

# sector\_state\_miners

March 9, 2021

## 1 Stats for the sectors, segmented by miner group

### 1.1 Setting-up

```
[1]: %load_ext autotime
```

```
%load_ext autoreload
```

```
%autoreload 2
```

time: 8.06 ms (started: 2021-03-09 18:43:06 +00:00)

```
[2]: # External dependences
```

```
import pandas as pd
```

```
import numpy as np
```

```
import plotly.express as px
```

```
# Move path to parent folder
```

```
import sys
```

```
sys.path.insert(1, '../')
```

```
import plotly
```

```
plotly.offline.init_notebook_mode()
```

time: 447 ms (started: 2021-03-09 18:43:06 +00:00)

```
[3]: from filecoin_metrics.connection import get_connection, get_connection_string
```

```
conn_string = get_connection_string('../config/sentinel-conn-string.txt')
```

```
connection = get_connection(conn_string)
```

time: 880 ms (started: 2021-03-09 18:43:07 +00:00)

```
[4]: UPGRADE_DATE = '2020-11-25 00:00:00'
```

time: 10.1 ms (started: 2021-03-09 18:43:07 +00:00)

```
[5]: QUERY = ""
```

```
/* Get the last state of the sectors */
```

```

with sector_states as (
    select
        msi.*,
        max(msi.height) over (partition by msi.sector_id, msi.miner_id) as
        ↪max_height
    from miner_sector_infos msi
    where msi.activation_epoch > 0
    and msi.expiration_epoch > msi.height /* Get only active sectors */
    order by max_height
)
select
    ss.miner_id,
    count(*) as sector_count,
    sum(ss.initial_pledge::numeric) / 1e18 as initial_pledge_in_fil,
    count(*) * 32 as network_power_in_gb,
    date_trunc('DAY', to_timestamp(height_to_unix(ss.activation_epoch))) as
    ↪activation_date,
    date_trunc('DAY', to_timestamp(height_to_unix(ss.expiration_epoch))) as
    ↪expiration_date
from sector_states as ss
where ss.max_height = ss.height /* get the last state of the info */
group by activation_date, expiration_date, miner_id
order by activation_date, expiration_date, miner_id
"""

query_df = (pd.read_sql(QUERY, connection)
            .assign(network_power_in_pib=lambda df: df.network_power_in_gb /
            ↪(1024 ** 2))
            .assign(initial_pledge_in_thousand_fil=lambda df: df.
            ↪initial_pledge_in_fil / 1000))

```

time: 7min 48s (started: 2021-03-09 18:43:07 +00:00)

```

[6]: import json

path = '../config/miners.json'

with open(path, 'r') as fid:
    miners_map = json.load(fid)

miner_id_map = {miner_id: miner
                for miner, miner_ids
                in miners_map.items()
                for miner_id in miner_ids}

metrics = {'miner': query_df.miner_id.map(miner_id_map).fillna('None'),
          'is_v1': lambda x: x['activation_date'] < UPGRADE_DATE}

```

```
query_df = query_df.assign(**metrics)
```

time: 49.7 ms (started: 2021-03-09 18:50:56 +00:00)

```
[7]: def resample_and_bar_plot(df, resample_rule, time_column, value_column, title,
    ↪ **kwargs):
    fig_df = df.groupby('miner').resample(resample_rule, on=time_column,
    ↪ label='left').sum()
    fig = px.bar(fig_df.reset_index(),
                  x=time_column,
                  y=value_column,
                  color='miner',
                  title=title,
                  **kwargs)
    return fig

def resample_and_bar_plot_relative(df, resample_rule, time_column,
    ↪ value_column, title, **kwargs):
    fig_df = df.groupby('miner').resample(resample_rule, on=time_column,
    ↪ label='left').sum()
    y = fig_df.groupby(time_column).sum()
    fig_df /= y
    fig = px.bar(fig_df.reset_index(),
                  x=time_column,
                  y=value_column,
                  color='miner',
                  title=title,
                  **kwargs)
    return fig
```

time: 10.3 ms (started: 2021-03-09 18:50:56 +00:00)

## 1.2 Sector Count

```
[8]: df = query_df.copy()

print("Basic stats")
print("----")
print(f"Total sectors (#): {df.sector_count.sum()}")
print(f"Raw bytes power (PiB): {df.network_power_in_gb.sum() / (1024 ** 2) :.
    ↪ 3g}")
print(f"Initial pledge (FIL): {df.initial_pledge_in_fil.sum()}")
print("----")
```

