In [1]:
```
pip install geopandas
```

```
Collecting geopandas
  Downloading https://files.pythonhosted.org/packages/f7/a4/e66aafbefcb
b717813bf3a355c8c4fc3ed04ea1dd7feb2920f2f4f868921/geopandas-0.8.1-py2.p
y3-none-any.whl (962kB)
     |████████████████████████████████| 972kB 2.8MB/s
Collecting fiona
  Downloading https://files.pythonhosted.org/packages/ec/20/4e63bc5c6e6
2df889297b382c3ccd4a7a488b00946aaaf81a118158c6f09/Fiona-1.8.13.post1-cp
36-cp36m-manylinux1_x86_64.whl (14.7MB)
     |████████████████████████████████| 14.7MB 313kB/s
Requirement already satisfied: pandas>=0.23.0 in /usr/local/lib/python
3.6/dist-packages (from geopandas) (1.0.5)
Requirement already satisfied: shapely in /usr/local/lib/python3.6/dist
-packages (from geopandas) (1.7.0)
Collecting pyproj>=2.2.0
  Downloading https://files.pythonhosted.org/packages/e5/c3/071e080230a
c4b6c64f1a2e2f9161c9737a2bc7b683d2c90b024825000c0/pyproj-2.6.1.post1-cp
36-cp36m-manylinux2010_x86_64.whl (10.9MB)
     |████████████████████████████████| 10.9MB 47.8MB/s
Collecting munch
  Downloading https://files.pythonhosted.org/packages/cc/ab/85d8da5c9a4
5e072301beb37ad7f833cd344e04c817d97e0cc75681d248f/munch-2.5.0-py2.py3-n
one-any.whl
Requirement already satisfied: attrs>=17 in /usr/local/lib/python3.6/di
st-packages (from fiona->geopandas) (19.3.0)
Requirement already satisfied: six>=1.7 in /usr/local/lib/python3.6/dis
t-packages (from fiona->geopandas) (1.12.0)
Collecting cligj>=0.5
  Downloading https://files.pythonhosted.org/packages/e4/be/30a58b4b073
3850280d01f8bd132591b4668ed5c7046761098d665ac2174/cligj-0.5.0-py3-none-
any.whl
Collecting click-plugins>=1.0
  Downloading https://files.pythonhosted.org/packages/e9/da/824b92d9942
f4e472702488857914bdd50f73021efea15b4cad9aca8ecef/click_plugins-1.1.1-p
```

```
y2.py3-none-any.whl
Requirement already satisfied: click<8,>=4.0 in /usr/local/lib/python3.
6/dist-packages (from fiona->geopandas) (7.1.2)
Requirement already satisfied: python-dateutil>=2.6.1 in /usr/local/li
b/python3.6/dist-packages (from pandas>=0.23.0->geopandas) (2.8.1)
Requirement already satisfied: numpy>=1.13.3 in /usr/local/lib/python3.
6/dist-packages (from pandas>=0.23.0->geopandas) (1.18.5)
Requirement already satisfied: pytz>=2017.2 in /usr/local/lib/python3.
6/dist-packages (from pandas>=0.23.0->geopandas) (2018.9)
Installing collected packages: munch, cligj, click-plugins, fiona, pypr
oj, geopandas
Successfully installed click-plugins-1.1.1 cligj-0.5.0 fiona-1.8.13.pos
t1 geopandas-0.8.1 munch-2.5.0 pyproj-2.6.1.post1
```

In [2]:
```
import pandas as pd
import geopandas as gpd
from shapely.geometry import Point,Polygon
%matplotlib inline
import matplotlib.pyplot as plt
```

In [3]:
```
bglr=gpd.read_file('/content/MODIFIED BANGALORE WARDS.csv')
bglr.head()
```

Out[3]:

	type	features__type	features__properties__WARD_NO	features__properties__WARD_
0	FeatureCollection	Feature	2	Chowdeswa
1	FeatureCollection	Feature	2	Chowdeswa
2	FeatureCollection	Feature	2	Chowdeswa
3	FeatureCollection	Feature	2	Chowdeswa
4	FeatureCollection	Feature	2	Chowdeswa

In [4]:
```
##bglr.plot()
```

In [5]:
```
print(bglr.info())
```

```
<class 'geopandas.geodataframe.GeoDataFrame'>
RangeIndex: 35126 entries, 0 to 35125
Data columns (total 10 columns):
 #   Column                                 Non-Null Count  Dtype
---  ------                                 --------------  -----
 0   type                                   35126 non-null  object
 1   features__type                         35126 non-null  object
 2   features__properties__WARD_NO          35126 non-null  object
 3   features__properties__WARD_NAME        35126 non-null  object
 4   features__properties__MOVEMENT_ID      35126 non-null  object
 5   features__properties__DISPLAY_NAME     35126 non-null  object
 6   features__geometry__type               35125 non-null  object
 7   features__geometry__coordinates__001   35125 non-null  object
 8   features__geometry__coordinates__002   35125 non-null  object
 9   geometry                               0 non-null      geometry
dtypes: geometry(1), object(9)
memory usage: 2.7+ MB
None
```

In [6]:
```
bglr2=gpd.read_file('/content/bangalore_wards.json')
bglr2.head()
```

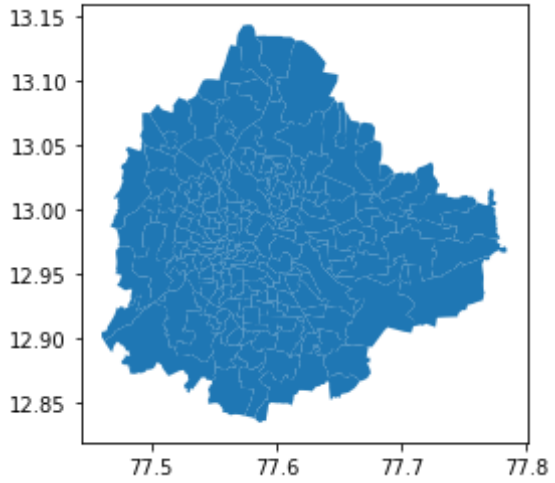
Out[6]:

	WARD_NO	WARD_NAME	MOVEMENT_ID	DISPLAY_NAME	geometry
0	2	Chowdeswari Ward	1	Unnamed Road, Bengaluru	MULTIPOLYGON (((77.59229 13.09720, 77.59094 13...
1	3	Atturu	2	9th Cross Bhel Layout, Adityanagar, Vidyaranya...	MULTIPOLYGON (((77.56862 13.12705, 77.57064 13...
2	4	Yelahanka Satellite Town	3	15th A Cross Road, Yelahanka Satellite Town, Y...	MULTIPOLYGON (((77.59094 13.09842, 77.59229 13...
3	51	Vijnanapura	4	SP Naidu Layout 4th Cross Street, SP Naidu Lay...	MULTIPOLYGON (((77.67683 13.01147, 77.67695 13...

	WARD_NO	WARD_NAME	MOVEMENT_ID	DISPLAY_NAME	geometry
4	53	Basavanapura	5	Medahalli Kadugodi Road, Bharathi Nagar, Krish...	MULTIPOLYGON (((77.72899 13.02061, 77.72994 13...

