Power Bi Dashboard for Data Analysis

Galiveedu Shoaib¹, Somesh Nandi²

1,2Department of ECE, R.V. College of Engineering, Bangalore - 560059

---***---

Abstract - *SAP is one of the world's leading manufacturers of business process management software, developing solutions that facilitate efficient data processing and information flow across organizations. SAP Cockpit is a online site which is used to obtain all the usage of Global accounts. Each Global account has different Sub-accounts which consume credits against services that are approved by the internal architecture team, recently it has been encountered that some sub-account owners were setting up services illegally. Such sub-account's related data and their monthly usage need to be tracked down. SharePoint Online and SAP Cockpit are confidential sites that are utilized for the usage export and import. A contract sheet is obtained from the internal team. The data that comes from SAP Cockpit and SharePoint sites requires access to view it (Confidential).The SAP Dashboard created using Power Bi helps the company to find out the moles that set up services illegally. Cross charges will be applied on the sub-accounts if the allocated budget is less than their consumption. Also helps in forecasting the usage and notifying the company to go for new budget purchase from IT.*

Key Words: **SAP Cockpit, Share Point, Power Bi desktop, Power Bi web, Data Synchronization, Data Refresh.**

1. INTRODUCTION

Earlier models of business often decompress data management, with each business function storing its own operational data in a separate database. This does not suit for employees from various business organizations to know information of each other. In addition to this duplicating the data among multiple organizations leads to increases in costs of IT storage and increase in the risk of data errors. CPEA goal is to establish one economic and simple customer experience for searching, demonstrating, buying and using cloud services from SAP and partners for beginner and previously installed customers in the organization. It enables customers to connect, easily extend and create their own apps with business and technical functions offered as cloud services, which is a innovative process going on[1].

The Overview page of global account's gives the information about the usage data of cloud credits (cloud credit budget if linked to the account) and costs for the global account, and service usage in the global account and it's sub‑accounts. There is no longer a need to license the SAP Cloud Platform service individually. Cloud services can be used when the demand arises and can be retired when they are no longer needed. Charges are based on actual usage and will be billed monthly against previously purchased cloud credit.

2. SOFTWARE TOOLS

The software tools used in this project are Power Bi Desktop Application, On-premises data gateway Application and Power Bi Web browser.

2.1 Power Bi Desktop Application

Power Bi desktop has the feature to use various sources of data and create reports for business intelligence by using source data. Power Bi is a cloud service. Also known as Software as a Service (SaaS).Power Bi has flexibility for report editing and connection between teams and organizations. Power Bi also integrate sources of data in Power Bi,low flexibility in modeling. Power Bi is used to do things like dashboard creation, design and share applications, analyze and Walk around the data to uncover business insights and many such things. Integrating and visualize any kind of data with a unique format, reliable self service and enterprise business intelligence platform that allows to use with ease and gives advantage to gain deeper insights into the data[2].

Almost all of the big data investments is made by integrating all data sources at a level to analyze, share and promote insights across the departments while maintaining accuracy of data, consistency and security[3].Collaborating with ease on the same used data, innovative creation on reports, and sharing reports among popular Microsoft Office apps like Microsoft Teams and Excel enabling all the ones in the organization to have data driven decisions made quickly that leads to strategic actions.

2.2 On-premises data gateway Application

On-premises data gateway (personal mode) is a version of on-premises data gateway that works only Power Bi. It doesn't work with any other application .It enables user to use Personal Gateway that need to be installed ,so the gateway on the local computer and permission to the local data is secured. Most of the scenarios can trigger a credential requirement. The most common thing is that On-premises data gateway users can install the on-premises data gateway on a another machine or another operating system than personal Power Bi gateway. There may be a difficulty in processing the data source and Power Bi would have not made a test connection such cases will be dealt by the On-premises data gateway application.

