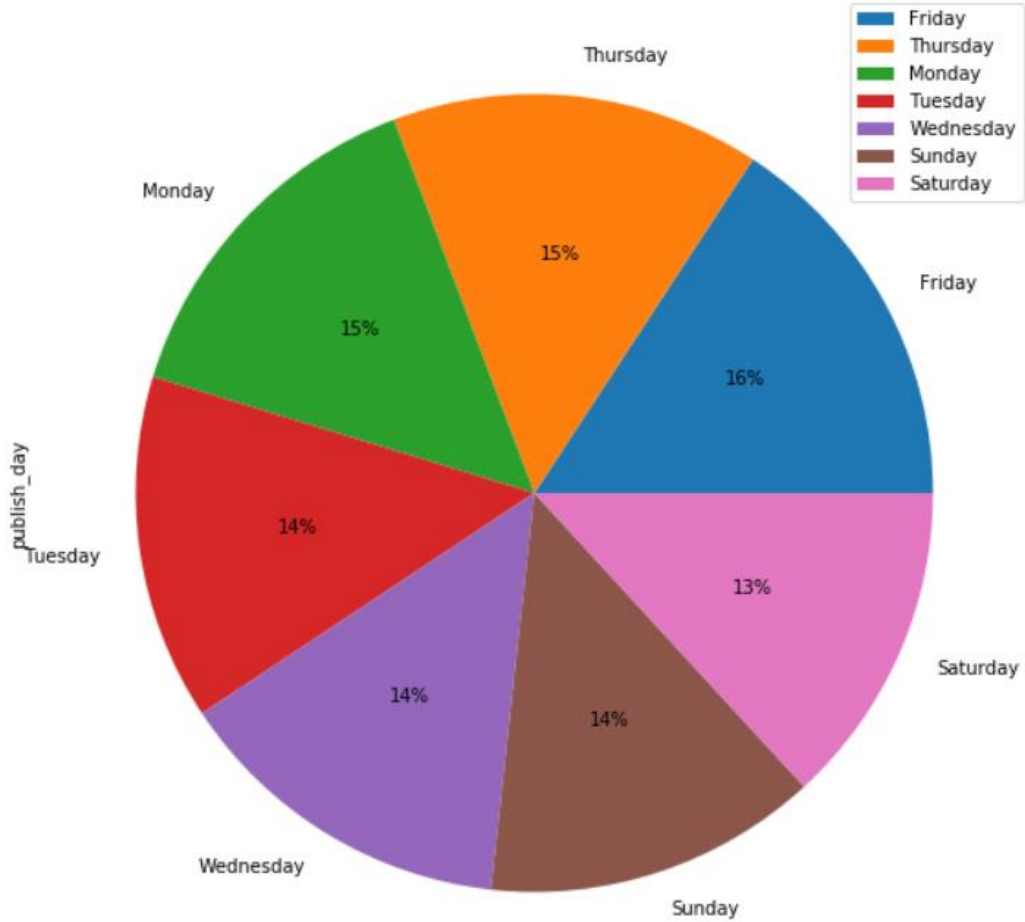
```
publish_day_count = df['publish_day'].value_counts()
print(publish_day_count)
```

```
Friday       26978
Thursday     25624
Monday       24920
Tuesday      23992
Wednesday    23868
Sunday       23233
Saturday     22534
Name: publish_day, dtype: int64
```

```
fig = plt.figure(figsize=(10,10))
ax = fig.gca()
publish_day_count.plot(kind = 'bar', ax = ax)
ax.set_title('Video Count By Published Day of the Week')
ax.set_xlabel('Day of the Week')
ax.set_ylabel('Number of Trending Videos')
```

```
df5 = pd.DataFrame(publish_day_count)
plot = df5.plot.pie(subplots = True, figsize=(10, 10), autopct='%1.0f%%')
```





- Publish date is generated when the Creator uploads the video and hence in his control.
- The day of the week is pretty evenly split so the difference between days is not drastic. However... when placed in video count order, there seems to be a preference and/or strategic decision to publish on weekdays (Saturday and Sunday had the least amount)
- Friday is the most popular day to publish, perhaps getting ahead of the weekend?

••• DAYS ON THE PLATFORM (PUBLISH DATE vs TRENDING DATE) •••

```
df['Time_Live'] = df['trending_timestamp'] - df['publish_timestamp']
```

```
df.head(100)
```

_timestamp	log_views	log_likes	log_dislikes	log_comment_count	tag_count	publish_day	trending_day	Time_Live	I
2017-11-14	9.877554	7.375882	3.178054	5.375278	44	Sunday	Tuesday	1 days 06:01:03	

```
df.info()
```

```
Time_Live                171149 non-null timedelta64[ns]
```

```
df["Days_Live"] = None
```

```
df["Days_Live"] = df["Time_Live"].dt.days
```

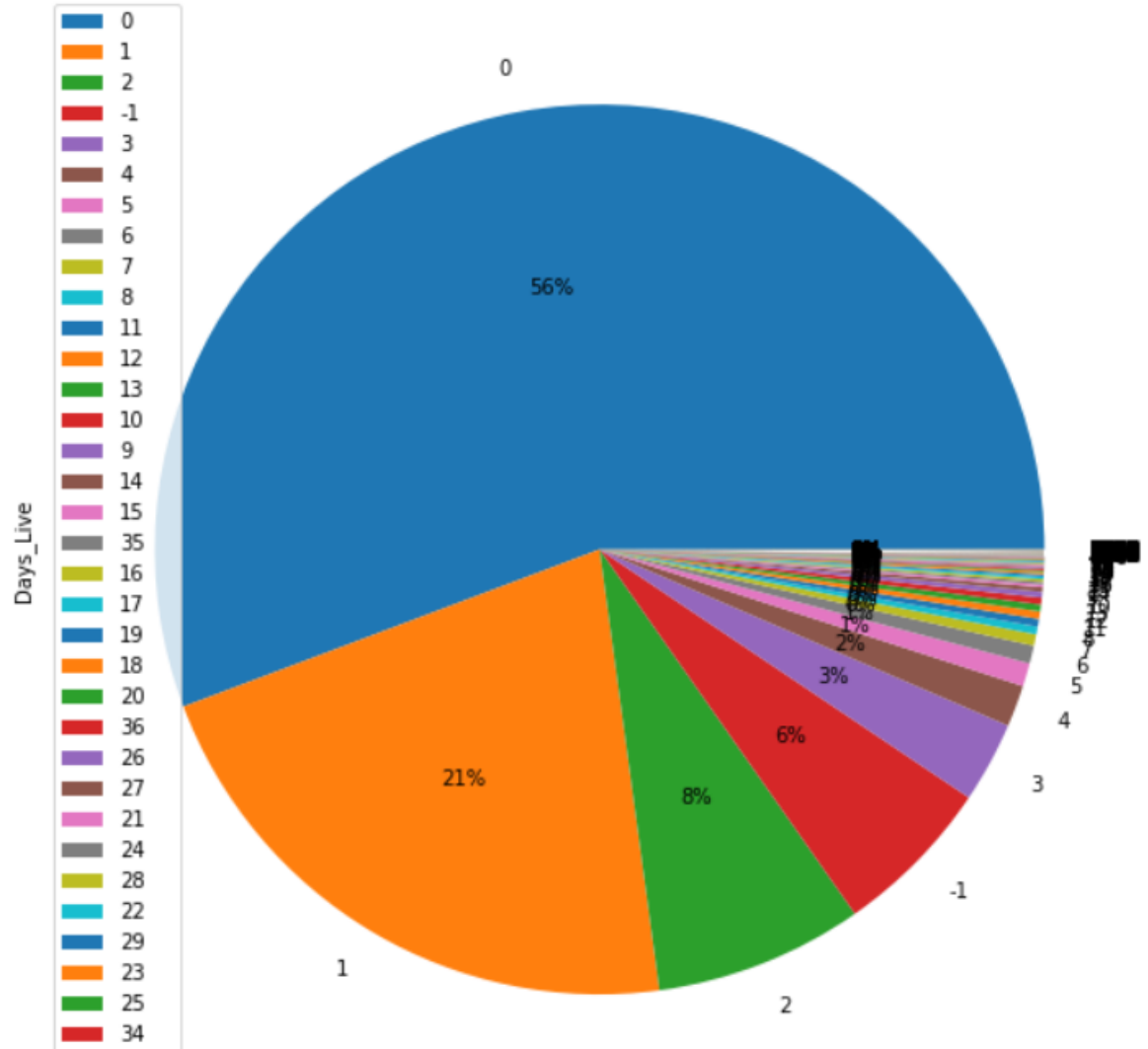
```
df.head(100)
```

_timestamp	log_views	log_likes	log_dislikes	log_comment_count	tag_count	publish_day	trending_day	Time_Live	Days_Live
2017-11-14	9.877554	7.375882	3.178054	5.375278	44	Sunday	Tuesday	1 days 06:01:03	1

```
days_live_count = df['Days_Live'].value_counts()
print(days_live_count)
```

```
 0       95410
 1       36631
 2       12972
-1       10024
 3        5021
         ...
 1356        1
 77          1
 333         1
 461         1
 698         1
Name: Days_Live, Length: 394, dtype: int64
```

```
df7 = pd.DataFrame(days_live_count)
plot = df7.plot.pie(subplots = True, figsize=(10, 10), autopct='%1.0f%%')
```



- The overwhelming majority of trending videos have been on the platform for less than a day 56%, with 85% for less than 3 days.
- This shows a clear correlation between the publish date and trending day. That videos tend to trend within days if not hours from the date published.
- In this perhaps an indication of viewer's attention span?

••• MULTIPLE TRENDERS •••

```
channel_count_series = df['channel_title'].value_counts()
print(channel_count_series)
```

```
SET India                                 253
SAB TV                                    248
VikatanTV                                 240
The Late Show with Stephen Colbert        230
Анатолий Шарий                            224
                                         ...
MCDAVO                                      1
Technical Patel                             1
Shizarium                                   1
Deejay Maquina                              1
Гельмут Вайссвальд                          1
Name: channel_title, Length: 33965, dtype: int64
```

```
channel_count_series.describe()
```

```
count    33965.000000
mean         5.038981
std         12.047872
min          1.000000
25%          1.000000
50%          1.000000
75%          4.000000
max        253.000000
Name: channel_title, dtype: float64
```

```
multiple_trender = channel_count['VideoCount'] >1
channel_count[multiple_trender]
```

	channel_title	VideoCount
0	SET India	253
1	SAB TV	248
2	VikatanTV	240
3	The Late Show with Stephen Colbert	230
4	Анатолий Шарий	224
...	...	...
16399	Sólo Ellas 4	2
16400	Коллекция Рецептов	2
16401	اعلانات مسلسل تركي	2
16402	메이리우 Korean Sister	2
16403	Mehmed Bir Cihan Fatihi	2

16404 rows × 2 columns

```
# From the channels with trending videos, almost 50% are concurren
tly trending more than one video

# From Previous calculations
Total_VideoCount_DF = 171149          # df.describe()
Total_ChannelCount_DF = 33965         # channel_count_series.descr
ibe()
Multiple_TrenderCount_Df = 16404      # multiple_trender view

Multiple_TrenderCount_Df/Total_ChannelCount_DF
```

```
0.48296776093036947
```

- If you aggregate the total number of videos trending by channel, almost 50% of those channels had more than one video trending. With the top 25% of channels, having at least 4 trending videos.
- Viewers tend to see videos from the same channel OR presumably, this property feeds into suggestion algorithms and viewers that see 1 video from a channel may be suggested to see another.
- This presents an opportunity for the Youtube Creator to have more than one video trending within a short timespan and for Youtube to encourage more trending videos.
- If a Creator achieves trending with 1 video, two things may happen: there is a potentail correlation that either one of his/her existing videos can increase in viewership OR if the creator posts another video, that new video may benefit from the popularity of the previous.
- Assuming the creator does not proactively see this connection, Youtube (who is most likely already suggesting to viewers to see videos from the same channel) may now encourage via prompts or incentives more video uploads in a short period of time from the same creator to build on momentum

CONCLUSION

QUESTIONS TO EXPLORE

WHAT?

- Is there a correlation between CONTENT properties inputted by the creator and trendability? - YES!
- Is there a correlation between the creator's publishing TIMELINE and trendability? - YES!

WHY?

- For Creators, are there any opportunities and or suggested behavior to encourage trendability? - YES!
- For Youtube, is it worthwhile to spend additional resources on the Youtube Creator? Are there any suggested changes to the existing platform? - YES!

WHAT IS NEXT FOR PROJECT?

- Qualitative Analysis: Particularly on Tags and Description
- Closer look at qualities provided for Multiple Trenders