In [7]:
```
bglr2.plot()
```

Out[7]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x7fb20b8270f0>
```



In [8]:
```
print(bglr2.info())
```

```
<class 'geopandas.geodataframe.GeoDataFrame'>
RangeIndex: 198 entries, 0 to 197
Data columns (total 5 columns):
 #   Column        Non-Null Count  Dtype
---  ------        --------------  -----
 0   WARD_NO       198 non-null    object
 1   WARD_NAME     198 non-null    object
 2   MOVEMENT_ID   198 non-null    object
 3   DISPLAY_NAME  198 non-null    object
 4   geometry      198 non-null    geometry
dtypes: geometry(1), object(4)
```

```
memory usage: 7.9+ KB
None
```

In [9]:
```
print(bglr2.geometry)
```

```
0      MULTIPOLYGON (((77.59229 13.09720, 77.59094 13...
1      MULTIPOLYGON (((77.56862 13.12705, 77.57064 13...
2      MULTIPOLYGON (((77.59094 13.09842, 77.59229 13...
3      MULTIPOLYGON (((77.67683 13.01147, 77.67695 13...
4      MULTIPOLYGON (((77.72899 13.02061, 77.72994 13...
                            ...
193    MULTIPOLYGON (((77.61399 12.92347, 77.61419 12...
194    MULTIPOLYGON (((77.68336 13.05192, 77.68384 13...
195    MULTIPOLYGON (((77.64931 13.07853, 77.64993 13...
196    MULTIPOLYGON (((77.68549 12.94121, 77.68539 12...
197    MULTIPOLYGON (((77.49854 12.92574, 77.49854 12...
Name: geometry, Length: 198, dtype: geometry
```

In [10]:
```
bglr_c=bglr2.copy()
```

In [11]:
```
bglr_c.geometry= bglr_c['geometry'].centroid
bglr_c.head()
```

```
/usr/local/lib/python3.6/dist-packages/ipykernel_launcher.py:1: UserW
arning: Geometry is in a geographic CRS. Results from 'centroid' are
likely incorrect. Use 'GeoSeries.to_crs()' to re-project geometries t
o a projected CRS before this operation.

  """Entry point for launching an IPython kernel.
```

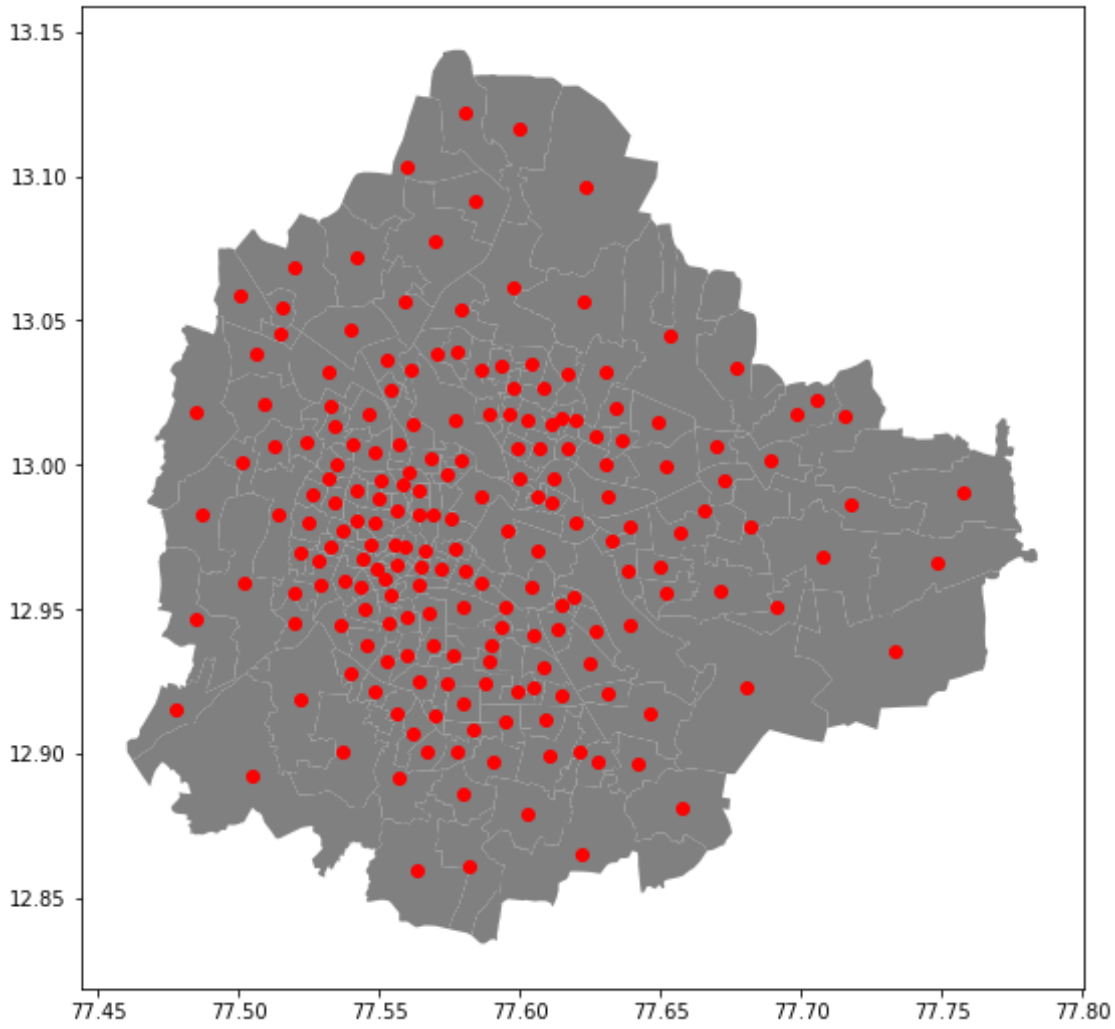
Out[11]:

	WARD_NO	WARD_NAME	MOVEMENT_ID	DISPLAY_NAME	geometry
0	2	Chowdeswari Ward	1	Unnamed Road, Bengaluru	POINT (77.58042 13.12171)
1	3	Atturu	2	9th Cross Bhel Layout, Adityanagar, Vidyaranya...	POINT (77.56004 13.10280)
2	4	Yelahanka Satellite Town	3	15th A Cross Road, Yelahanka Satellite Town, Y...	POINT (77.58393 13.09099)

	WARD_NO	WARD_NAME	MOVEMENT_ID	DISPLAY_NAME	geometry
3	51	Vijnanapura	4	SP Naidu Layout 4th Cross Street, SP Naidu Lay...	POINT (77.66957 13.00606)
4	53	Basavanapura	5	Medahalli Kadugodi Road, Bharathi Nagar, Krish...	POINT (77.71546 13.01685)

In [12]:
```
fig, ax = plt.subplots(figsize=(9,9))
bglr2.plot(color='grey',ax=ax)
bglr_c.plot(color='red',ax=ax)
```

Out[12]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x7fb20b44f9b0>
```



In [13]:
```
bglr1=gpd.read_file('/content/bangalore-wards-2019-3-All-HourlyAggregate.csv')
bglr1.head()
```

Out[13]:

	sourceid	dstid	hod	mean_travel_time	standard_deviation_travel_time	geometric_mean_travel_
0	88	33	12	2022.22	665.53	19

	sourceid	dstid	hod	mean_travel_time	standard_deviation_travel_time	geometric_mean_travel_
1	163	16	14	3159.21	680.03	309
2	160	46	14	3943.34	581.21	39
3	162	26	14	3193.64	615.47	314
4	84	73	12	801.05	324.42	76

In [14]:
```
bglr1.dtypes
```

Out[14]:
```
sourceid                                 object
dstid                                    object
hod                                      object
mean_travel_time                         object
standard_deviation_travel_time           object
geometric_mean_travel_time               object
geometric_standard_deviation_travel_time object
geometry                                 geometry
dtype: object
```

