

Batch Processing in Business Operations

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Abstract— The success of organization depends on how the business process is designed. A constructive and efficient design is vital. There is need for automation as many of these business process includes high level of repetitions. When each process in business has independent presence, then synchronized execution is beneficial. This is called batch processing. It helps in both performance and accuracy. This paper provides a insight on requirements and framework to automate processes in billing system on service network.

Keywords—Business process model, multihoming, batch processing.

I. INTRODUCTION

In an organization there are multiple operations that are performed repeatedly. This requires a lot of time, human effort and resources. If we take example of clothing industry, sewing same kinds of cloths again and again would take a great deal of human resource and time. With introduction of automated assembly, cloths of similar kinds were produced in accelerated rate. Similarly, the Billing processes can be designed in such a way that similar independent operations are executed at one shot. This is Batch processing.

In practice, the batch processing technique is either hard coded or done manually. When the process is done manually for long time, the rules to automate the process may be unclear.

In this paper effort is made to clearly understand the requirement for batch processing and way to implement it in standard way, i.e., over service network. Broadband has changed the way organizations work. With high internet connectivity, organization can reach large number of customers, thus helping in expansion of organization. Currently internet billing system is facing problems like tariffs, disconnection, issues with infrastructure, fluctuation in speed. An efficient model has to be designed to overcome these problems.

This paper provides a framework that captures the aspects that have to be considered when designing a batch processing approach to the payment and billing process. It also compares current and future solutions. It also describes how to implement efficient system on a service network.

II. LITERATURE SURVEY

A. Jianxun Liu and Haiyun Chen

This paper [1] provides the knowledge required to implement batch services in Workflow management .Workflow management system is used in organizations to model and execute business processes. It describes the problems with traditional workflow management system to support batch service

B. B D Kumar and G. Vasanth

This paper [2] provides overview of the technologies available in billing system and strategies to implement billing for enterprise network

C. S. Das, A. Kim, Z. Tingle and Christena Nippert-EngAll

This paper [3] presents a user focused study. It includes details about the target users, which is not often taken into consideration. It calls for better reporting and recruiting practices.

D. EBaswaraju Swathi, Abhishek Kumar, Ishu Kumar

This paper [8] talks about automated payment processing , security in billing system and storage of bill details. It focuses on main steps to be considered while making billing system digital.

III. NEED FOR BATCH PROCESSING

A. Listing basic scenarios where Batch processing is required

- Certain events done would trigger several activities in the system which sends notification to customers. Frequent notification might bother the customers. So these events can be batched together, forming a single notification to improve customer experience.
- Invoice may need to be generated immediately on request of the customer. In many scenarios, the details are fetched manually and sent. Instead, if all manually done processes can be batched together and done at once.
- Chartered accountants have multiple clients. They may use Billing software handle operations on their accounts. There may be scenarios where they might have to perform same operations on all accounts. Performing same operation on each account will be tedious and error prone. Providing single interface to perform the repeated process at once will improve efficiency.

B. Developer needs for batch processing.

- Speed to benefit developer productivity
 - Price performance optimized technologies
 - Built-in frameworks to minimize elementary setup
 - Less time managing infrastructure.
- Baseline, Sample Developer Experience

- Integrated workflows across data, analytics & ML
- Enables self service
- Maintain everything as code

IV. METHODOLOGY

A. Async Batch processing

- In Async Batch processing, operation that are independent are batched together. It is like fire and forget. The independent batched are distributed between systems. These systems are interconnected. If the second batch process must be started after the first batch process, then call batch 2 ‘On-complete’ of first batch process.
- Each Asynchronous node represents the event. When client request is made, the node gets invoked.
- The async process improves independence. The idle time wasted is reduced. Batch request efficiency is improved from Async technique.

