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Final Report

Executive Summary

Verituity's goal for this project is to optimize its ad spending, track the efficiency of ad campaigns and creatives, and the ads' effectiveness to support the sales department. First, the team looked at the data collected from the LinkedIn Ad Campaign Manager and evaluated the critical questions to solve throughout the project. Once we had the plan to achieve the goals laid out by the client, we started extracting the data from Ad Campaign Analytics and Ad Performance Analytics with demographic information included. While evaluating the data, we tracked the ad campaign performance, job title performance, company performance, and ad creative performance. A few of the problems the team aimed to solve included when to stop the ads, the effectiveness of the ads, the job titles that should be targeted, and keywords companies are interested in. After analyzing the data, the team created Tableau dashboards to easily visualize the findings. These visualizations will help the marketing team in the future monitor the trends in job titles, the company's preferred keywords, cost per click, click-through rates, and more.

Background information

Verituity is a fintech startup providing secure, pay-by-anything services on behalf of Payers that are direct clients or treasury service clients of banks. The company is a white-label SaaS platform that ensures verified digital transactions, minimizing transaction risks and costs and increasing transaction rate success. The Verituity Payouts Platform allows ACH, Wire, Zelle, RTP, and virtual card trying to reduce payment errors, fraud, and cost of payouts. With cybersecurity attacks, it's important to have a company that can securely hand out payouts, especially for large companies. Verituity's target audience includes banks, insurance companies, and the entertainment industry. The marketing team serves as an educator educating their target audience and more to attract potential customers. This semester, the company aims to increase its ad effectiveness by looking at current data in its possession.

The primary form for advertisements for Verituity is LinkedIn. Moving forward, Verituity aims to have efficient advertisements to support its sales cycle. The objective of this semester's project is to better optimize Verituity's ad spend by leveraging data provided to the team. By analyzing the data collected, from their previous advertisements, analysts can develop models and dashboards visualizing and determining the ad-spend and effectiveness. The team set out to solve questions including: how does the target audience interact with the ad in each sales

cycle, how well does the ad distribution perform over time, what is the trend analysis of ad effectiveness, or what does the ad fatigue cycle look like? One important aspect the team looked at is the job title because Verituity wants to target those specializing in payouts for their company over other job titles. Furthermore, we evaluated metrics such as the duration of time the ad is in use, click-through rate (CTR), and cost per click (CPC). One challenge we faced while analyzing the data is that LinkedIn APIs had limited insights and LinkedIn Manager had a limited data source. The team organized all the data by utilizing a PostgreSQL database, with Ad Campaign and Ad Creative making schemas and tables. Furthermore, with the use of Tableau, the team was able to create valuable insights for Verituity. Some insights include job titles to target, CTR, and CPC to inform Verituity what job titles to target, the success of clicks, and the cost incurred by the ad to determine when to retire the ad.

Problem Understanding

Core problem

Since Verituity does not use traditional advertising campaigns, it is arduous to directly link advertising expenditures to revenues; however, the effectiveness of ad campaigns is still very important. The team focuses on four key questions: 1) How does target audience (TA) interact with the ad in each sales cycle; 2) How well does the ad distribution perform over time; 3) What are the signs showing advertisements reach ad fatigue; 4) What are the signs showing advertisements reach ad fatigue.

Business Understanding & Data Understanding

To better understand the needs of clients and to be more in line with the market situation, the team conducts logistic set-up, data analytics, marketing analytics research, and background information dig-in research. The preparation step is designed to divide into business understanding and data understanding, as the primary recipients are Chief Data Scientist, Senior Data Scientist, and Senior Manager of Marketing Operations. Upon the business understanding, the team decides to discuss the potential requirements and needs for Verituity and focus on the three key questions, how does the Target audience look like, how does TA interact with the ad in each sales process, how well does the ad distribution perform over time and when to terminate. First, uncomplicating LinkedIn API data is needed because of fragmented data points by LinkedIn policy, for example, job function and company data not appearing at the same time, and TA overlaps among creatives under the same campaign, as well as the TA relationships. Second, investigating the important metrics for LinkedIn data since the metrics measure the performance, such as user reach, impression, and clicks, and metrics also may appear redundancy, such as “full screenplays”, “viralComments”, etc. Third, the understanding of pieces of the recipe for paid media engines is also necessary since quantifying the effectiveness of ad performance and brand awareness leads to a clear list of TAs. Besides, knowing what action will boost how much percentage in the performance metric will be clear to the marketing team. During the data understanding stage, the team’s main task is

to find out the data insights to support solving the business problem. After Verituity's authentication, the team could access the LinkedIn API token and LinkedIn Manager. By using and manipulating the LinkedIn API data, different Metrics are available for data analysis, such as Impressions, Reach, and Clicks. And the LinkedIn campaign Manager provides some filtering features and needs to be downloaded manually. Thus, the team deems to use Python to extract the ads data within the LinkedIn API and organize the data source. Also, assisting build PostgreSQL databases for analytics in Azure. Then, after comparing different visualization software, the team eventually decided to use tableau, integrate and automate the dashboards and reports, and eventually upload all the finished tasks into the GitHub repository. Other than that, teams also consider building models and performing A/B testing to determine creative deployment strategy, which could forward the evaluation, for example, compare each model's performance by metrics and evaluate each model's prediction performance with test data. Finally, the team wishes to deliver the desired outputs to Verituity's technical team and marketing team.

Methodology (Data Analyzed, Analytics Techniques Used)

Data Pipeline and Database Construction

The data are generated from the LinkedIn Ads service, utilizing python with LinkedIn Marketing Developer Platform, marketing APIs (Reporting & ROI), its access token, and LinkedIn Campaign Manager insights. The API calls can be found at:

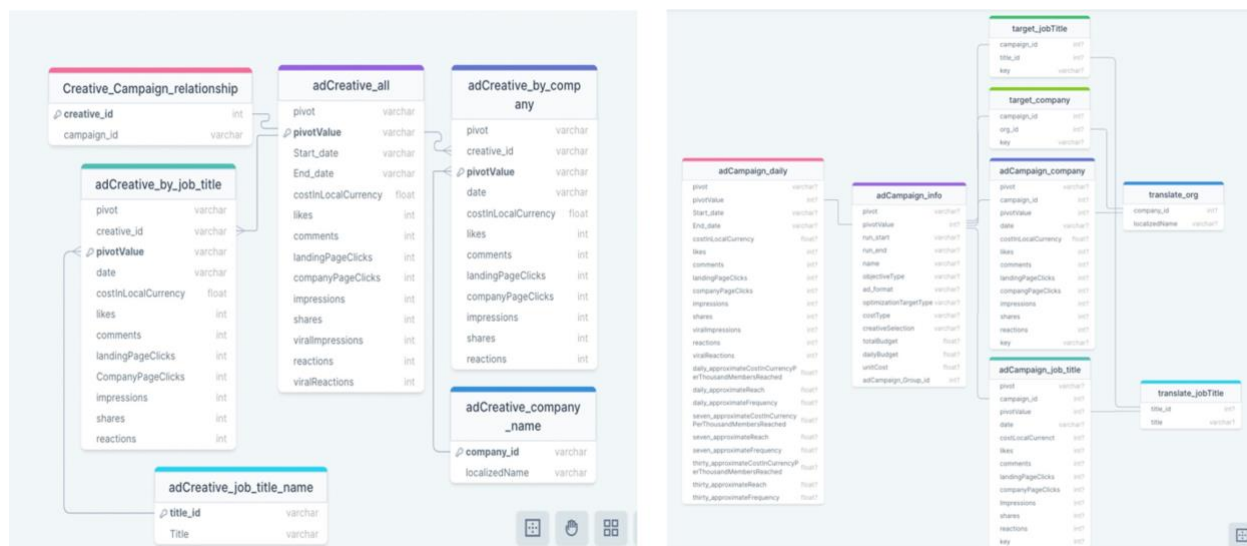
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- ✓  [LinkedIn API_adCampaign&adCreative TA Settings Extraction.ipynb](#)
- ✓  [LinkedIn API_adCampaign Performance Analytics.ipynb](#)
- ✓  [LinkedIn API_adCreative Performance Analytics.ipynb](#)
- ✓  [LinkedIn API_Database Construction_Campaign&Creative.ipynb](#)

The above 4 files are our data extraction pipeline for dashboard building and data center construction for data update automation in Tableau.

With adCampaign Performance Analytics and adCreative Performance Analytics pipeline, we can access all ads performance metrics at ALL TIME, with their demographics data that is not included in the LinkedIn APIs directly. The performance metrics including Start_date, Likes, Comments, Impressions, Landing page clicks, Cost, and Reach Metrics for adCampaign and the same for adCreative except Reach Metrics that can only be pivoted with adCampaign due to API limitation. The demographics data look into the job titles and companies in order to identify the target audiences for improving the marketing strategy at Verituity. The TA Settings ensure

access to Campaign_id, Title_id, and Title as the example for demographic data extraction blueprint for further investigation on other types of demographic data if applicable in the future. If Verituity continues to explore the machine learning algorithm based on the performance metrics, all the above pipelines can be utilized to get up-to-date data without new pipeline building.



The database construction file includes the code with PostgreSQL that provides Verituity data experts a perspective on how our team emphasizes the data structure and format on LinkedIn ROI and Reporting metrics. The above two schemas contain 8 tables for adCampaign and 6 tables for adCreative. The PostgreSQL code can be utilized while Verituity's data experts build the tables on their own cloud service platform (Azure), the tables then will be embedded in the Tableau with Data Source linking with Verituity's Cloud service account or PostgreSQL directly.

For detailed instructions on how to link the Ad Performance Tracking Center to PostgreSQL database, please refer to the Appendix.

Metrics for Evaluating Ad Performances

Ad Quality	Cost per Click (CPC), Click Through Rate (CTR)
Ad Fatigue	7-Day Reach, 30-Day Reach

Usually, a good ad quality has low CPC and high CTR. Marketers may compare the metrics with the past ad campaign analytics as well as the LinkedIn official stats benchmarks. According to LinkedIn, the average CTR is around 0.44% to 0.65%, and average CPC is around \$5.58 with a some of related breakdown in the following:

LinkedIn Official Stats Benchmarks		CTR	CPC
Ad Format	Sponsored Content (Single Image)	0.56%	NA
	Sponsored Content (Carousel)	0.40%	NA
	Sponsored Content (Video)	0.44%	NA
Job Functions	Business Development	0.65%	\$6.3
	Finance	0.60%	\$6.9
	Informational Technology	0.57%	\$7.9
	Operations	0.55%	\$5.7
	Sales	0.58%	\$5.4
Industry	Finance Services, Insurance & Banking	0.49%	NA
	Retail	0.80%	NA
	Consumer Goods	0.55%	NA
	Corporate Services	0.5%	NA

Overall Ad Campaign Analysis

Dated to the end of November 2022, Verituity had 9 ad campaigns in total with \$14,917.95 total ad spend. The CPC is \$5.7, which is about the average of the global CPC benchmark. The CTR is 0.44%, which is at the lower bound of the global CTR benchmark. We could firstly classify the past ad campaigns into three tiers, listed as follows. Tier 1 contains campaigns with good ad quality:

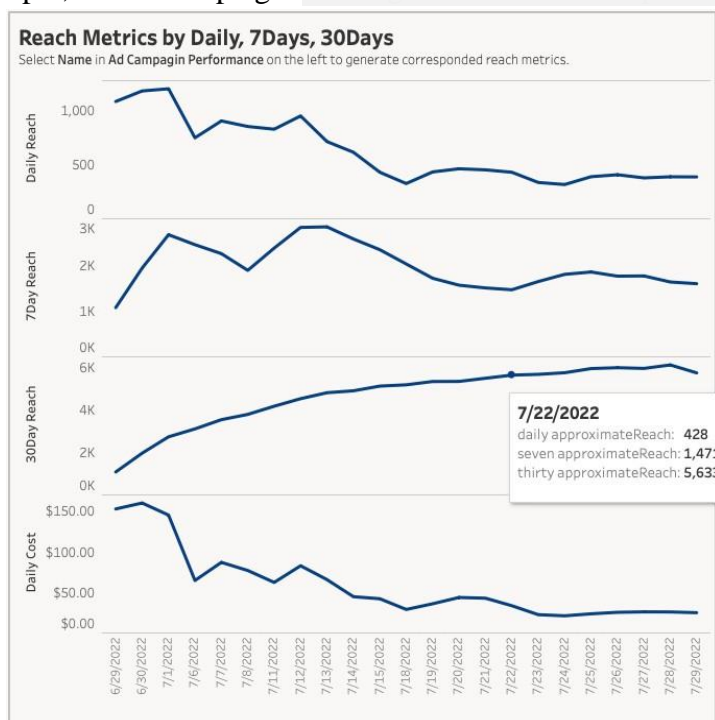
Tiers	Ad Campaigns
Tier 1 high CTR & low CPC	Banking 4 Pillars, AFP Campaign_01, AFP Campaign_02, AFP Campaign_03, PayPod Podcast Carousel, Modernize Disbursements- Trust, KB, WF

Tier 2 high CTR & high CPC, low CTR & low CPC	Final Citizens Bank LIP Boost 7, 6, 4 Pillars - Third, Money 20/20 Campaign_03, Insurance 4Pillars, ITC Awareness Campaign, ITC Organic Boost
Tier 3 low CTR & high CPC	LIP Podcast Boost, Insurance Video AT, 3Pillars - JPM, 3Pillars- Direct Payers, Money 20/20 Campaign_01, Money 20/20 Campaign_02

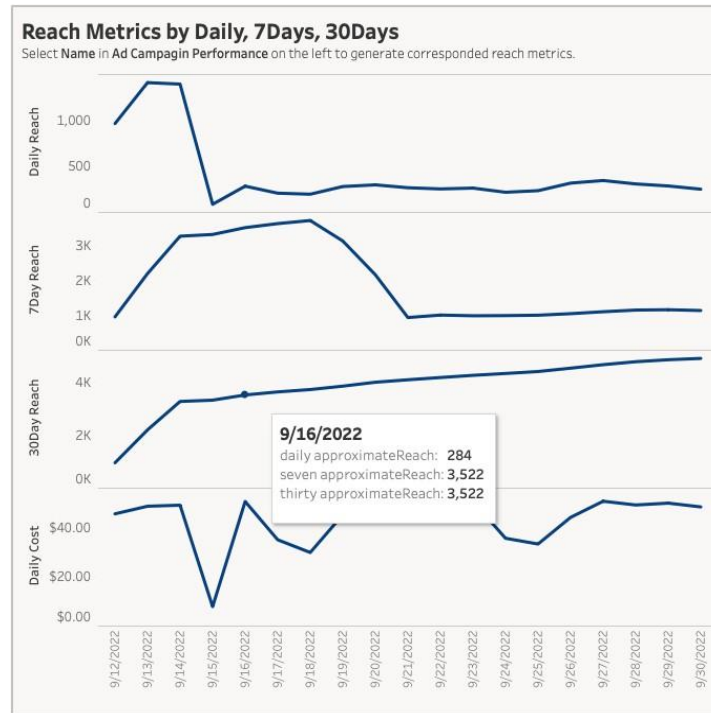
For quick examination in the future, click open adCampaign Quadrant Diagram in the Ad Performance Tracking Center.

Detecting the Ad Fatigue

For detecting whether an ad campaign reaches its ad fatigue, marketers should look to 7-Day Reach and 30-Day Reach metrics. When a trend shows an inversion point and the trend becomes relatively flat, markets should consider either to **(1) adjust the targeting criteria if the ad campaign runs at the early stage** or **(2) stop the ad campaign if the ad campaign has run for a while**. For example, the ad campaign I



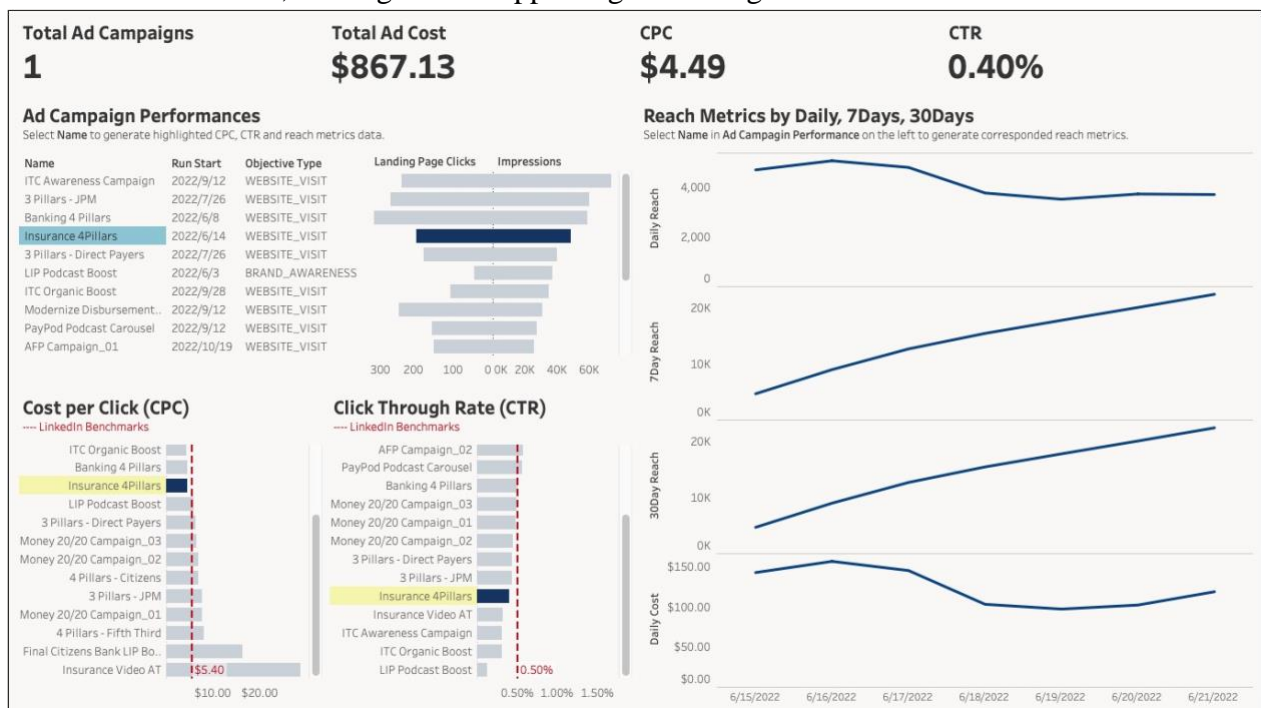
Here's another example. Modernize Disbursements- Trust, KB, WF (Figure) should consider adjusting the targeting criteria on 7/15/2022.



Gluing Ad Quality and Ad Fatigue Together

When evaluating whether an ad campaign is effective or not, we need to look at both ad quality and ad fatigue. In this example, **Insurance 4Pillars**

However, both 7-Day and 30-Day Reach metrics were still growing and show no inversion point. The ad campaign didn't reach ad fatigue. Marketers could consider adjusting the content of the ads, making it more appealing to the targeted audience.