In [36]:
```
bglr1["mean_travel_time"] = bglr1["mean_travel_time"].astype(str).astyp
e(float)
print(bglr1.dtypes)
```

```
sourceid                                 float64
dstid                                    float64
hod                                      float64
mean_travel_time                         float64
standard_deviation_travel_time            object
geometric_mean_travel_time                object
geometric_standard_deviation_travel_time  object
geometry                                 geometry
dtype: object
```

In [51]:
```
##bglr1["standard_deviation_travel_time"] = bglr1["standard_deviation_t
ravel_time"].astype(str).astype(float)
```

```
import os, sys
from scipy import stats
import numpy as np
##bglr1['standard_deviation_travel_time'] = bglr1['standard_deviation_travel_time'].astype(float)
##print(bglr1.dtypes)
##bglr1['standard_deviation_travel_time'] = bglr1.standard_deviation_travel_time.str.replace('$', '').astype(float)
```

In [55]:
```
bglr1['geometric_mean_travel_time'].replace("None", np.nan, inplace=True)
bglr1['standard_deviation_travel_time'].replace("None", np.nan, inplace=True)
bglr1['geometric_standard_deviation_travel_time'].replace("None", np.nan, inplace=True)
##bglr1['geometric_mean_travel_time'].replace("None", np.nan, inplace=True)
##bglr1["geometric_mean_travel_time"] = bglr1["geometric_mean_travel_time"].astype(str).astype(float)
##print(bglr1.dtypes)
```

In [56]:
```
bglr1['geometric_mean_travel_time'] = bglr1['geometric_mean_travel_time'].replace(np.nan, 0)
bglr1['standard_deviation_travel_time'] = bglr1['standard_deviation_travel_time'].replace(np.nan, 0)
bglr1['geometric_standard_deviation_travel_time'] = bglr1['geometric_standard_deviation_travel_time'].replace(np.nan, 0)
bglr1
```

Out[56]:

	sourceid	dstid	hod	mean_travel_time	standard_deviation_travel_time	geometric_mean_
0	88.0	33.0	12.0	2022.22	665.53	
1	163.0	16.0	14.0	3159.21	680.03	
2	160.0	46.0	14.0	3943.34	581.21	
3	162.0	26.0	14.0	3193.64	615.47	
4	84.0	73.0	12.0	801.05	324.42	

	sourceid	dstid	hod	mean_travel_time	standard_deviation_travel_time	geometric_mean_
...	...	...	...	...	...	
398337	55.0	51.0	14.0	1351.52	388.79	
398338	59.0	11.0	14.0	1334.32	411.91	
398339	46.0	159.0	17.0	4468.16	822.11	
398340	58.0	175.0	16.0	3637.46	786.0	
398341	56.0	195.0	16.0	2310.67		

398342 rows × 8 columns

In [ ]:

In [57]:
```
bglr1["geometric_standard_deviation_travel_time"] = bglr1["geometric_st
andard_deviation_travel_time"].astype(str).astype(float)
print(bglr1.dtypes)
```

```
sourceid                                 float64
dstid                                    float64
hod                                      float64
mean_travel_time                         float64
standard_deviation_travel_time            object
geometric_mean_travel_time                object
geometric_standard_deviation_travel_time  float64
geometry                                 geometry
dtype: object
```

In [60]:
```
##bglr1["standard_deviation_travel_time"] = bglr1["standard_deviation_t
ravel_time"].astype(str).astype(float)
##print(bglr1.dtypes)
```

In [59]:
```
bglr1["geometric_mean_travel_time"] = bglr1["geometric_mean_travel_tim
e"].astype(str).astype(float)
print(bglr1.dtypes)
```

```
sourceid                                  float64
dstid                                     float64
hod                                       float64
mean_travel_time                          float64
standard_deviation_travel_time             object
geometric_mean_travel_time                float64
geometric_standard_deviation_travel_time  float64
geometry                                 geometry
dtype: object
```

In [62]:
```
bglr1.dtypes
```

Out[62]:
```
sourceid                                  float64
dstid                                     float64
hod                                       float64
mean_travel_time                          float64
standard_deviation_travel_time             object
geometric_mean_travel_time                float64
geometric_standard_deviation_travel_time  float64
geometry                                 geometry
dtype: object
```

In [97]:
```
##bglr1["geometric_standard_deviation_travel_time"].plot()
```

In [98]:
```
##bglr1["mean_travel_time"].plot()
```

In [99]:
```
##bglr1["standard_deviation_travel_time"].plot()
```

In [100]:
```
##bglr1["geometric_mean_travel_time"].plot()
```

In [71]:
```
bglr1['hod']=pd.cut(bglr1.hod,
                    bins=[0,4,8,12,16,24],
                    labels=['Latenight','Early_morning','morning','afte
rnoon','evening'])
```

```
---------------------------------------------------------------------
----
TypeError                                 Traceback (most recent call l
```

```
TypeError                                 Traceback (most recent call l
ast)
<ipython-input-71-5552655b6b89> in <module>()
      1 bglr1['hod']=pd.cut(bglr1.hod,
      2                     bins=[0,4,8,12,16,24],
----> 3                     labels=['Latenight','Early_morning','mornin
g','afternoon','evening'])

/usr/local/lib/python3.6/dist-packages/pandas/core/reshape/tile.py in c
ut(x, bins, right, labels, retbins, precision, include_lowest, duplicat
es)
    263         include_lowest=include_lowest,
    264         dtype=dtype,
--> 265         duplicates=duplicates,
    266     )
    267

/usr/local/lib/python3.6/dist-packages/pandas/core/reshape/tile.py in _
bins_to_cuts(x, bins, right, labels, precision, include_lowest, dtype,
 duplicates)
    386
    387     side = "left" if right else "right"
--> 388     ids = ensure_int64(bins.searchsorted(x, side=side))
    389
    390     if include_lowest:

TypeError: '<' not supported between instances of 'int' and 'str'
```

In [69]:
```
bglr1
```

Out[69]:

	sourceid	dstid	hod	mean_travel_time	standard_deviation_travel_time	geometric_m
0	88.0	33.0	morning	2022.22	665.53	
1	163.0	16.0	afternoon	3159.21	680.03	
2	160.0	46.0	afternoon	3943.34	581.21	
3	162.0	26.0	afternoon	3193.64	615.47	

	sourceid	dstid	hod	mean_travel_time	standard_deviation_travel_time	geometric_m
4	84.0	73.0	morning	801.05	324.42	
...	...	...	...	...	...	
398337	55.0	51.0	afternoon	1351.52	388.79	
398338	59.0	11.0	afternoon	1334.32	411.91	
398339	46.0	159.0	evening	4468.16	822.11	
398340	58.0	175.0	afternoon	3637.46	786.0	
398341	56.0	195.0	afternoon	2310.67		

398342 rows × 8 columns

In [72]:
```
bglr1
```

Out[72]:

	sourceid	dstid	hod	mean_travel_time	standard_deviation_travel_time	geometric_m
0	88.0	33.0	morning	2022.22	665.53	
1	163.0	16.0	afternoon	3159.21	680.03	
2	160.0	46.0	afternoon	3943.34	581.21	
3	162.0	26.0	afternoon	3193.64	615.47	
4	84.0	73.0	morning	801.05	324.42	
...	...	...	...	...	...	
398337	55.0	51.0	afternoon	1351.52	388.79	
398338	59.0	11.0	afternoon	1334.32	411.91	
398339	46.0	159.0	evening	4468.16	822.11	
398340	58.0	175.0	afternoon	3637.46	786.0	
398341	56.0	195.0	afternoon	2310.67		

