AN EFFICIENT DATA AGGREGATION SCHEME FOR PRIVACY-FRIENDLY DYNAMIC PRICING-BASED BILLING AND DEMAND-RESPONSE MANAGEMENT

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ABSTRACT - An efficient data aggregation scheme for privacy-friendly dynamic pricing-based billing and demand response management may be a metered billing or pay-as-you-go pricing model, which allows customers to only pay for what they've used in each billing cycle. Basically, the customer uses a product or a service. The company providing the product or service has a metering system in place to track usage. The customer then pays a fixed price plus the charges for what they’ve used every billing cycle. Traditionally, this monetization model is adopted when a business has a clear unit of measurement associated with how much of its product or service a customer uses. But in this billing system, this kind of usage-based pricing often includes additional dimensions. Because it’s not only the rate of customer consumption that matters; it’s also the value associated with the product, which is called the value metric. Having a basic unit to measure usage that’s not time-, user-, or seat-based is a primary differentiator of the usage-based billing model. Also, unlike the user-based model, where customers pay in advance for increasing seats or usage time, usage-based billing only charges customers post-usage.

I.INTRODUCTION

While some businesses would prefer to charge clients based on their usage or consumption of these items and services, the majority of businesses charge a single, standard price for their products or services. Traditional business models are being replaced by flexible, consumption-based ones that let customers consume products or services and pay for them based on how much they use. Reengineering the value chain and realigning teams to the new business model are both necessary during this substantial transformation. The cost of telecommunications services is determined by user consumption. Users only pay for what they use, aside from a base service fee. When customers make more API requests than what is included in their subscription base limit, for example, some SaaS companies charge overage fees.

As a result, a client is charged a flat rate for their plan plus any usage fees or overages. You can accurately charge your consumers based on how much of your goods and services they use using a metering billing solution. Plans and add-ons are examples of metering components. These metered components are established as part of subscriptions, and invoices for those subscriptions are generated in a pending condition, in the as-a-service economy, the competencies and technological foundations required to support a flexible consumption model (FCM). We also came to realise the need for revenue recognition and subscription billing capabilities for FCM transformations. These capabilities are crucial enablers of the corporate shift to consumption-based models, coupled with offer management, CPQ (configure, price, quote), contract management, entitlement management, and taxation. We will discuss the distinctions between subscription billing and regular billing in this article, as well as some key principles for implementing subscription- or consumption-based models.

In FCM business models, subscription billing and revenue management allow consumers to pay for goods and services based on what they use (pay-as-you-go), scale their service usage up or down based on business needs, and have their subscriptions renew automatically. Organizations must develop new subscription billing and recurring revenue management capabilities to meet the rising demand for these flexible consumption models.

II.DTH

Direct-to-home television is known as DTH. DTH is the practise of receiving satellite signals at one's residence using a personal dish. DTH eliminates the Putting the broadcaster in need and the local cable operator in close communication with the customer.

2.1 PROPOSED SYSTEM

DTH operators use integrated and automated software called the DTH billing system. Customers of DTH providers will receive TV channels, for which they must pay a monthly fee. DTH systems keep track of their subscribers, users, and usages because of the automation this software offers. The manual processing of their company activity records might occasionally result in numerous errors or misuse opportunities. Maintaining their monthly collection information, such as who was paid and who wasn't, is challenging. They occasionally could not be aware of their new clients, as well as their assets and equipment. A competent metered billing system is necessary to deploy a usage-based billing system because it can reliably track and manage user consumption data and transform it into legible billing data for invoice generation. With the help of this billing system, the admin may easily bill clients for the goods and services they use.
2.2 ENCRYPTION AND TRANSMISSION
To prevent individuals from downloading the video for free, the supplier must encrypt it after it has been compressed. Digital data is encrypted so that it can only be decrypted, or turned back into usable data, by a receiver that has the right decoding satellite receiver, together with the necessary decryption algorithm and security keys. The broadcast centre beams the compressed and encrypted signal directly to its satellites after compression and encryption. The signal is captured by the satellite, amplified, and transmitted back to Earth, where the consumer can receive it.