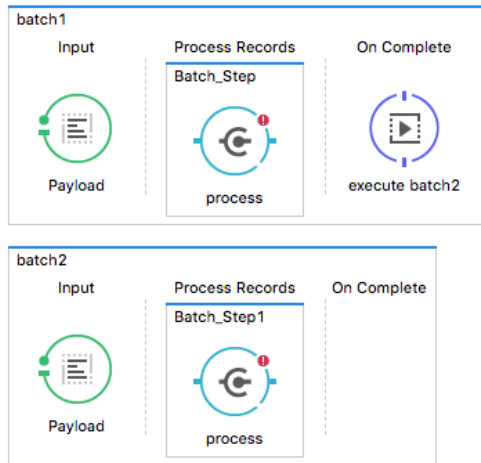


Figure 1: Async Batch processing

B. Sync Batch processing

- In sync processes, the second task waits for the first task to be done. The second task starts its processing only after the first task.
- The jobs are bundled into one batch, but their execution is in synchronizing with the other task
- Though asynchronous seems a good choice for time saving and efficiency, synchronous is preferred many times. When the information from one process is

needed by another process, the technique used is sync. The operation must be performed concurrently to guarantee that the application receives the information it requires from the workflow before the workflow is completed and the application is closed.

V. IMPLEMENTATION OF BATCH ADJUSTMENT

A. Gathering the requirements from the user

The accountant might need to make some operations to be done to all accounts together. Currently, accountant does same operation to each accounts separately. This may be tiresome for accountants, and it might also lead to errors. The system must be such a way that it makes the work of accountant easy.

The process that need to be batched together are getting account number and bill details of all accounts in one UI. This can be done by creating an API that hits the DB containing parent account and gathers all the information of client under that account. Create an API that makes adjustment to all the accounts simultaneously.

The accountant should be confident to use the tool. So after the adjustment, the UI must reflect the changes made to each account.

Field	Type	Extras
account_id	varchar	Primary key,
Bill-id	varchar	-
time	datetime	current_timestamp
message	varchar	-
details	blob	-

Table 1: Events table schema

B. Breaking the task into smaller individual modules which can be coded separately

The landing pages are also hosted from the same server using SMTP servers. Each landing page URL must have a unique identifier which defines the user that clicked on it. A 4 character long randomly generated short string represents the target user. This is unique to every user that the detail is sent out to, for a particular campaign. If the aim to collect data that is submit in the landing page, a form with an empty action and method as POST must be present – this allows the server to handle the POST event and capture the data that was submit. If redirecting to other external webpages, a redirect query parameter must be present, with it having the URL for the

original webpage. In total, the URL landing page would look like,

`https://<hostname>/?cid=xx&uid=yyyy&redirect=xyz.com`

The API can be done separately using stub and then after completion of that together can be batched.

C. Capturing events

By handling the *GET* and *POST* methods on the landing page URL, one can capture the events that happen in real time. As and when the user clicks a link in the email, a *GET* request is placed to the landing page URL. Since our server would be listening to this, the clicked link event can be captured for the particular user. The endpoint for the server to listen to would be,

```
{path:.*}
```

which listens to all combinations of the landing page URL.

If the method was *GET*, then there are two different scenarios.

1. Presence of a redirect query parameter: In this case, the user intends to go to an external webpage, but we need to capture the event before actually redirecting the user to it. The redirect query parameter is read and its value which denotes the original link is used to the redirection, after actually saving the details in a *Clicked External Link* event.
2. Absence of a redirect query parameter: In this case, the landing page is loaded, and the event *Clicked Link* is captured. It still has the campaign identifier and target user identifier as its query parameters.

If the method was *POST*, then the submitted data is sent along with the request in its body. We read all the values and save the details in a *Submitted Data* event.

The query to get all accounts looks like,

```
Select X from /item where (F1 in (V1, act1, act2, act3, act4, act5, act5 ..));
```

VI. CONCLUSION

This paper presents why there is a need for batch processing in business procedures. The time and human efforts wasted can be utilized in improving the service

of organization. The developer productivity increases with use of batch processing. Batch processing must be considered when modelling enterprise approaches for performance evaluation functions due to its implications for process performance. To gain insight into batching behavior, this work is a first step toward a more comprehensive help for the retrieval of batch processing understanding from an event log by identifying and defining various types of batch process.

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