398342 rows × 8 columns

In [73]:
```
corr = bglr1.corr() #plot with actual values
corr.style.background_gradient(cmap='coolwarm').set_precision(2)
```

Out[73]:

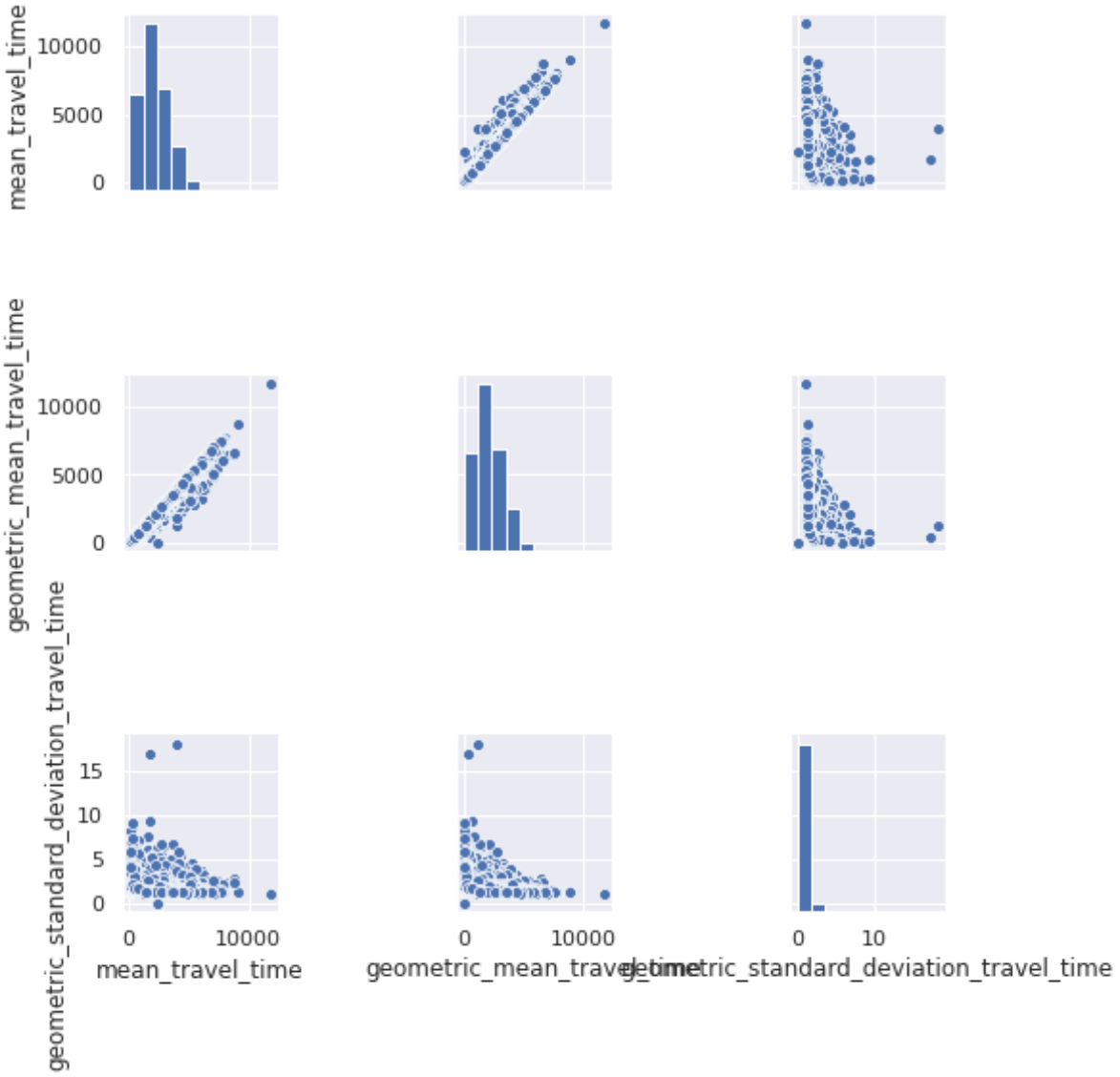
	sourceid	dstid	mean_travel_time	geometric_mean_trave
sourceid	1.00	0.02	0.04	
dstid	0.02	1.00	0.06	
mean_travel_time	0.04	0.06	1.00	
geometric_mean_travel_time	0.04	0.06	1.00	
geometric_standard_deviation_travel_time	-0.00	0.01	-0.36	

In [75]:
```
import seaborn as sns
```

```
/usr/local/lib/python3.6/dist-packages/statsmodels/tools/_testing.py:1
9: FutureWarning: pandas.util.testing is deprecated. Use the functions
in the public API at pandas.testing instead.
  import pandas.util.testing as tm
```

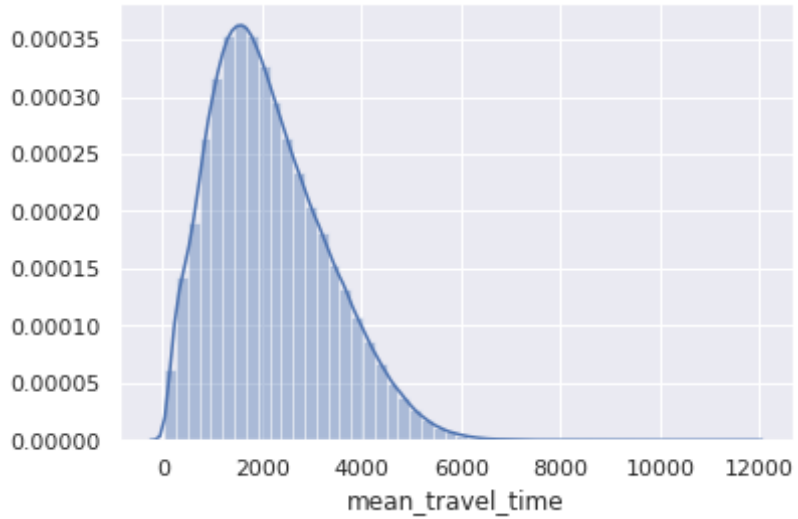
In [76]:
```
sns.set()
cols = ['mean_travel_time','standard_deviation_travel_time','geometric_
mean_travel_time','geometric_standard_deviation_travel_time']
sns.pairplot(bglr1[cols], size = 2.5)
plt.show()
```

```
/usr/local/lib/python3.6/dist-packages/seaborn/axisgrid.py:2071: UserWa
rning: The `size` parameter has been renamed to `height`; please update
your code.
  warnings.warn(msg, UserWarning)
```