Basic stats

```
---
Total sectors (#): 79744049
Raw bytes power (PiB): 2.43e+03
Initial pledge (FIL): 22231625.337688163
---
time: 17.2 ms (started: 2021-03-09 18:50:56 +00:00)
```

```
[9]: resample_rule = '1m'
time_column = 'expiration_date'
value_column = 'sector_count'
title = 'Count of Expiring Sectors (#)'

groups = [pd.Grouper(key='expiration_date', freq=resample_rule),
           'is_v1']

fig_df = (df.groupby(groups)
          .sum()
          )

fig = px.bar(fig_df.reset_index(),
              x=time_column,
              y=value_column,
              color='is_v1',
              title=title)
fig.show()
```

```
time: 280 ms (started: 2021-03-09 18:50:56 +00:00)
```

```
[10]: resample_rule = '1d'
time_column = 'expiration_date'
value_column = 'sector_count'
title = 'Count of Expiring Sectors Before 15Jun2021 (#)'

groups = [pd.Grouper(key='expiration_date', freq=resample_rule),
           'is_v1']

fig_df = (df.query("expiration_date < '2021-06-15 00:00+00:00'")
          .groupby(groups)
          .sum()
          .reset_index()
          )

fig = px.bar(fig_df,
```

```

        x=time_column,
        y=value_column,
        color=fig_df.is_v1,
        title=title,
        log_y=True)
fig.show()

```

time: 84.7 ms (started: 2021-03-09 18:50:56 +00:00)

```

[11]: resample_rule = '1d'
time_column = 'expiration_date'
value_column = 'sector_count'
title = 'Count of Expiring Sectors Before 15Jun2021, grouped by Miner (#)'

groups = [pd.Grouper(key='expiration_date', freq=resample_rule),
          'is_v1',
          'miner']

fig_df = (df.query("expiration_date < '2021-06-15 00:00+00:00'")
          .groupby(groups)
          .sum()
          .reset_index()
          )

fig = px.bar(fig_df,
             x=time_column,
             y=value_column,
             color='miner',
             facet_col='is_v1',
             title=title)
fig.show()

```

time: 138 ms (started: 2021-03-09 18:50:56 +00:00)

```

[12]: resample_rule = '1m'
time_column = 'expiration_date'
value_column = 'sector_count'
title = 'Upcoming Sector Expiration Count (#)'

resample_and_bar_plot(df,
                      resample_rule,
                      time_column,
                      value_column,
                      title).show()

```

time: 215 ms (started: 2021-03-09 18:50:56 +00:00)

```
[13]: resample_rule = '1m'
time_column = 'expiration_date'
value_column = 'sector_count'
title = 'Upcoming Sector Expiration Count, grouped by sector version (#)'

groups = ['miner',
          pd.Grouper(key='expiration_date', freq=resample_rule),
          'is_v1']

fig_df = (df.groupby(groups)
          .sum()
          .reset_index()
          )

fig = px.bar(fig_df.reset_index(),
             x=time_column,
             y=value_column,
             color='miner',
             facet_col='is_v1',
             title=title)

fig.show()
```

time: 200 ms (started: 2021-03-09 18:50:56 +00:00)

```
[14]: resample_rule = '1m'
time_column = 'expiration_date'
value_column = 'sector_count'
title = 'Percentage of Expiring V1 Sectors (%)'

groups = [pd.Grouper(key='expiration_date', freq=resample_rule),
          'is_v1']

fig_df = (df.groupby(groups)
          .sum()
          .reset_index(level='is_v1')
          )

v1_df = fig_df.query('is_v1 == True').fillna(0)
v2_df = fig_df.query('is_v1 == False').fillna(0)
fig_df = (v1_df / (v1_df + v2_df))

fig = px.bar(fig_df.reset_index(),
             x=time_column,
             y=value_column,
             title=title)
```

```
fig.show()
```

time: 116 ms (started: 2021-03-09 18:50:57 +00:00)

```
[15]: resample_rule = '1m'
time_column = 'expiration_date'
value_column = 'sector_count'
title = 'Percentage of Expiring Old Sectors per Miner Group (%)'

groups = ['miner',
          pd.Grouper(key='expiration_date', freq=resample_rule),
          'is_v1']

fig_df = (df.groupby(groups)
          .sum()
          .reset_index(level='is_v1')
          )

v1_df = fig_df.query('is_v1 == True').fillna(0)
v2_df = fig_df.query('is_v1 == False').fillna(0)
fig_df = (v1_df / (v1_df + v2_df))

fig = px.bar(fig_df.reset_index(),
             x=time_column,
             y=value_column,
             color='miner',
             animation_frame='miner',
             title=title)
fig.show()
```

time: 185 ms (started: 2021-03-09 18:50:57 +00:00)

```
[16]: resample_rule = '1m'
time_column = 'activation_date'
value_column = 'sector_count'
title = 'Count of Sector Activation Date (#)'

resample_and_bar_plot(df, resample_rule, time_column, value_column, title).
    ↪ show()
```

time: 161 ms (started: 2021-03-09 18:50:57 +00:00)

```
[17]: resample_rule = '1w'
time_column = 'activation_date'
value_column = 'sector_count'
```

```

title = 'Activated Sector Count, grouped by sector version (#)'

groups = ['miner',
          pd.Grouper(key='activation_date', freq=resample_rule),
          'is_v1']

fig_df = (df.groupby(groups)
          .sum()
          .reset_index()
          )

fig = px.bar(fig_df.reset_index(),
             x=time_column,
             y=value_column,
             color='miner',
             facet_col='is_v1',
             title=title)
fig.show()

```

time: 175 ms (started: 2021-03-09 18:50:57 +00:00)

```

[18]: resample_rule = '7d'
time_column = 'activation_date'
value_column = 'sector_count'
title = 'Count of Sector Activation Date (#)'

groups = ['miner',
          pd.Grouper(key='activation_date', freq=resample_rule),
          pd.Grouper(key='expiration_date', freq=resample_rule)]
fig_df = df.groupby(groups).sum().reset_index()
px.density_heatmap(fig_df,
                  x='activation_date',
                  y='expiration_date',
                  z='sector_count',
                  animation_frame='miner')

```

time: 240 ms (started: 2021-03-09 18:50:57 +00:00)

```

[19]: resample_rule = '1d'
time_column = 'activation_date'
value_column = 'sector_count'
title = 'Count of Sector Activation Date (#)'

groups = ['miner',

```



```

        pd.Grouper(key='activation_date', freq=resample_rule),
        pd.Grouper(key='expiration_date', freq=resample_rule)]
fig_df = df.groupby(groups).sum().reset_index()
fig = px.density_contour(fig_df,
                        x='activation_date',
                        y='expiration_date',
                        z='sector_count',
                        histfunc='sum',
                        color='miner')
fig.show()

```

time: 717 ms (started: 2021-03-09 18:50:58 +00:00)

```

[20]: resample_rule = '1m'
time_column = 'expiration_date'
value_column = 'sector_count'
title = 'Upcoming Sector Expiration Count (%)'
resample_and_bar_plot_relative(df, resample_rule, time_column, value_column,
↪title).show()

```

time: 215 ms (started: 2021-03-09 18:50:58 +00:00)

```

[21]: resample_rule = '1m'
time_column = 'activation_date'
value_column = 'sector_count'
title = 'Count of Sector Activation Date (%)'
resample_and_bar_plot_relative(df, resample_rule, time_column, value_column,
↪title).show()

```

time: 166 ms (started: 2021-03-09 18:50:59 +00:00)

### 1.3 Initial Pledge

```

[22]: resample_rule = '1m'
time_column = 'expiration_date'
value_column = 'initial_pledge_in_fil'
title = 'Initial Pledge (FIL) of Expiring Sectors (#)'

groups = [pd.Grouper(key='expiration_date', freq=resample_rule),
          'is_v1']

fig_df = (df.groupby(groups)
          .sum()
          )

```

```
fig = px.bar(fig_df.reset_index(),
             x=time_column,
             y=value_column,
             color='is_v1',
             title=title)
fig.show()
```

time: 115 ms (started: 2021-03-09 18:50:59 +00:00)

```
[23]: resample_rule = '1m'
time_column = 'expiration_date'
value_column = 'initial_pledge_in_fil'
title = 'Initial Pledge (FIL) of Expiring Sectors, grouped by Miner and Sector_
→Version'

groups = ['miner',
          pd.Grouper(key='expiration_date', freq=resample_rule),
          'is_v1']

fig_df = (df.groupby(groups)
          .sum()
          .reset_index()
          )

fig = px.bar(fig_df,
             x=time_column,
             y=value_column,
             color='miner',
             facet_col='is_v1',
             title=title)
fig.show()
```

time: 203 ms (started: 2021-03-09 18:50:59 +00:00)

```
[24]: resample_rule = '1m'
time_column = 'activation_date'
value_column = ['initial_pledge_in_thousand_fil']
title = 'Sum of Initial Pledge (FIL) across activation dates'
resample_and_bar_plot(df, resample_rule, time_column, value_column, title).
→show()
```

time: 178 ms (started: 2021-03-09 18:50:59 +00:00)

## 1.4 RB Network Power

```
[25]: resample_rule = '1m'
time_column = 'expiration_date'
value_column = 'network_power_in_pib'
title = 'RB Network Power (PiB) of Expiring Sectors (#)'

groups = [pd.Grouper(key='expiration_date', freq=resample_rule),
          'is_v1']

fig_df = (df.groupby(groups)
          .sum()
          )

fig = px.bar(fig_df.reset_index(),
             x=time_column,
             y=value_column,
             color='is_v1',
             title=title)
fig.show()
```

time: 123 ms (started: 2021-03-09 18:50:59 +00:00)

```
[26]: resample_rule = '1m'
time_column = 'expiration_date'
value_column = 'network_power_in_pib'
title = 'RB Network Power (PiB) of Expiring Sectors, grouped by Miner and ↵
       ↵Sector Version'

groups = ['miner',
          pd.Grouper(key='expiration_date', freq=resample_rule),
          'is_v1']

fig_df = (df.groupby(groups)
          .sum()
          .reset_index()
          )

fig = px.bar(fig_df,
             x=time_column,
             y=value_column,
             color='miner',
             facet_col='is_v1',
             title=title)
```

```
fig.show()
```

time: 201 ms (started: 2021-03-09 18:50:59 +00:00)

```
[27]: resample_rule = '1m'
time_column = 'activation_date'
value_column = ['network_power_in_pib']
title = 'Sum of RB Network Power (PiB) across activation dates'
resample_and_bar_plot(df, resample_rule, time_column, value_column, title).
    ↪ show()
```

time: 166 ms (started: 2021-03-09 18:51:00 +00:00)