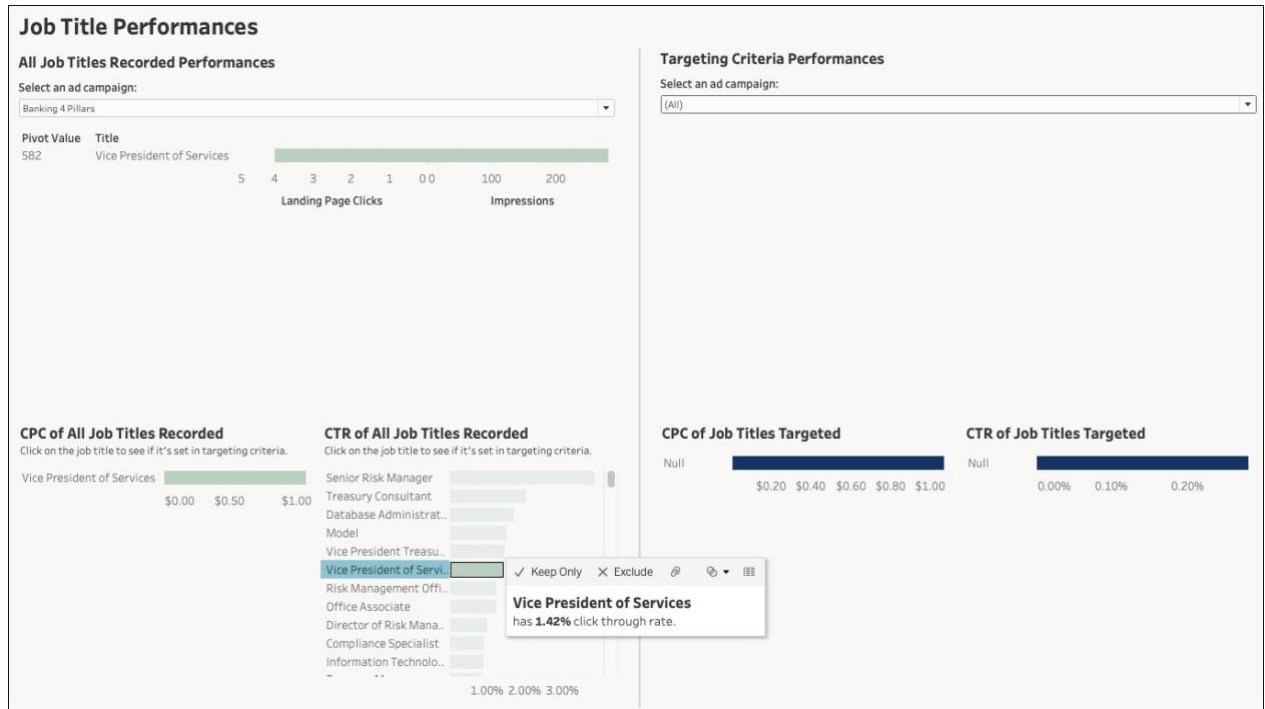
Overall Job Titles Analysis

Of all the targeting job titles with total impressions of each job title listed in top 200, only 18 job titles had more than 10 landing page clicks. Of all the job titles recorded, 4 more than 10 landing page clicks, listed as following. Marketers may consider removing underperforming job titles and explore other possible or similar job titles and observe their performances.

Title (Translate Jobtitle1)	Impressions	Landing Page Clicks
Vice President of Sales	10,000	1
Vice President of Products	10,000	1
Vice President of Business Development	10,000	3
Vice President of Compliance	10,000	9
Compliance Manager	10,000	1
Chief Executive Officer	10,000	6
Compliance Officer	10,000	1
Lead Software Engineer	10,000	2
Vice President of Treasury Management	10,000	8
Director of Risk Management	10,000	0
Vice President of Finance	10,000	0
Chief Financial Officer	10,000	0
Treasury Management Officer	10,000	8
Marketing Services	10,000	6
Vice President of Treasury	10,000	5
Head of Risk	10,000	5
Treasury Specialist	10,000	2
Head of Strategy	10,000	10

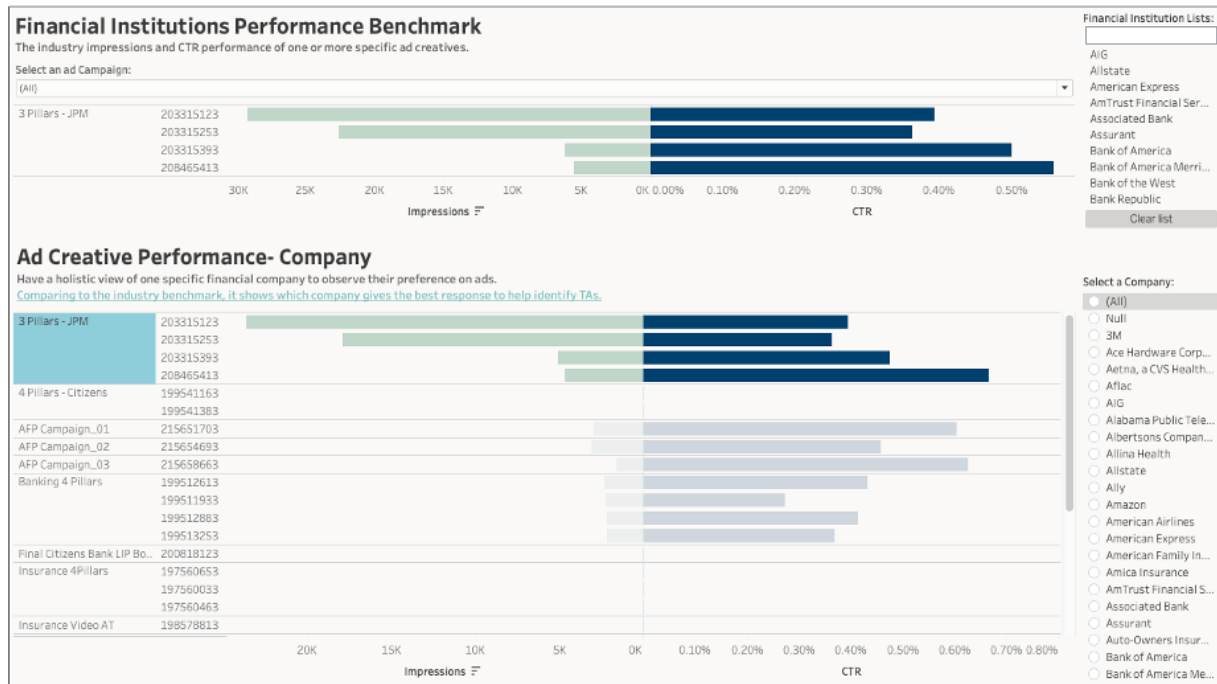
Optimizing Ad Performances- Job Titles & Company

Once we identify the ad campaign performance, marketers still need to look into who were actually interacting with the ads and might need optimizations. 7 an example again. By clicking on the job title recorded in the Job Title Performances dashboard, marketers may consider adding **Senior Risk Manager, Vice President of Services, Risk Management Officer, Treasury Management Specialist, Risk Management Specialist...**etc into the targeting criteria. Similar optimization analysis may also be done by the Job Title Performances and Company Performances dashboard.



Overall Ad Creatives Analysis

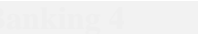

The dashboard on adCreative shows a grand view of the financial industry-level performance metrics (impressions, CTR) filtered from the Top 200 audiences and its comparison on a single company level or the all industry-level, with data mainly focusing on adCreative. The overall performance can be accessed on the bottom chart when selecting “All”.

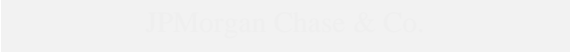



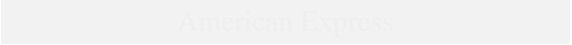
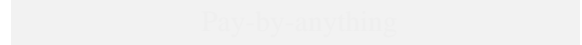


To standardize the data and avoid bias based on the number of employees of each company, we recommend to read the impression data first to have a sense of how an specific adCreative leaves impressions on the landing page by the target settings. The CTR for each company under specific adCreative would provide more accurate data than clicks with all target audiences to let you know the Ad quality. The industry level analysis also helps you reduce the noise of other target industries' responses.

Optimizing Personalization with Audience Preferences

To better understand what drives the attention of a specific company for further building personalization ad strategy, select the company you want to target on the bottom right to see company response for all adCreatives. Compare the bar length on CTR under the same campaign would give you an idea on how different adCreative settings such as phrasing differences, format differences. Please note that the company's interest may vary depending on their business strategy and thus differ with distinct campaign effective periods.

Take the content differences on keywords for example: Along with Campaign I  I  , there are 4 ad creatives with different keywords. The below chart shows how specific companies respond to different keywords. It is indicated by the highest CTR out of 4 ads under the same campaign for each company.

Company Localized Name	Keywords associated with Ad Creative
	
	
	

Digital Ad Strategies

Digital ad is a marketing tool that requires much trial and error but could be optimized in a data-driven way. There are five important guidelines for Verituity when designing digital ads.

Five Digital Ad Design Guidelines	
Step 1	Segmentation, segmentation, segmentation
Step 2	Educate the market, focusing on content provided
Step 3	Clear objectives and hypotheses marketers want to achieve or test out
Step 4	Deliver values in several stages

Step 5	Call to action (words or fake button design)
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For example, if Verituity would like to run an ad campaign to build brand awareness for an upcoming conference. Here's what could be done:

LinkedIn Ad Campaign Group: Upcoming Conference Promotion	
Step 1	Set up several ad campaigns in similar industry or job titles: Campaign_01: Banking + VP Campaign_02: Banking + Senior management Campaign_03: Banking + Juniors Campaign_04: Insurance + VP Campaign_05: Insurance + Senior management Campaign_06: Insurance + Juniors Campaign_07 (See step 3): Retails + VP
Step 2	Provide information about potential threats of writing checks: The wordings of each ad creative should adjust according to different industries and job levels.
Step 3	Clear objectives or hypotheses marketers want to achieve or test out Ex. Would retails be interested in our service? (Add a testing campaign)
Step 4	Deliver values in several stages Before the conference: 80% check threats + 20% company solution During the conference: 50% check threats + 50% company solution After the conference: 30% check threats + 70% company solution
Step 5	Call to Action (words or fake button design) Before the conference: Click to learn more about xxx During the conference: Find us at booth #xxx, Join the conversation with us... After the conference: Book an online demo with Verituity, Request a quote...

Conclusions, and/or Recommendations

1) Track Ads Quality and Ads Fatigue

Advertising quality metrics help you see how your marketing campaigns are progressing, what's working well, and what needs to change. Marketers need to ensure that their advertising ROI generates positive results month after month so that their business can increase its revenue. But if they can't monitor the results of your advertising campaigns, they cannot prove that your advertising is performing well. Therefore, we recommend Verituity have a luminance metric that they can check regularly so that they can adjust their campaigns as needed. The Quality Score for advertising quality is also a diagnostic tool that tells how well the company's advertising quality compares to other advertisers. A high-quality score means that the company's ads and landing pages are more relevant and useful to people searching for its company's keywords compared to other advertisers.

We recommend that Verituity actively utilize CPC and CTR. CPC is the amount paid each time a user clicks on your ad, representing the actual price you pay for each click in the marketing campaign. It is also sometimes referred to as “pay-per-click”. Pay-per-click (PPC) advertising can be a cost-effective way to drive traffic to your website. CPC has many benefits to consider. First, businesses pay only when users reach your website, so it’s good value. So, they can choose to spend as much as they like. Next is a marketing strategy that is advantageous for targeting. CPC allows businesses to select prospects based on demographics such as location, occupation, and the company's industry. A metric that allows businesses to set up their PPC campaigns to carefully measure their effectiveness. CPC gives an accurate view of what their return on investment is. It can also be customized. When running a campaign, businesses can freely adjust from small to large parts to improve based on what works best. Also, the effectiveness of PPC or CPC can be seen immediately. Therefore, we encourage Verituity to utilize the advertising metrics above.

Ad fatigue is a problem that occurs when users become so accustomed to certain types of ads that their effectiveness diminishes. As a result, campaigns are less effective, preventing users from moving to the sales stage and ultimately harming the company's bottom line. Therefore, it is important for marketing teams to continuously deliver fresh, high-quality, targeted advertising so that content continues to inspire customers. Indicators of ad fatigue include low click-through rate, low engagement, low impressions, etc. CTR is a measure of how compelling an ad is and whether it's compelling enough to entice visitors to explore the brand further to the final act. Therefore, it is necessary to observe the time series trend of the reach metric on a 7-day basis and on a 30-day basis to monitor whether the CTR number drops over time. Not only that, but the business also needs to make sure that your customer engagement continues to be a high score, and if people accidentally see your ad and go elsewhere, they're not actually engaged. Also, if customers go elsewhere in large numbers, even though businesses regularly show them ads, they're not really engaging. Not only that, but businesses need to make sure that their customers are interacting with their ad posts with high relevance. If customers don't interact with their posts, they're highly unlikely to see them in the future. So, if impressions have declined over time, it may be time to revamp advertising campaigns. Therefore, we recommend Verity observe time series trends in reach indicators on a 7-day and 30-day basis to continue to observe advertising fatigue indicators to ensure that customer engagement and impressions continue to be well maintained over time.

2) Air Cover Strategy (Digital Ads)

Predictive marketing is essential to the implementation of B2B demand generation. Many businesses understand and follow the marketing funnel of the sales process, but it can be difficult to understand how Air Cover fits into the marketing spectrum and how well it fits. The team recommends that Verituity proceeds with the Air Cover Strategy.

Account- and target-based marketing allows companies to focus on prospective customers who are most likely to make a purchase. This means a business can reach its ideal

customers, engage them with personalized content, and get personalized results from them to gain key insights. So, Air Cover can deliver a consistent stream of leads when done right. An integrated marketing strategy using Aircover acts as an intermediary between product awareness, conversation with a sales representative, and actual use of the site, either before or simultaneously with a sales representative. Additionally, Air Curve allows businesses to use B2B marketing artificial intelligence to increase awareness of their company's services. Verituity is running several campaigns for Creatives and through data integration platforms, they can see performance analytics of all running experiments in a particular campaign. Increasing the number of impressions they get through Aircover helps build their brand. Creating compelling content and distributing it through targeted advertising can leave an impression on a target audience. In other words, ads pop up in target audiences' feeds that generate impressions even if they don't act on them. Target customers may not buy immediately, but at some point, they will think of Verituity first. Finally, Air Cover runs continuously behind the scenes, allowing a business development team to deliver a consistent stream of leads while creating other tactical campaigns. A consistent lead stream provides a holistic view, reducing workflow discrepancies in business. And when business personalizes and combines this data on a per-target basis, they can gain better insights into consumer behavior, helping them achieve their goals on a per-customer basis.