In [77]:
```
sns.distplot(bglr1['mean_travel_time'])
```

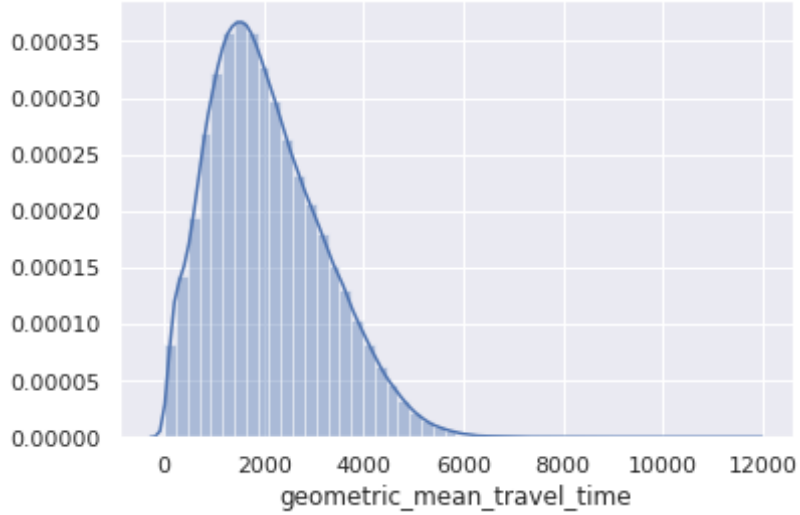
Out[77]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x7fb20b21bfd0>
```



In [79]:
```
##sns.distplot(bglr1['standard_deviation_travel_time'])
```

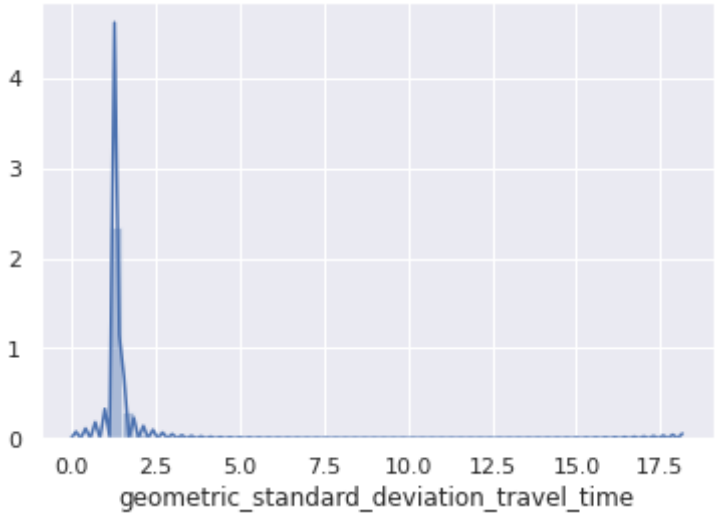
In [80]:
```
sns.distplot(bglr1['geometric_mean_travel_time'])
```

Out[80]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x7fb209b5d160>
```