III. TESTING AND IMPLEMENTATION
It involves testing software with the goal of identifying and ultimately fixing bugs. Because web-based systems and applications are network-based and interact with a wide range of operating systems, browsers, hardware platforms, and communication protocols, this core principle does not change for web apps. Thus, finding problems is a major challenge for web apps.

3.1 TESTING ISSUE:
- Client GUI must be taken into account.
- Considerations for the target environment and platform
- Issues with distributed databases
- Considering distributed processing

3.2 TESTING METHODOLOGY
Before the system is put into live operation, it must first undergo system testing to make sure it performs as expected in terms of accuracy and efficiency. It demonstrates that all of the programs work together. A test plan that includes various essential actions and steps for program execution, string, system, and user acceptability testing is necessary for system testing. A successful adoption of a new system depends on the installation of newly designed packages. The testing phase of software development is crucial. When a system is tested after implementation, it should serve as a confirmation that everything is in order and a chance to demonstrate to the users that the system performs as planned. It represents the majority of the technical work put into the software development process.

The testing phase of testing involves comparing the code to the functional requirements. The success of the system goals depends on testing. Error detection is the goal of testing. A number of test steps, including the unit test, integration test, validation test, and system test, were planned and carried out to achieve this goal.

IV. DESIGN FLOW
The process of converting the user-oriented is known as input design, input for an electronic format. The input design aims to make data entry simpler, logical, and error-free. The input design regulates input data error levels. The output quality of the system is based on the input quality. One of the most crucial stages of system design is input design. The process of planning and designing input so that it is accepted by the system with the minimum amount of unnecessary information is known as input design.

The following goals are taken into account while designing inputs:
- Type of input processing; flexibility and completeness of validation procedures.
- handling the input documents' properties.
- Screen design that ensures the input relationship with files is accurate and effective.
- Considering error management, controls, batching, and validation methods is part of careful input design.
- Features of the input design can either guarantee the system's dependability and create results from valid data or they can produce inaccurate information.

4.1 DESIGN FLOW DIAGRAM
Making a data flow diagram is the first step (DFD). The DFD was initially created by Larry Constantine as a mechanism to visually describe system requirements.

A DFD, commonly referred to as a "bubble chart," is used to explain system requirements and indicate significant changes that will be turned into programmes in system design. Therefore, it is at this point in the design phase that the required specifications are functionally broken down into their most basic components. Data flow diagrams are meant to serve as a semantic link between users and system developers.

The illustrations are:
- Graphic, omitting much text;
- Rather than physical models that show how a system works, logical representations that model what a system does
- Detailed systems can be shown in a hierarchy, and less jargon makes it easier for users to grasp and review.
Before the system is put into live operation, it must first undergo system testing to make sure it performs as expected in terms of accuracy and efficiency. It demonstrates that all of the programmes work together. A test plan that includes various essential actions and steps for programme execution, string, system, and user acceptability testing is necessary for system testing. A successful adoption of a new system depends on the installation of newly designed packages.

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### 4.2 ADVANTAGE

- Automate your billing process to simplify metered billing.
- Combining the daily use statistics
- modifying your pricing strategy to include usage-based fees.
4.3 BETTER CUSTOMER EXPERIENCE
Since flat rates tax consumers for unused resources, they are a better value for low- to medium-volume users. Additionally, it saves a lot of money if the consumer only uses the product seasonally in the case of subscription billing that automatically renews. A clear charging policy also demonstrates financial responsibility and a dedication to the client, both of which foster loyalty and confidence.

4.4 REVENUE GROWTH
Good optimization in terms of customer success, upsell chances, and overall revenue entails matching price points with consumption in real time. According to research, public companies that use usage-based pricing expand more effectively and generate income more quickly.

V. CONCLUSION
In the past, businesses with clearly defined units of measure for the usage of their products frequently used usage-based billing. The system allows for the implementation of dynamic pricing strategies. You can increase the revenue from your distinctive offers more quickly. Good optimization in terms of customer success, upsell chances, and overall revenue entails matching price points with customers with unmatched transparency.

REFERENCES