2.3 Power Bi web

After Publishing report to Power Bi Web, dashboard is created and shared, the report is updated with any modifications made further. The url link to publish the dashboard will become active immediately. Anyone from the organization who use the link can view it, after having access to the power bi web. Power Bi visualizations are allowed in Power Bi Web.

The users who has the link shared by the admin of the report have the reports published with visual, this do not require to have Power Bi visualizations to view the report[4]. Data modifications are automatically reflected in the final report or visual. When data is modified for an imported usage data model in Power BI, the service flows the data cache memory to modify the data as quickly as possible.

2.4 Acterys Power Synchronization tool

Acterys Power Bi Synchronization is a Windows app or cloud service that gives advantage to schedule the activation of any kind of Power Bi model or Power Bi data set, Power Bi Desktop model or data stream as a source, Acterys Power Bi tool synchronize all model details with leading platforms data warehouses like Microsoft SQL Server, Azure SQL Server, Synapse and Snowflake[5]. Acterys Applications are already configured apps with cloud accounting, Enterprise Resource Planning, Software as a Service systems that enables integration of data, dashboards for interactive business logic reports and planning cases.

3. POWER QUERY LANGUAGE

Power Query is transformation of data and engine for preparation purpose. Power Query has advantage that with a Graphical Interface (GI) for collecting data from various sources and a Power Query editor for implementing the transformations of data[6]. Since Power Query engine comes in handy many products and services, destination where the stored data depends on the place where Power Query was utilized.

After completing the import of data into data model ,Data Analysis Expression (DAX).DAX works with Microsoft SQL Server Analysis Services tabular models and pictures , Pivot tables in power point and in Excel, and Power Bi report creators. DAX contains a library of various functions and various operators that can be utilized to integrate and build formulae and expressions. DAX is similar to Excel formulae that is, it can be laerned with ease and helpful for new users to understand and learn it.

The Power Query Formula Language is a powerful mashup query language optimized for building queries that join data[7]. Power Query Formula Language is likely to be the first language that beginners actually use, even though the beginners or new users who are not aware of the fact that they are utilizing the Power Query Formula Language. This happens because when users import data into their data model, which is generally the former step while using Power Bi Designer, queries are most likely using Power Query Formula Language in the background[8].

Anyways, the Power Query Editor provides a powerful GI that enables users to do complex data mashups without having to check at the Power Query Formula Language- ode that the Query Editor created behind the stages.

4. Power Bi report creation process

The Export of Usage data happens from SAP Cockpit Online platform to a specific location in SharePoint online Cloud Platform, then the same Usage data will be imported to Power Bi Desktop App. There the report creation process takes place and necessary Servers with software tools.

The reports that are created are combined to create a Dashboard. Now the Dashboard is ready to be published.

The Dashboard is published to Vendor Management Reporting page which is a premium workspace in Power Bi web browser[3].To perform the publication access is required for the Vendor Management Reporting page required since it is a premium workspace that the HPE Global IT has.
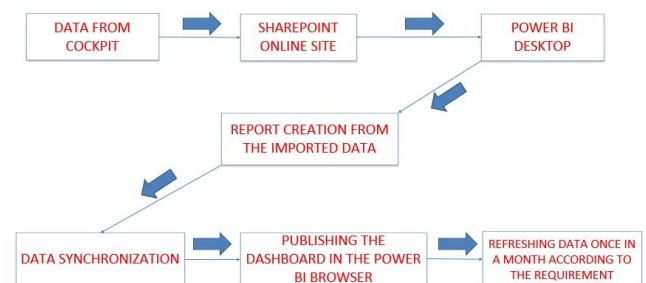

Fig:1 Flow Chart of Power Bi Transfer

Data Transfer, the process of report creation and the publishing process is shown in the Figure.1 Refreshment of the Dashboard will be scheduled once in a month since the Usage data of the Credits needs to be monitored. The refreshment is scheduled once in a month because the premium workspace cannot be utilized for daily basis which leads to inefficient way of utilizing premium workspace[9].

4.1 Export data from the SAP cockpit

SAP is an application in which data is stored in a database. This data can be accessed directly or by using SAP transactions. Many ways of exporting data exist as follows:

• Through the use of a custom program specifically built in order to export data from SAP

• By using SE16, SE11 or similar transactions. To be able to directly export the contents of a database table.

• Through the use of RFC functions exposed by SAP

• Through the use of export functionalities present in standard transactions

The first method that is "Through the use of a custom program specifically built in order to export data from SAP" is used to export data from SAP Cockpit which is efficient than other methods. The data of the Global accounts vendors/suppliers is exported from SAP cockpit to SharePoint online site which contains confidential information[10].Gaining access to the SAP Cockpit and SharePoint is must before accessing the data

4.2 Import data into the Power Bi desktop

This requires Power Bi Pro license which is given by IT team The data can be imported in three ways in which using SharePoint site is efficient.

• Excel sheets to import data.

• Use SQL server to integrate data with Power Bi

• Directly copy and paste our data into a blank table by creating a blank table

• Use the sample dataset provided by Power Bi

• Use the path of data file from SharePoint to import into Power Bi

Among all the methods above using the path of file from SharePoint is preferred for this project. This is because it is the efficient way while performing refreshments on the reports.

4.3 Report creation in Power Bi

The data imported into the power Bi desktop Application is then visualized, using pie chart or doughnut chart or bar graphs etc., Different reports will be created for analysis purpose like Run against Budget full tenant, Run against budget sub account etc. The reports created are as follows:

• Monthly Budget and Usage View

• Cross Charges Information

• Approved Services

• Run rate by sub-account and services

• Sri Biz Report

• CPEA Platform Usage vs Contractual Rights

Based on the requirements of this project the above reports have been created using Power Bi Desktop Application by acquiring the Power Bi Pro License after going through some Power Bi training sessions offered by the HPE Global IT.

4.3.1 Monthly Budget and Usage View

Necessary columns like Consumption which is the subtraction of allocated budget and the usage budget and Consumption status which indicates whether the particular budget is overly consumed or under consumed. A bar graph chart is added to picture the scenario between Monthly budget and Monthly usage. Filters are added in the report to view the desired content from the Monthly Budget and Usage View report. Helps to track budget usage in every month. If the consumption is in green, tells that the budget is still left that can be used in next month. If the consumption is in red that tells the budget is overly consumed in respective month.

The data from SAP Cockpit Usage data is merged with Sub-account owner data by using the primary key that is sub account which is available in both the data. This merged data is again merged with the budget data that contains the allocated credits to the different budget[11].Expanding the merged data to and selecting the required columns after each merge yields the Monthly Budget and Usage View report.

4.3.2 Cross Charges Information report

Cross charge column is added for confirming whether the given budget for particular month is cross charged or not. Filters are added in the report to view the desired content from the Cross Charges Information report. Pie chart is added in this report for picturing the Cross charged amount and yet to cross charge amount. The data from SAP Cockpit Usage data is merged with Sub-account owner data by using the primary key that is sub account which is available in both the data[8].This merged data is again merged with the budget data that contains the allocated credits to the different budget with the primary key budget which is available in the latest merged report and finally merging this report with the cross charged data with the budget as primary key, expanding the columns which are necessary gives the Cross Charges Information report.

4.3.3 Approved Services report

SAP Cockpit Usage data is merged with Sub-account owner data by using the primary key that is sub-account which is available in both the data[12].This merged data is again merged with the budget data that contains the allocated credits to the different budget with the primary key budget which is available in the latest merged report and finally merging this report with the service data with the

budget as primary key, expanding the columns which are necessary gives the approved Services report.

4.3.4 Run rate by sub-account and services report

The data from SAP Cockpit is merged with Sub-account owner data by using the primary key that is sub-account which is available in both the data[13].This merged data is again merged with the budget data that contains the allocated credits to the different budget with the primary key budget which is available in the latest merged report, expanding the columns which are necessary gives the Run rate by sub-account and services report. Pie charts are added to give flexibility to the user who views the report to have a quick review for run-rate by sub-account and run rate by services.

4.3.5 Sri Biz report

The credit data from SAP Cockpit is merged with Sub-account owner data by using the primary key that is sub-account which is available in both the data. This merged data is again merged with the budget data that contains the allocated credits to the different budget with the primary key budget which is available in the latest merged report, expanding the columns which are necessary gives the SRI Biz report.

4.3.6 CPEA Platform Usage vs Contractual Rights report

The report Monthly Budget and Usage View report provides data for CPEA Platform Usage vs Contractual Rights report by giving the information of total usage of different budgets of different completed months[14].

Month of new budget purchase: Month of new budget purchase is the month in which the purchased contract amount will be consumed completely prior to the contract end date, this can happen due to Over consumption of credits by the sub-accounts[10].

Month of expiry: Month of expiry is the month in which the purchased contract amount will be left over by the end of contract, this can happen due to less consumption of credits by the sub-accounts. The expired amount can not be utilized after contract end date by the sub-account owner and the IT Sector will be paid back the same. Usually Month of expiry is the end of contract date[15].

This information is then processed and the average usage of the completed months is then forecasted[16] into future months .If the running total exceeds the contract amount a warning symbol is shown in the report, indicating to go for new budget purchase.

5. DATA SYNCHRONIZATION

The data in the Power Bi should be synchronized with the original data in SAP cockpit. The data refreshment takes place once in a month. The updated data file is exported to the SharePoint site by renaming it with the previous data file name. Acterys Power Sync tool for synchronizing Power Bi tables with SQL Server. The tool offers easy functions for planning, write back and integration of data and storage. With the Acterys data synchronization tool, can synchronize any Power Bi model, service or data flow with relational databases such as MySQL or SQL Server, both in the cloud and on premises[17].

E. Publication of Report The reports created in Power Bi Desktop Application will be published to Vendor Management Reporting page in the Power Bi Web. The Vendor Management Reporting page is a premium workspace page which requires access from the HPE Global IT to access it and to publish in it.

6. DATA REFRESHMENT

The data in the Dashboard needs to refreshed once in a month for having the updated information in the dashboard. Since premium workspace contains limited space to refresh, the refreshment of the dashboard is planned so that the premium workspace is utilized efficiently. The Dashboard is scheduled to refresh once in a month according to the requirement of the project. SQL server is utilized in this project for database connection. A gateway connection is needed to perform the refreshment of the dashboard. SQL database Gateway connection is utilized for performing refreshment on the Dashboard

3. CONCLUSIONS

Reports are created by using the tools available in the Power Bi and hence creating the Dashboard. Synchronizing the Dashboard gives the modified content in the Dashboard if there are any updates. Synchronization happens whiles performing scheduled refreshments which is fully automatic. Reports created in Power Bi Desktop Application are published in the Power Bi browser, to make the Dashboard available to view by the specific employees who got access to view.

The usage data of the future months can be updated in the Dashboard by scheduling refresh once in month(according to the requirement).Gaining Owner-ship of the Dashboard will allow the Power Bi pro License Users to make updates or Advancements in the Dashboard with new constraints. As far as India is concerned, more than 1000 companies are using it as a top product in data visualization and will continue to do so in the near future[18].

ACKNOWLEDGEMENT

REFERENCES

[1] Lennart Harnefors et al. "Robust Analytic Design of Power-Synchronization Control". In: IEEE Transactions on Industrial Electronics 66.8 (2019), pp. 5810–5819. DOI: 10.1109/TIE.2018.2874584. M. Young, The Technical Writer's Handbook. Mill Valley, CA: University Science, 1989.

[2] Richard C Schaefer. "The art of generator synchronizing". In: 2019 IEEE Pulp, Paper Forest Industries Conference (PPFIC). 2019, pp. 88–95. DOI: 10.1109/PPIC.2019.7523471.K. Elissa, "Title of paper if known," unpublished.

[3] Bin Wu and Lei Qin. "Design and implementation of business-driven BI platform based on cloud computing". In: 2021 IEEE International Conference on Cloud Computing and Intelligence Systems. IEEE. 2021, pp. 118–122.

[4] Lin Lin. "Research and Analysis on Key Technologies of Cloud Computing Platform Based on IPv6". In: 2020 IEEE International Conference on Power, Intelligent Computing and Systems (ICPICS). IEEE. 2020, pp. 181–183.

[5] Wei Hu et al. "Power BI for Impacts Analysis on Cost of Living Caused by Industry Prevalence in Smart Cities". In: 2019 3rd International Conference on Smart Grid and Smart Cities (ICSGSC). 2019, pp. 134–139. DOI: 10.1109/ICSGSC.2019.000-6.

[6] Jamás Vincen. "Introduction of Innovative SAP Development Solutions at University Level". In: 2020 IEEE 18th World Symposium on Applied Machine Intelligence and Informatics (SAMI). IEEE. 2020, pp. 171–174.

[7] Henry W. Davis and Leon E. Winslow. "Computational Power in Query Languages". In: SIAM Journal on Computing 11.3 (2019), pp. 547–554. DOI: 10.1137/0211044.

[8] Viorel Costin Banta and Dorian Cojocaru. "Development Center Tool a software application for change request management". In: 2021 17th International Conference on System Theory, Control and Computing (ICSTCC). IEEE. 2021, pp. 42–47.

[9] Bahareh Alami Milani and Nima Jafari Navimipour. "A comprehensive review of the data replication techniques in the cloud environments: Major trends and future directions". In: Journal of Network and Computer Applications 64 (2020), pp. 229–238.

[10] Geoffrey Fox and Shantenu Jha. "Conceptualizing a Computing Platform for Science Beyond 2021: To Cloudify HPC, or HPCify Clouds?" In: 2020 IEEE 10th International Conference on Cloud Computing (CLOUD). IEEE. 2020, pp. 808–810.

[11] Yanxin Xue. "The research on data synchronization of distributed real-time mobile network". In: 2019 International Conference on Computer Science and Software Engineering. Vol. 3. IEEE. 2019, pp. 1104–1107.

[12] Jiancheng Ni, Lianyong Qi, and Chao Yan. "A selection strategy supporting service outsourcing in cloud platform". In: 2021 Second International Conference on Cloud and Green Computing. IEEE. 2021, pp. 726–729.

[13] Alina Oprea and Michael K Reiter. "On consistency of encrypted files". In: International Symposium on Distributed Computing. Springer. 2019, pp. 254–268.

[14] Pedro Garcıa López et al. "Stacksync: Architecturing the personal cloud to be in sync". In: Research Paper), May 31 (2018), p. 20.

[15] Wei Hu et al. "Power BI for Impacts Analysis on Cost of Living Caused by Industry Prevalence in Smart Cities". In: 2019 3rd International Conference on Smart Grid and Smart Cities (ICSGSC). IEEE. 2019, pp. 134–139.

[16] Mokrane Bouzeghoub, Françoise Fabret, and Maja Matulovic-Broqué. "Modeling the Data Warehouse Refreshment Process as a Workflow Application." In: DMDW. Vol. 19. 2019, p. 6.

[17] Tamás Orosz. "Analysis of SAP Development tools and methods". In: 2021 15th IEEE International Conference on Intelligent Engineering Systems. IEEE. 2021, pp. 439–443.

[18] Fabio Casati et al. "Conceptual modeling of workflows". In: International Conference on Conceptual Modeling. Springer. 2019, pp. 341–354