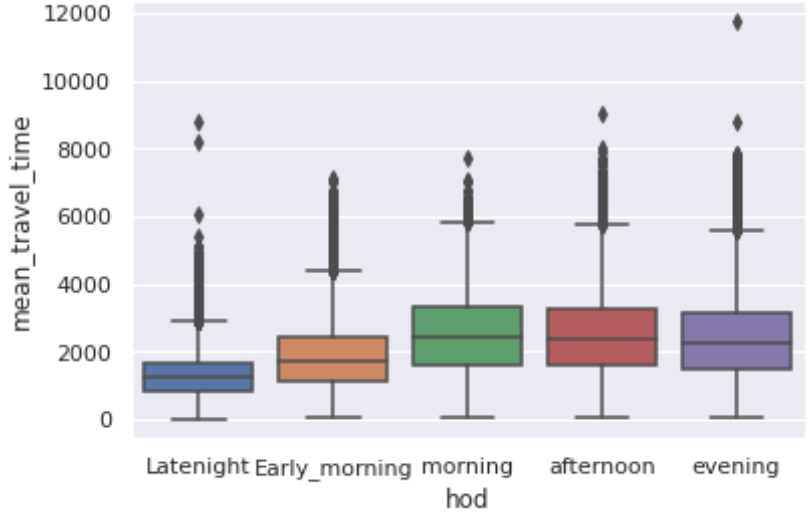


In [81]:
```
sns.distplot(bglr1['geometric_standard_deviation_travel_time'])
```

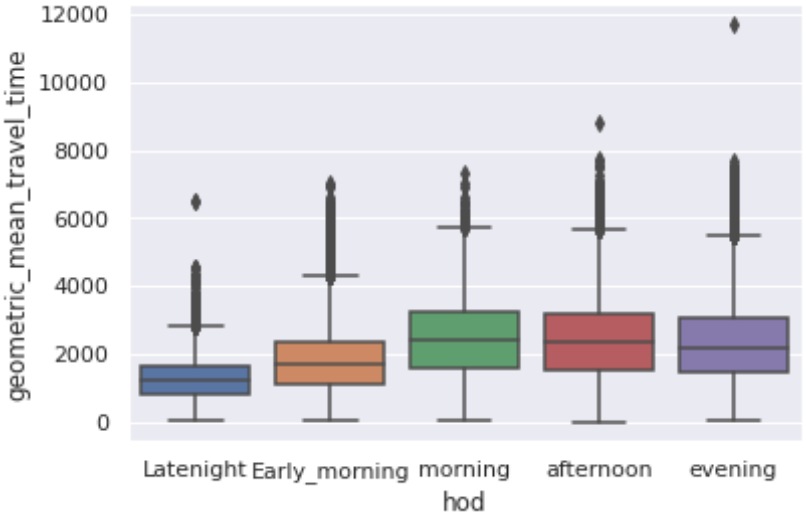
Out[81]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x7fb20a688400>
```



In [85]:
```
box1= sns.boxplot(x='hod' , y='mean_travel_time' ,data=bglr1)
```

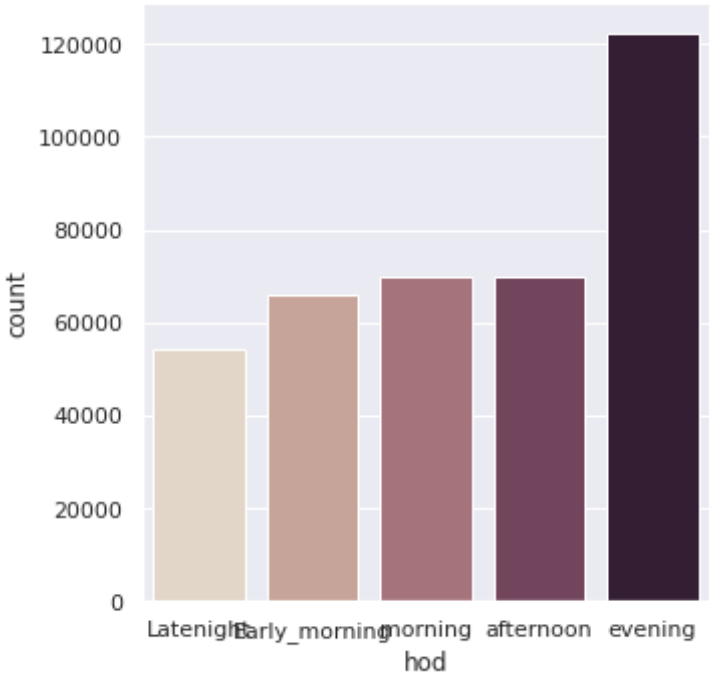


In [84]:
```
box1= sns.boxplot(x='hod' , y='geometric_mean_travel_time' ,data=bglr1)
```



In [86]:
```
sns.catplot(x = "hod", kind = "count", palette = "ch: 0.25", data = bgl
r1)
```

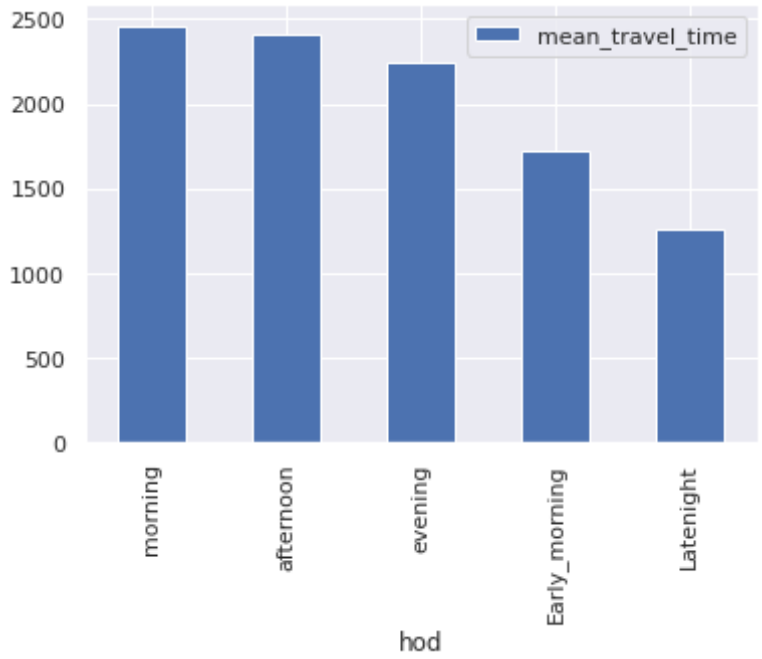
Out[86]:
```
<seaborn.axisgrid.FacetGrid at 0x7fb20a9fc828>
```



In [88]:
```
##sns.catplot(x = "geometric_mean_travel_time", kind = "count", palette
 = "ch: 0.25", data = bglr1)
```

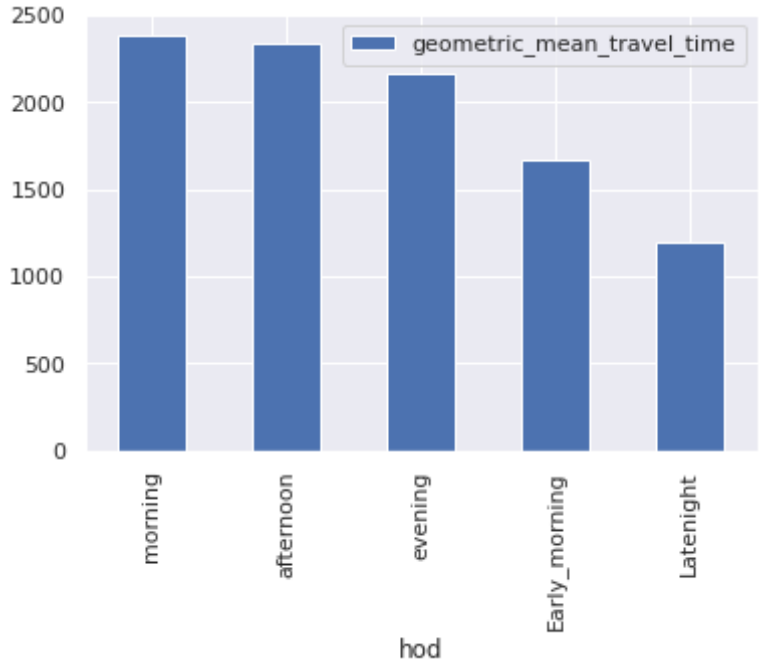
In [90]:
```
bglr1[['mean_travel_time', 'hod']].groupby(['hod']).median().sort_value
s("mean_travel_time", ascending = False).plot.bar()
```

Out[90]: <matplotlib.axes._subplots.AxesSubplot at 0x7fb1bd666278>



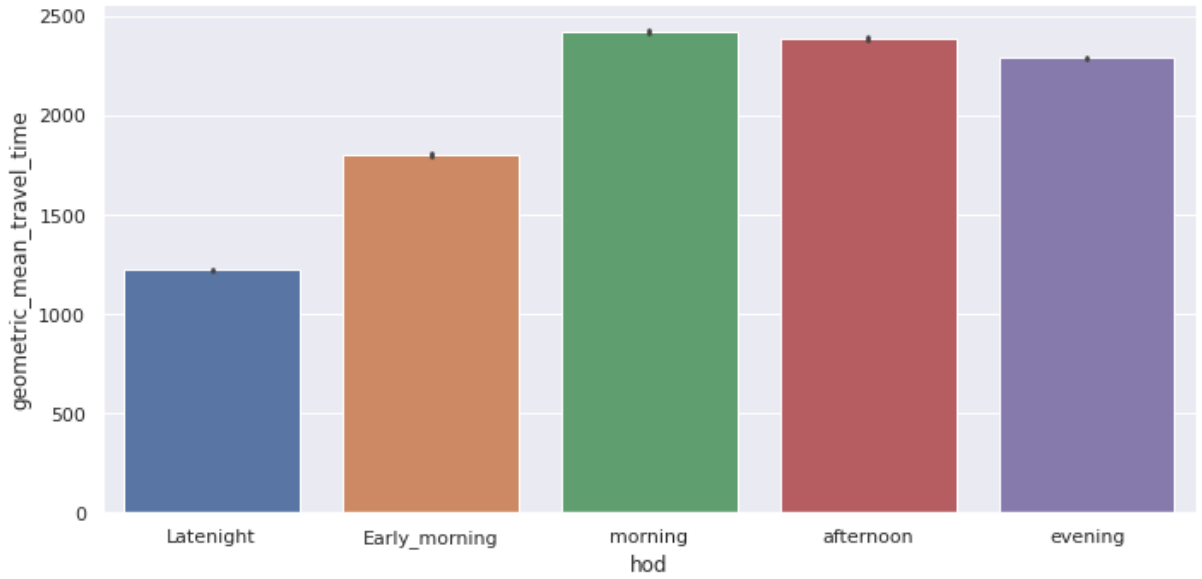
In [89]:
```
bglr1[['geometric_mean_travel_time', 'hod']].groupby(['hod']).median().
sort_values("geometric_mean_travel_time", ascending = False).plot.bar()
```

Out[89]: <matplotlib.axes._subplots.AxesSubplot at 0x7fb1f68899b0>