3) Targeting Criteria Optimization

Optimized targeting extends to potential users by creating profiles of converters based on real-time transition data. Targeting optimized for the campaign's objectives can help companies reach new, relevant prospects with the potential for transition. Optimized targeting provides campaign flexibility to explore customers who are most likely to transition within their campaign objectives. Optimized targeting allows a business to optionally provide targeting signals, such as keywords or prospect segments. Currently, Verituity has a target audience. However, we recommend optimizing their targeting criteria. We recommend two approaches. First, identify target audiences that are underperforming and either remove their settings or retest with different content. Among target audiences with poor performance, it is appropriate to remove those who cannot be resuscitated or who are unlikely to recover from the target audience segment. However, when tested with other content, some of them perform better than before. The implication of this result is that the content they are exposed to is incorrect. Or, depending on the case, the content exposure method may need to be changed. Therefore, it is a priority to expose other content to target audiences with poor performance or to try different ways to expose them. If the performance is poor even after these tests, it is correct to remove the target audience from the segment. The second is to separate the target audience setup into two advertising campaigns. Based on the two current advertising campaigns, it is to reset the target audience for each. In this way, advertising efficiency can be further maximized by exposing more segmented and customized advertising campaigns for each TA. Personalized advertising continues to be a popular strategy for many companies due to digital advertising, and its effectiveness has been

proven in many cases. If Verituity subdivides and resets TA and uses advertising campaign strategies tailored to each group, the effectiveness of the results will be clear.

4) Maintenance: Renew the tokens every 90 days

Once the token expires or is revoked, it can no longer be used to authenticate API requests. Expired or canceled tokens cannot be restored, and the program must create a new token. Therefore, we recommend that Verituity maintain tokens by renewing them every 90 days. This can also be done by data automation codes. With data automation code, if the code is maintained with automatic renewal, Verituity will be free from the hassle of requesting a new token.

5) Automate reports: Jenkins CI/CD and GitHub/Tableau integration

Team recommends Verituity build report automation with Jenkins CI/CD and GitHub/Tableau integration. Jenkins is an open-source automation tool that provides excellent community support, written in Java with plug-ins built for continuous integration. Jenkins is used to constantly build and test software projects, making it easier for developers to incorporate changes into projects and for users to obtain new builds. In addition, the software can be continuously delivered by integrating with numerous test and deployment technologies. In addition, Jenkins enables organizations to accelerate the software development process through automation. Jenkins integrates all kinds of development lifecycle processes, including build, document, test, package, preparation, deployment, and static analysis. In other words, Jenkins achieves continuous integration with the help of plugins. Jenkins is not only easy to install, but also has many plugins. It is also built in Java, so it has the advantage of being portable to all major platforms. Given the data and documentation from Verituity's LinkedIn API, as well as ad quality metrics and ad fatigue metrics, there's no reason not to use Jenkins. The Jenkins API helps data centers continuously integrate and deliver up-to-date data and dashboards for their customers without manual intervention. Thus, automation of all required documentation will accelerate Verituity's work and maximize efficiency.

6) Machine Learning and Parameter Tuning for Ads inversion point

An ad inversion point typically occurs when the cost of running the ad campaign exceeds the revenue generated from it. At this point, the company will need to either adjust its ad campaign to make it more profitable or stop running the ads altogether. Ad inversion points are an important consideration for companies that are running ad campaigns to ensure that their marketing efforts are sustainable and profitable.

Parameter tuning is a specific method of machine learning that can be used to optimize ad campaigns. This involves adjusting the parameters of a machine learning model to improve its performance on a specific task, such as predicting the profitability of an ad campaign. By carefully tuning the parameters of a machine learning model, Verituity can make more accurate predictions about the profitability of ad campaigns, identify areas where their ads are

underperforming, and take steps to improve them, such as by adjusting the target audience, the ad copy, or the placement of the ads, which can help avoid reaching an ad inversion point. One example of parameter tuning for an ad inversion point could involve training a machine learning model to predict the profitability of an ad campaign based on various factors, such as the target audience, the ad copy, and the placement of the ads. The model could be trained on data from previous ad campaigns, and the parameters of the model could be adjusted to improve its accuracy in predicting the profitability of future ad campaigns. Once the model has been trained and optimized, Verituity could use it to make predictions about the profitability of new ad campaigns.

Potential Next Steps

1) Incorporate Google Analytics Data

Google Analytics (GA) is user-friendly and helps companies get a better handle on their websites. It is particularly helpful for marketing departments, helping to visually and more quickly evaluate and measure the performance of marketing, content, and products relative to user stickiness. This tool collects data and categorizes it into useful information. Also, GA allows the data collected to be transformed into more comprehensive and engaging charts, graphs, and spreadsheets that make sense. It allows for the creation of relevant dashboards when effectively measuring the performance of the web, which is critical to achieving business goals. For Verituity, GA could help to seamlessly track each ad campaign's performance and the number of visits for returning users and new users. With GA, the user could track the advertising result by using three parameters, Campaign Source, Campaign Medium, and Campaign Name. Each ad that is placed will have a unique set of values. Finally, the Goal Conversion tab contributes a lot to the success of the business, for instance, submitting the contact information form for the marketing or the lead generation sites.

Verituity's marketing team may consider using this tool in the future after embedding the UTM code, which could add directly onto the URL link. Previously, the team encountered some barriers to loading the dataset at the GA site, after going to the UA -Google Merchandise Store, there were only a limited number of ad campaigns that have already been linked to the GA account.

2) Generate ML models

Machine learning methods allow marketing teams to analyze large amounts of historical data and make accurate predictions about customer behavior. Deploying statistical algorithms and AI techniques can help companies create more effective marketing campaigns by targeting the right customers with the right message at the right time. Machine learning algorithms can also help companies automate and optimize their marketing processes, which can save time and resources, make sure they stay ahead of the curve and assess the future of their marketing efforts.

Additionally, machine learning can help personalize marketing efforts, which can improve customer engagement and increase customer loyalty.

With the accumulation of historical data, it is hopeful for Verituity to expect a meaningful outcome from the following usage of machine learning models: campaign marketing spending, customer demographic analysis and segmentation, ROI prediction, and understanding the inherent drive of success of creatives and campaigns. Particularly for customer analysis, classification models including KNN, random forest, Support Vector Machine and ensembled models can be considered for customer segmentation purposes.

3) Search Engine Optimization

Search Engine Optimization (SEO) refers to the process of inducing organic traffic to a website and increasing the ranking on the search engine results page. This requires creating high-quality content, monitoring the technical status of the website, obtaining backlinks from other websites to sites, and maintaining the presence of local searches on the website. SEO is important in the red ocean of fintech companies and startups like today because it increases visibility when searching for services offered by customers and makes it easier for customers to find businesses. To increase visibility, businesses need to focus on what their target customers are looking for online, the content they are using, and the keywords they are using. To gain the upper hand in market competition, they should prioritize the search engine optimization of their website. Not only is SEO's click rate significantly higher than that of PPC campaigns, but the cost per acquisition is significantly lower than that of PPCs. SEO can increase brand visibility because SEO can help promote brand recall by creating continuous online word-of-mouth surrounding the brand.

Therefore, the team recommends Verituity actively use search engine optimization. Identify the key differences between the advertising creators of each campaign and use this keyword with SEO. More specifically, Verituity has several ad creations. First, identify the key differences between each campaign's advertising creators that produce the best performance. The elements can be further subdivided by audience demographics within the creative, but elements that produce results within the creative are sufficient. Keyword marketing results can be identified specifically by several factors, such as Volume, CPC, Organic search result, paid search result, and the number of linked links, which can be used as insights for future marketing. SEO is not a one-time strategy. SEO builds content marketing strategies that complement all marketing steps. A robust SEO strategy even includes customized content targeted at each stage of the funnel to provide recognition, evaluation, and transformation. SEO can help establish a site's authority through various practices, as well as build brand credibility and trust.

4) A/B Testing with New Ads

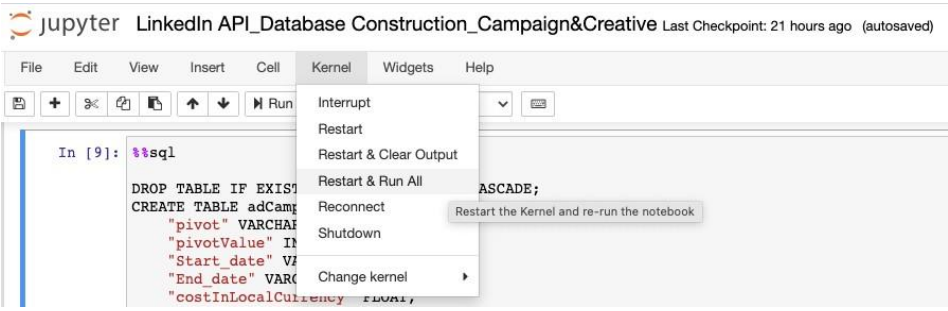
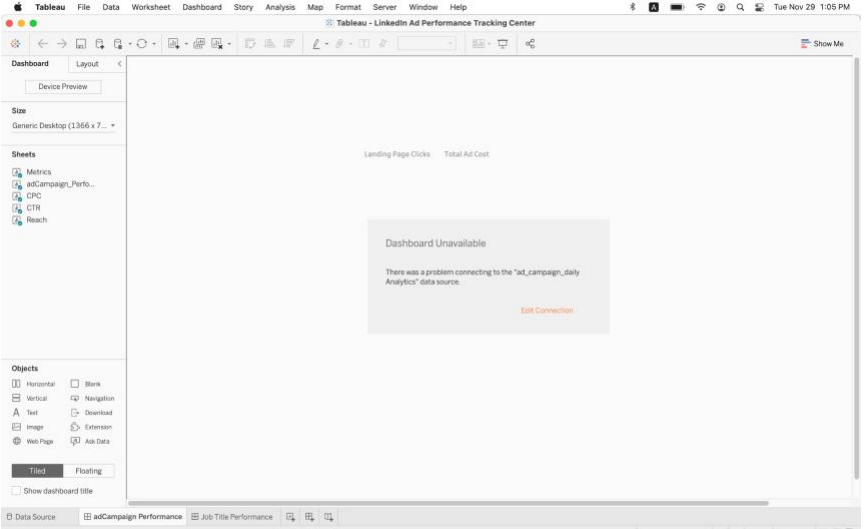
A/B testing is a useful tool commonly used in marketing and product development to determine which of two versions of a campaign strategy will be more successful in the market. It allows marketing teams to make data-driven decisions about their product, rather than relying on

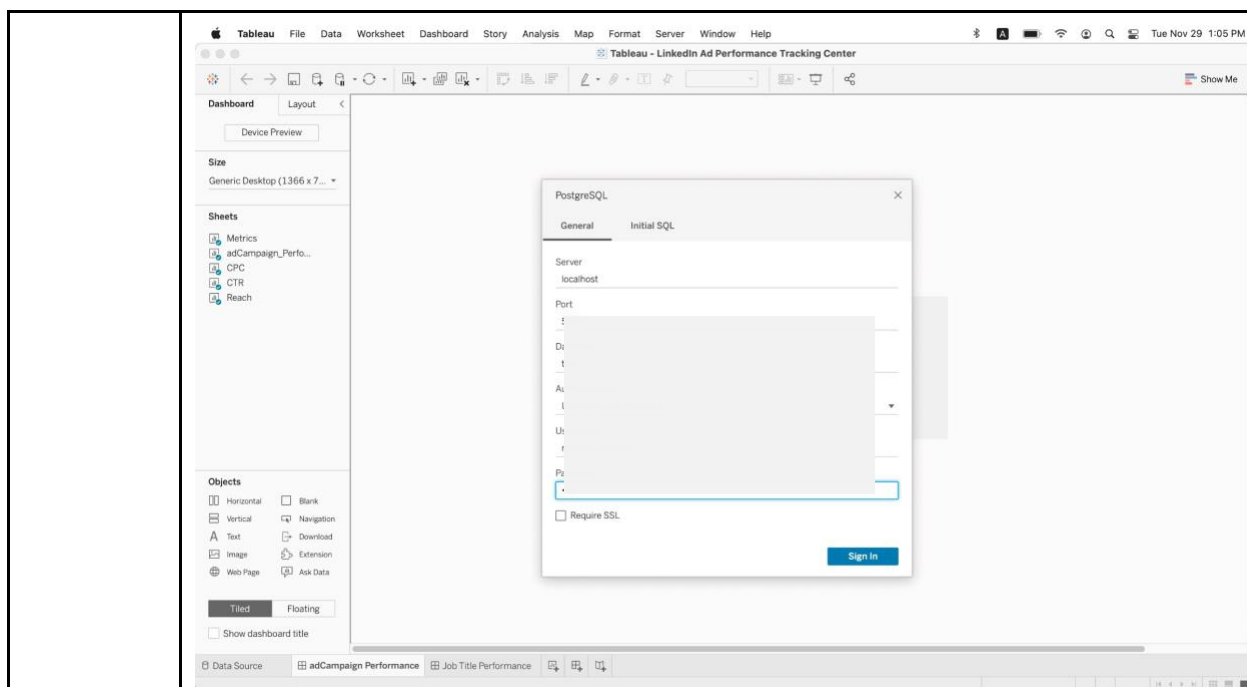
hunches or guesswork. Due to the limited number of operating campaigns, we were unable to perform A/B testing during the period of the analysis. However, if the conditions are right, we do recommend the marketing team implement A/B testing on new campaigns in the future and verify the usage of insights and the effectiveness of various strategies. The primary “independent variable” we recommend is the creative content variant under the same campaign, which includes keyword, wording, format and UI design.

Appendices

How to link the Ad Performance Tracking Center to PostgreSQL database in local? (mac OS as example)

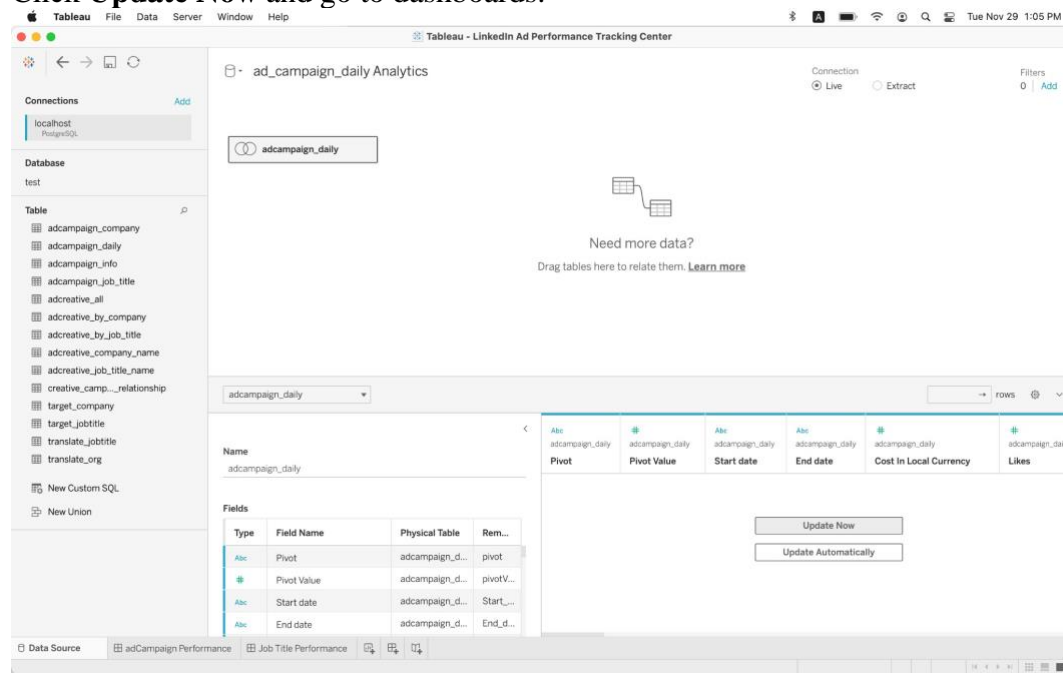
Step 1	Open LinkedIn API Database Construction Pipeline jupyter notebook, and open terminal.
Step 2	Follow the [In Terminal] cell, download PostgreSQL and create the skeleton of the database INSIDE the terminal .
Step 3	Go back to the pipeline, modify the path in cell 5 & 7 to connect to your postgresQL engine. <div> <pre>In [5]: sqlalchemy.create_engine('postgresql://') Out[5]: Engine(postgresql://)</pre> <pre>In [7]: %sql postgresql://</pre> </div>
Step 4	Modify the path of the table files in the pipeline. <div> <pre>%%sql DROP TABLE IF EXISTS adCampaign_daily CASCADE; CREATE TABLE adCampaign_daily("pivot" VARCHAR(255), "pivotValue" INTEGER, "Start_date" VARCHAR(255), "End_date" VARCHAR(255), "costInLocalCurrency" FLOAT, "likes" INTEGER, "comments" INTEGER, "landingPageClicks" INTEGER, "companyPageClicks" INTEGER, "impressions" INTEGER, "shares" INTEGER, "viralImpressions" INTEGER, "reactions" INTEGER, "viralReactions" INTEGER, "daily_approximateCostInCurrencyPerThousandMembersReached" FLOAT, "daily_approximateReach" FLOAT, "daily_approximateFrequency" FLOAT, "seven_approximateCostInCurrencyPerThousandMembersReached" FLOAT, "seven_approximateReach" FLOAT, "seven_approximateFrequency" FLOAT, "thirty_approximateCostInCurrencyPerThousandMembersReached" FLOAT, "thirty_approximateReach" FLOAT, "thirty_approximateFrequency" FLOAT); -- Copy data from file into the table COPY adCampaign_daily FROM '/Users/ /adCampaign_daily_1128.csv' CSV HEADER;</pre> </div>

<p>Step 5</p>	<p>Restart and run all</p>  <p>The screenshot shows the Jupyter Notebook interface for a file named 'LinkedIn API_Database Construction_Campaign&Creative'. The 'Kernel' menu is open, and the 'Restart & Run All' option is highlighted. A tooltip indicates that this action will 'Restart the Kernel and re-run the notebook'. The code in the notebook cell is a SQL query: <code>DROP TABLE IF EXISTS adCampaign; CREATE TABLE adCampaign ("pivot" VARCHAR(255), "pivotValue" INT, "Start_date" VARCHAR(255), "End_date" VARCHAR(255), "costInLocalCurrency" FLOAT);</code></p>
<p>Step 6</p>	<p>Open the Ad Performance Tracking Center Tableau .twbx file and click Edit Connection.</p>  <p>The screenshot shows the Tableau Desktop interface. A message box in the center states 'Dashboard Unavailable' and 'There was a problem connecting to the "ad_campaign_daily Analytics" data source.' An 'Edit Connection' button is visible at the bottom of the message box. The left sidebar shows the 'Sheets' pane with 'Metrics', 'adCampaign_Performance', 'CPC', 'CTR', and 'Reach' listed. The 'Objects' pane shows various visualization options like 'Horizontal', 'Vertical', 'Text', 'Image', 'Web Page', 'Blank', 'Navigation', 'Download', 'Extension', and 'Ask Data'.</p>
<p>Step 7</p>	<p>Enter Server: localhost, Port: (It will generate automatically), Database: #YourDatabaseName, Username: #YourMacName, Password: #YourMacPassword. Click Sign in</p>



Step 8

Click **Update Now** and go to dashboards.



Type	Field Name	Physical Table	Rem...
Pivot	adcampaign_d...	pivot	
Pivot Value	adcampaign_d...	pivotV...	
Start date	adcampaign_d...	Start...	
End date	adcampaign_d...	End_d...	