In [1]:
```
import pandas as pd
import numpy as np
```

In [17]:
```
df = pd.read_excel('E:/Upwork Projects/2022/North America/USA/Home Lending Data Python/data.xlsx')
```

paste your data file link here

In [18]:
```
df.head(2)
```

Out[18]:

| | Lead_ID | LeadSubmitTs | InitialRightPartyContactTs | OpportunityCreatedTs | CreditPullDt | App_Initiate_Dt | Fund_Dt | Loan_Amount | Property_State | L |
|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 77452771 | 2022-08-30 04:53:00 | 2022-08-31 11:03:00 | NaT | NaT | NaT | NaT | $0.00 | CA | |
| **1** | 71005918 | 2022-10-21 19:32:00 | 2022-10-21 19:34:00 | NaT | NaT | NaT | NaT | $145,500.00 | ME | |

# Solution - Marketing Funnel Conversion

In [5]:
```
# Funnel Conversion estimate and Conversion rate
# since "Application Achieved" is the success we would create another variable for "Application Achieved" to count i
```

# NotNull = 1, Null = 0 -> Transformed the values to build the funnel using one simple aggregation formula

In [19]:
```
df['LeadSubmiTs_2'] = np.where((df['LeadSubmitTs'].notnull()),1,0)
df['InitialRightPartyContactTs_2'] = np.where((df['InitialRightPartyContactTs'].notnull()),1,0)
df['OpportunityCreatedTs_2'] = np.where((df['OpportunityCreatedTs'].notnull()),1,0)
df['CreditPullDt_2'] = np.where((df['CreditPullDt'].notnull()),1,0)
df['App_Initiate_Dt_2'] = np.where((df['App_Initiate_Dt'].notnull()),1,0)
df['Fund_Dt_2'] = np.where((df['Fund_Dt'].notnull()),1,0)
df['Lead_Exit= Achieved'] = np.where(df['LeadExitDesc'] == 'Application Achieved', 1, 0)
```

# Aggregating the marketing funnel stages

In [20]:
```
Funnel = pd.DataFrame(df[['LeadSubmiTs_2', 'InitialRightPartyContactTs_2', 'OpportunityCreatedTs_2', 'CreditPullDt_2
```

In [21]:
```
Funnel
```

Out[21]:

| | 0 |
|---|---|
| **LeadSubmiTs_2** | 4999 |
| **InitialRightPartyContactTs_2** | 4924 |
| **OpportunityCreatedTs_2** | 4402 |
| **CreditPullDt_2** | 3802 |
| **App_Initiate_Dt_2** | 1553 |
| **Fund_Dt_2** | 552 |
| **Lead_Exit= Achieved** | 367 |

In [22]:
```
Funnel.columns = ['Conversion']
```

In [23]:
```
Funnel
```

Out[23]:

| | Conversion |
|---|---|
| **LeadSubmiTs_2** | 4999 |
| **InitialRightPartyContactTs_2** | 4924 |
| **OpportunityCreatedTs_2** | 4402 |
| **CreditPullDt_2** | 3802 |
| **App_Initiate_Dt_2** | 1553 |
| **Fund_Dt_2** | 552 |
| **Lead_Exit= Achieved** | 367 |

In [24]:
```
Funnel['Conversion_Rate'] = round((Funnel['Conversion']/4999)*100,2)
Funnel
```

Out[24]:

| | Conversion | Conversion_Rate |
|---|---|---|
| **LeadSubmiTs_2** | 4999 | 100.00 |
| **InitialRightPartyContactTs_2** | 4924 | 98.50 |
| **OpportunityCreatedTs_2** | 4402 | 88.06 |
| **CreditPullDt_2** | 3802 | 76.06 |
| **App_Initiate_Dt_2** | 1553 | 31.07 |
| **Fund_Dt_2** | 552 | 11.04 |
| **Lead_Exit= Achieved** | 367 | 7.34 |

# Funnel

In [41]:

```
from plotly import graph_objects as go

fig = go.Figure(go.Funnel(
    y = ['LeadSubmiTs', 'InitialRightPartyContactTs', 'OpportunityCreatedTs', 'CreditPullDt', 'App_Initiate_Dt', 'Fu
    x = Funnel['Conversion'],
    textposition = "inside",
    textinfo = "value+percent initial",
    opacity = 0.69, marker = {"color": ["deepskyblue", "lightsalmon", "tan", "teal", "silver", "green","dark blue"],
    "line": {"width": [2, 2, 2, 2, 2, 2, 3], "color": ["wheat", "wheat", "blue", "wheat", "wheat" , "wheat", "wheat"
    connector = {"line": {"color": "royalblue", "dash": "dot", "width": 4}})
    )

fig.show()
```