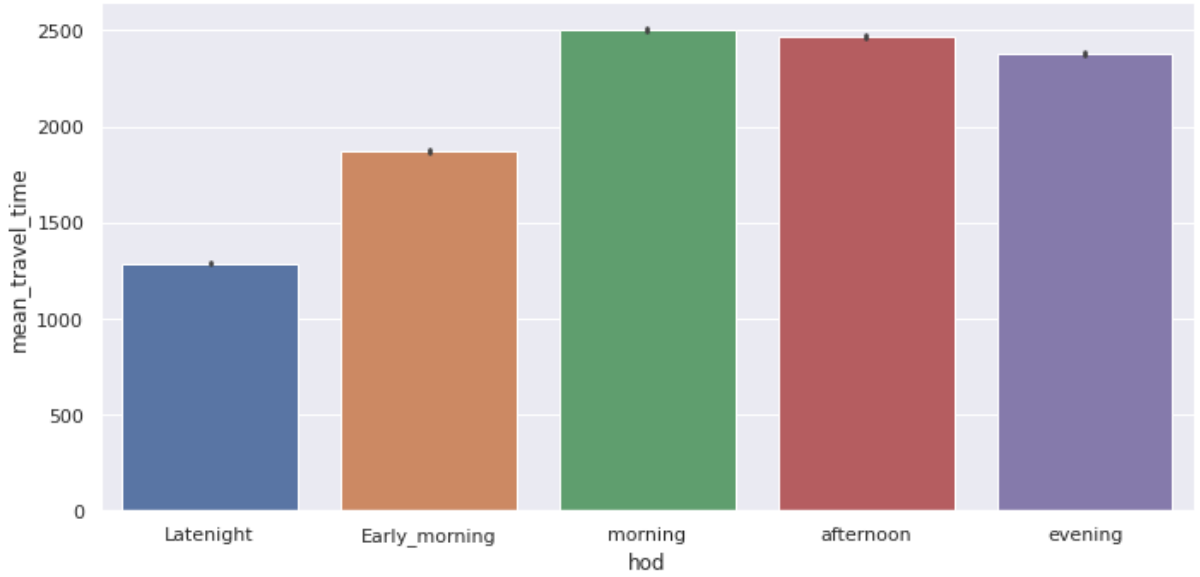
In [91]:
```
sns.catplot(x='hod',y='geometric_mean_travel_time',kind='bar',data=bglr
1,aspect=2)
```

Out[91]: <seaborn.axisgrid.FacetGrid at 0x7fb1bd5d0048>



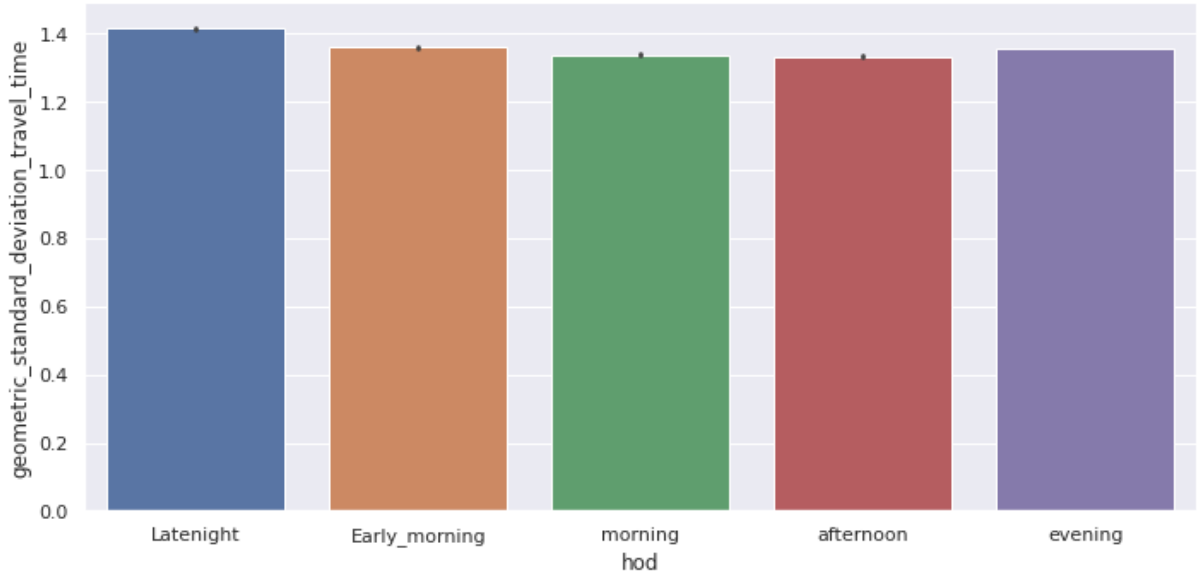
In [92]:
```
sns.catplot(x='hod',y='mean_travel_time',kind='bar',data=bglr1,aspect=2
)
```

Out[92]: <seaborn.axisgrid.FacetGrid at 0x7fb1bd5d0438>



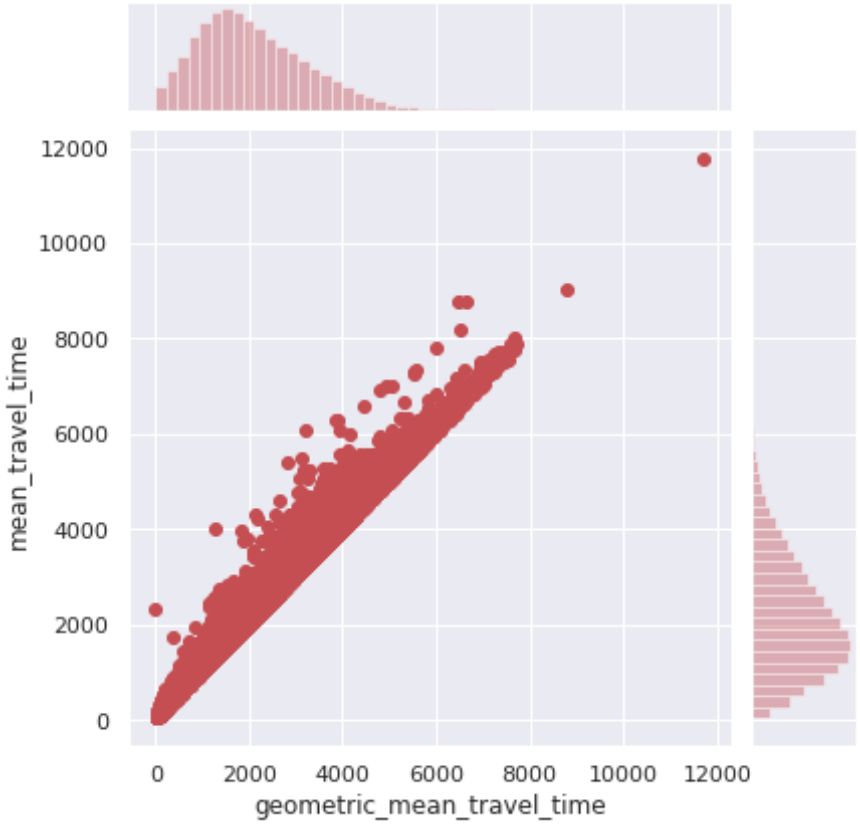
In [93]:
```
sns.catplot(x='hod',y='geometric_standard_deviation_travel_time',kind=
'bar',data=bglr1,aspect=2)
```

Out[93]: <seaborn.axisgrid.FacetGrid at 0x7fb1bd59fa90>



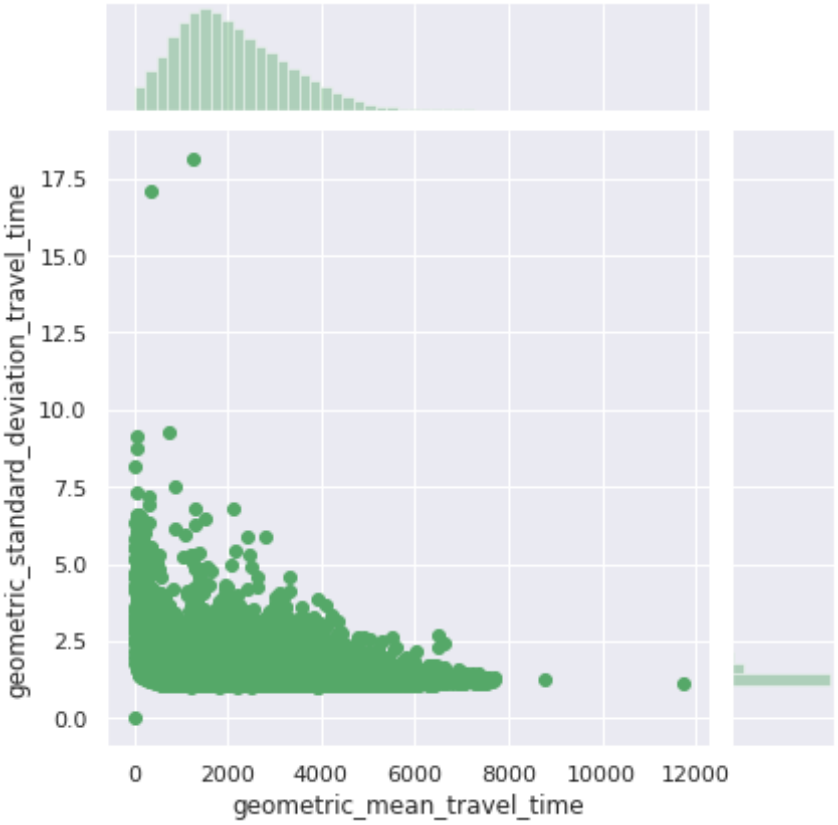
In [95]:
```
sns.jointplot(x='geometric_mean_travel_time',y='mean_travel_time',data=
bglr1,kind='scatter',color='r')
```

Out[95]:
```
<seaborn.axisgrid.JointGrid at 0x7fb1bd45ef60>
```



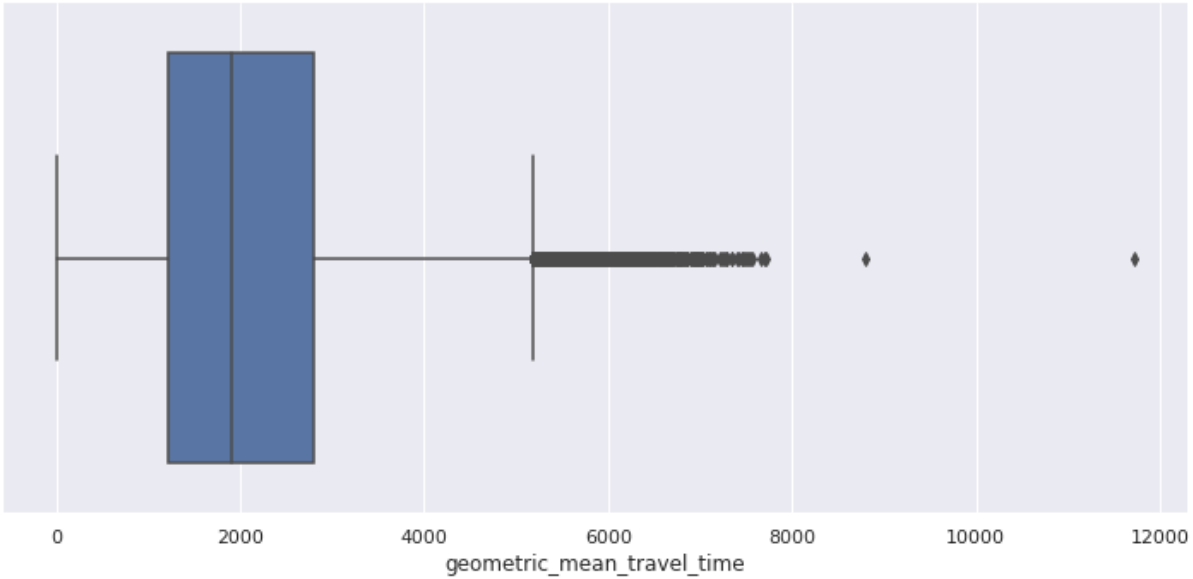
In [96]:
```
sns.jointplot(x='geometric_mean_travel_time',y='geometric_standard_deviation_travel_time',data=bglr1,kind='scatter',color='g')
```

Out[96]:
```
<seaborn.axisgrid.JointGrid at 0x7fb1bd2beb00>
```



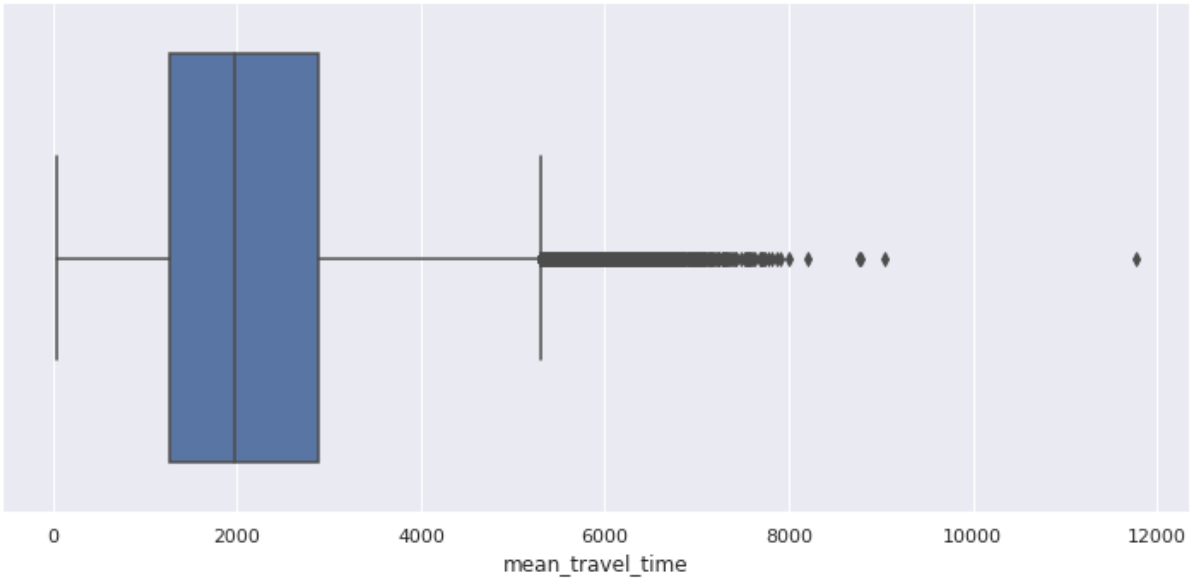
In [101]:
```
sns.catplot(x='geometric_mean_travel_time', kind='box',data=bglr1, aspect=2)
```

Out[101]: <seaborn.axisgrid.FacetGrid at 0x7fb1bd159d30>



In [102]:
```
sns.catplot(x='mean_travel_time', kind='box',data=bglr1, aspect=2)
```

Out[102]:
```
<seaborn.axisgrid.FacetGrid at 0x7fb1bd387518>
```



In [104]:
```
##sns.catplot(x='hod', kind='box',data=bglr1, aspect=2)
```

In [23]:
```
bglr_c.dtypes
```

Out[23]:
```
WARD_NO          float64
WARD_NAME         object
MOVEMENT_ID      float64
DISPLAY_NAME      object
geometry        geometry
dtype: object
```

In [24]:
```
bglr_c["WARD_NO"] = bglr_c["WARD_NO"].astype(str).astype(float)
bglr_c['WARD_NAME'] = bglr_c['WARD_NAME'].astype('|S')
##bglr_c[""] = bglr_c["WARD_NAME"].astype(str).astype(float)
##bglr_c['WARD_NAME'].astype(str)
bglr_c["MOVEMENT_ID"] = bglr_c["MOVEMENT_ID"].astype(str).astype(float)
bglr_c['DISPLAY_NAME'].astype(str)
##bglr_c["DISPLAY_NAME"] = bglr_c["DISPLAY_NAME"].astype(str).astype(fl
oat)
```

```
bglr_c['geometry'].astype(str)
print(bglr_c.dtypes)
```

```
WARD_NO          float64
WARD_NAME         object
MOVEMENT_ID      float64
DISPLAY_NAME      object
geometry        geometry
dtype: object
```

In [25]:
```
bglr_c['geometry'].tail()
```

Out[25]:
```
193    POINT (77.61442 12.92002)
194    POINT (77.67654 13.03361)
195    POINT (77.65327 13.04456)
196    POINT (77.69150 12.95074)
197    POINT (77.50501 12.89190)
Name: geometry, dtype: geometry
```

In [ ]:

In [34]:

In [ ]: