SpringOne

Application Modernization: Migrating mainframe apps to the cloud using Spring

September 1–2, 2021

springone.io

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GLENN RENFRO

Works on – Spring Cloud Data Flow, Spring Cloud Task, & Spring Batch

Board of Directors – AJUG & DevNexus

Twitter - @cppwfs

Agenda

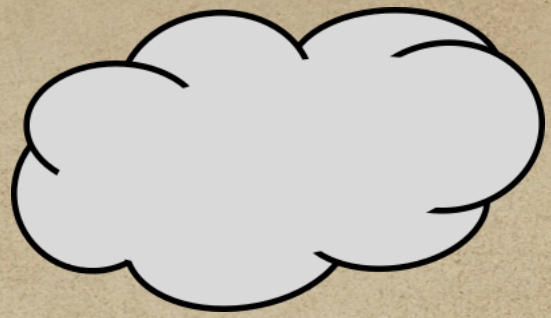
- Mainframe will surely be gone by now
- Strategies (the path)
- Streaming info out of the mainframe
- Batch apps
- Accessing the data
- Keeping the footprint small

My Story

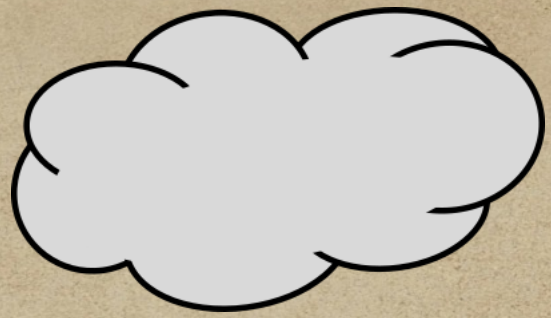
Why Migrate?

Big Bang

Strangler Pattern



Strangler Pattern




Our Company Island
Java Sea
Existing Data Mountains
Mainframe-ville
Spring Cloud Stream
Data Lake
Flat File Forest
Batchington
Query Bay
Graphql-town

Our Quest

- Stream data from mainframe to new datastore
- Migrate batch jobs
- Give services access to data to services


Our Company Island
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First Steps

How do we get our data from mainframe's DB?

How do we keep our data in sync from the mainframe?

Chapter One: Following The Stream


Our Company Island
Existing Data Mountains
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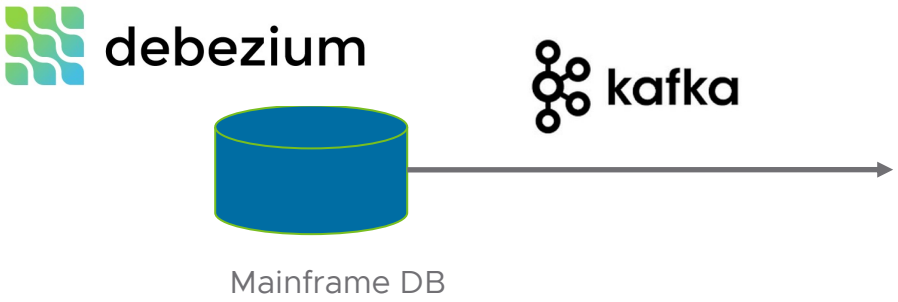
Query Bay

What are the components to our stream?



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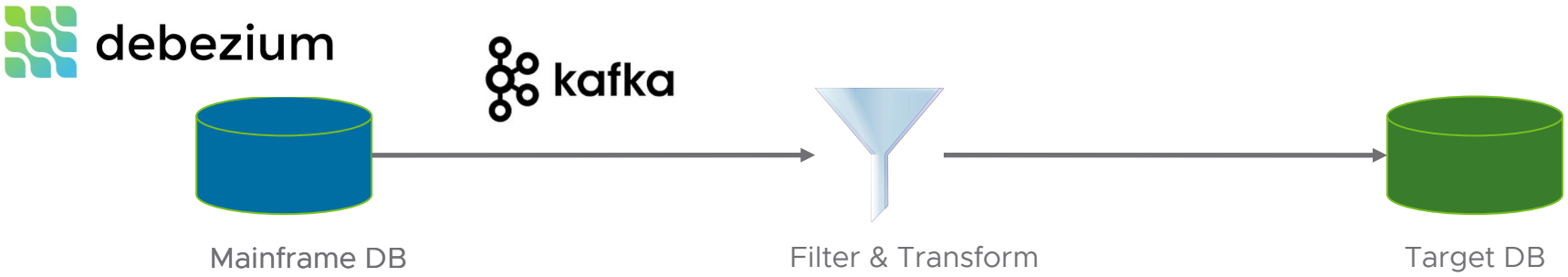

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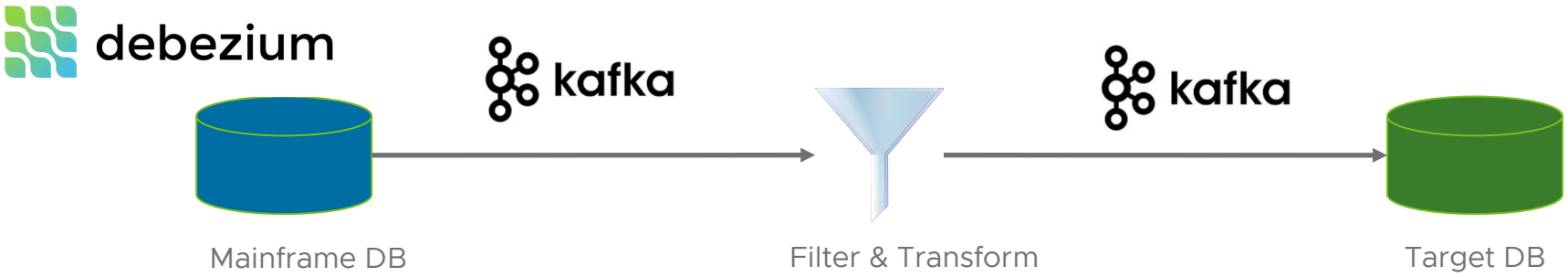

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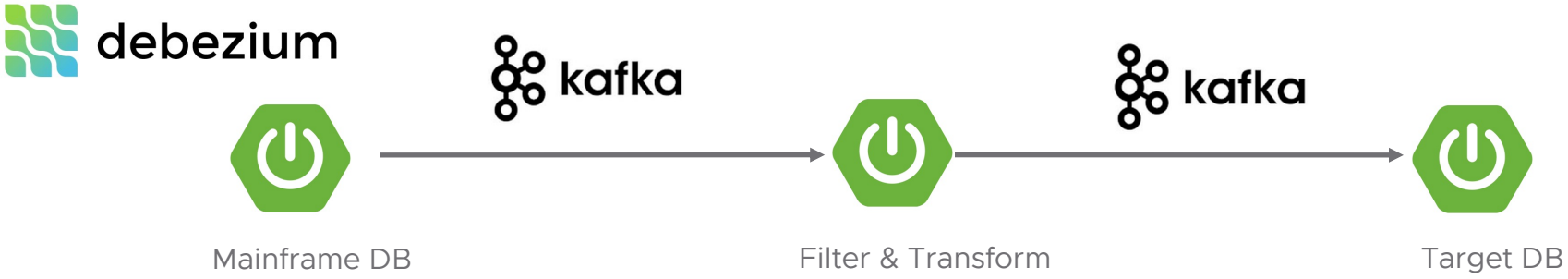
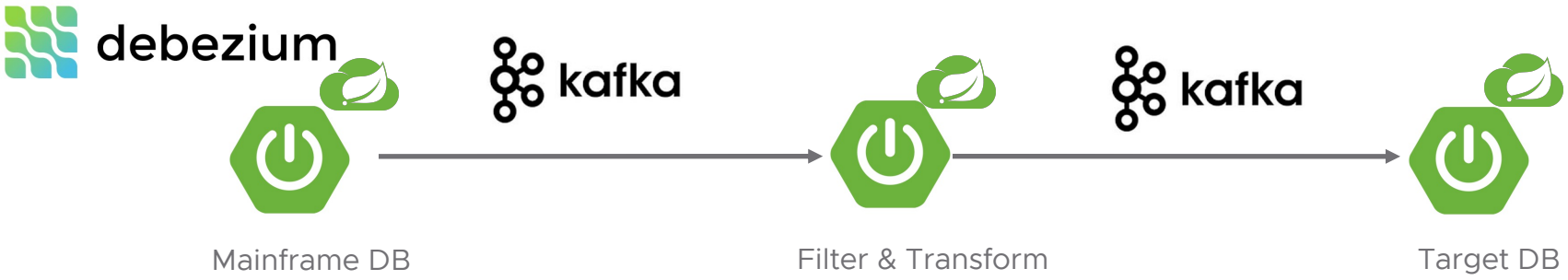


Spring Cloud Stream to the rescue



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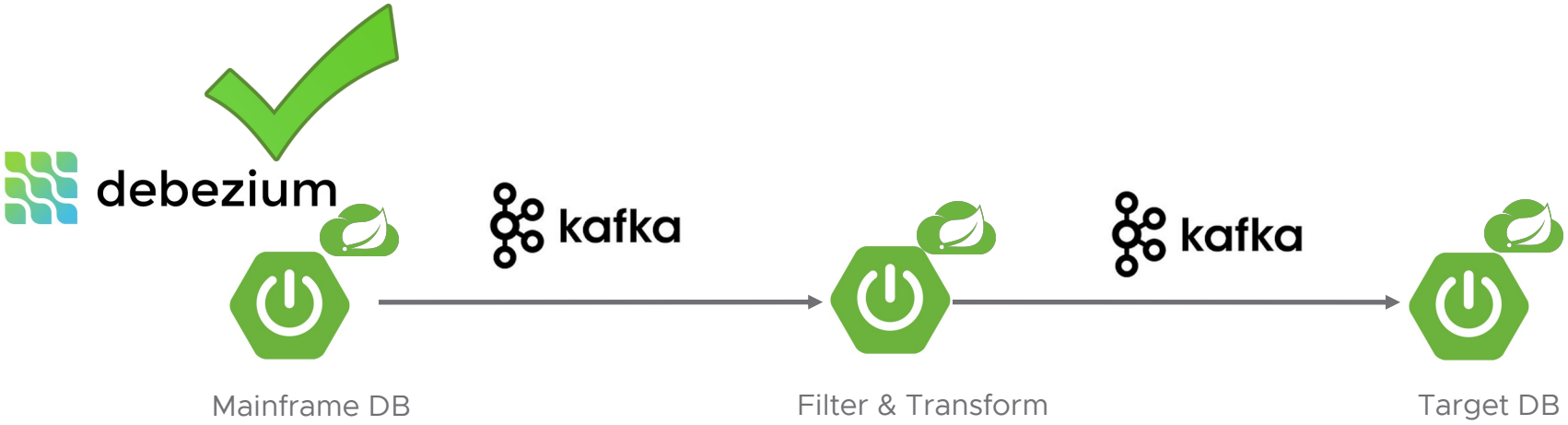

Spring Cloud Stream to the rescue

```
    <dependency>
        <groupId>org.springframework.cloud</groupId>
        <artifactId>spring-cloud-stream</artifactId>
    </dependency>
    <dependency>
        <groupId>org.springframework.cloud</groupId>
        <artifactId>spring-cloud-stream-binder-kafka</artifactId>
    </dependency>
    <dependency>
        <groupId>org.springframework.cloud.fn</groupId>
        <artifactId>filter-function</artifactId>
        <version>1.0.3</version>
    </dependency>
```

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```xml
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    <groupId>org.springframework.cloud</groupId>
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</dependency>
<dependency>
    <groupId>org.springframework.cloud.fn</groupId>
    <artifactId>filter-function</artifactId>
    <version>1.0.3</version>
</dependency>
```

```java
@Bean
public Function<String, String> transform() {
    return (payload) -> {
        JsonNode jsonNode = getJsonNode(payload);
        String result;
        String tableName = jsonNode.get("source").get("table").asText();
        if (tableName == null || jsonNode.get("after") == null) {
            result = translateOthers(jsonNode);
        }
        else {
            if (tableName.equals("plans")) {
                result = translatePlan(jsonNode);
            }
            else if (tableName.equals("users")) {
                result = translateUser(jsonNode);
            }
            else if (tableName.equals("call_usage")) {
                result = translateCallUsage(jsonNode);
            }
            else if (tableName.equals("data_usage")) {
                result = translateDataUsage(jsonNode);
            }
            else {
                result = translateOthers(jsonNode);
            }
        }
        return result;
    };
}
```

Spring Cloud Stream to the rescue

```xml
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</dependency>
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</dependency>
<dependency>
    <groupId>org.springframework.cloud.fn</groupId>
    <artifactId>filter-function</artifactId>
    <version>1.0.3</version>
</dependency>
```

```yaml
spring:
  cloud:
    stream:
      function:
        definition: transform|filterFunction
        bindings:
          transformfilterFunction-out-0: output
          transformfilterFunction-in-0: input

filter:
  function:
    expression: headers[usage]=='true'
```

```java
@Bean
public Function<String, String> transform() {
    return (payload) -> {
        JsonNode jsonNode = getJsonNode(payload);
        String result;
        String tableName = jsonNode.get("source").get("table").asText();
        if (tableName == null || jsonNode.get("after") == null) {
            result = translateOthers(jsonNode);
        }
        else {
            if (tableName.equals("plans")) {
                result = translatePlan(jsonNode);
            }
            else if (tableName.equals("users")) {
                result = translateUser(jsonNode);
            }
            else if (tableName.equals("call_usage")) {
                result = translateCallUsage(jsonNode);
            }
            else if (tableName.equals("data_usage")) {
                result = translateDataUsage(jsonNode);
            }
            else {
                result = translateOthers(jsonNode);
            }
        }
        return result;
    };
}
```


Demo


Java Sea
Existing Data Mountains
Mainframe-ville
TapTown
Tap
Cloud Stream
Spring
Flat File Forest
Data Lake
Batchington
Query Bay
Graphql-town

Chapter Two: Off to Batchington


Our Company Island
Existing Data Mountains
Java Sea
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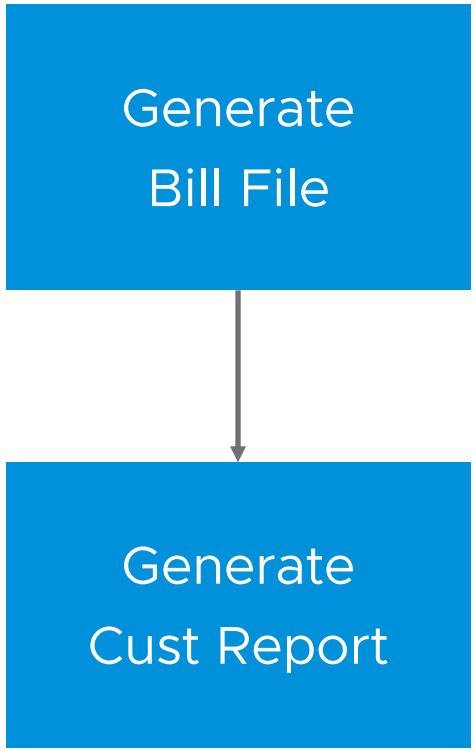
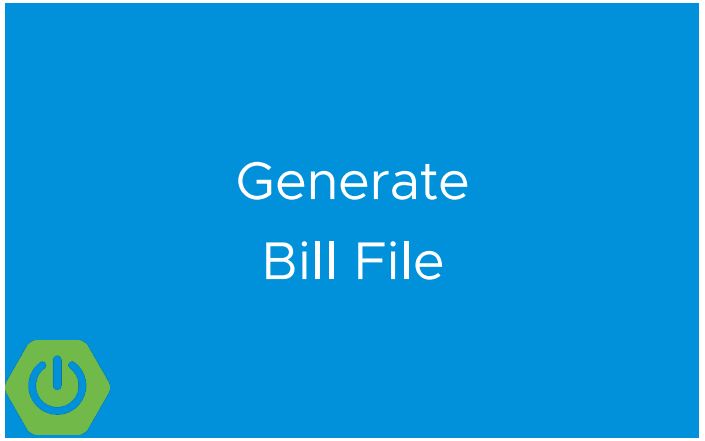
Batch Jobs

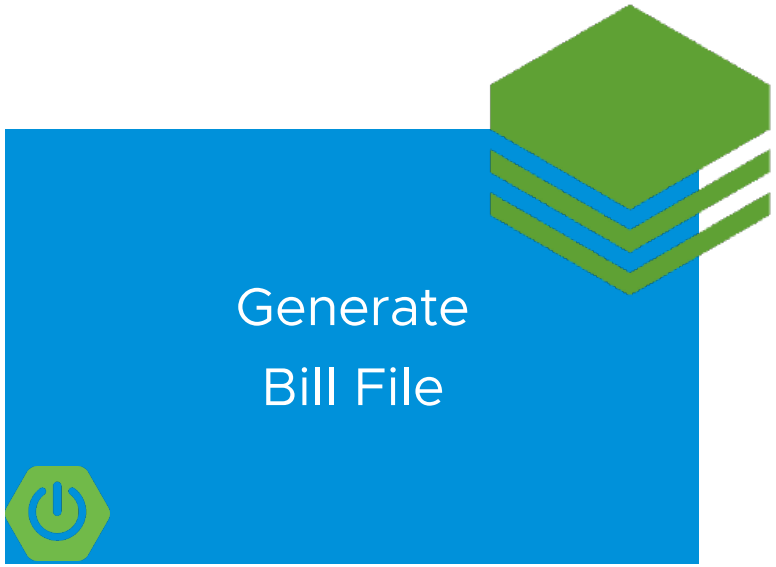



```
//MYJCL JOB ,'GLENN',CLASS=6,NOTIFY=&SYSUID
//*
//STEP1 EXEC PGM=GENBILL
//INPUT1 …
//OUTPUT1 DD DSN=BILL.OUTPUT,…
//*
//STEP2 EXEC PGM=BILLREP
//INPUT2 DD DSN=BILL.OUTPUT,…
//OUTPUT2 DD DSN=BILL.REPORT,…
```

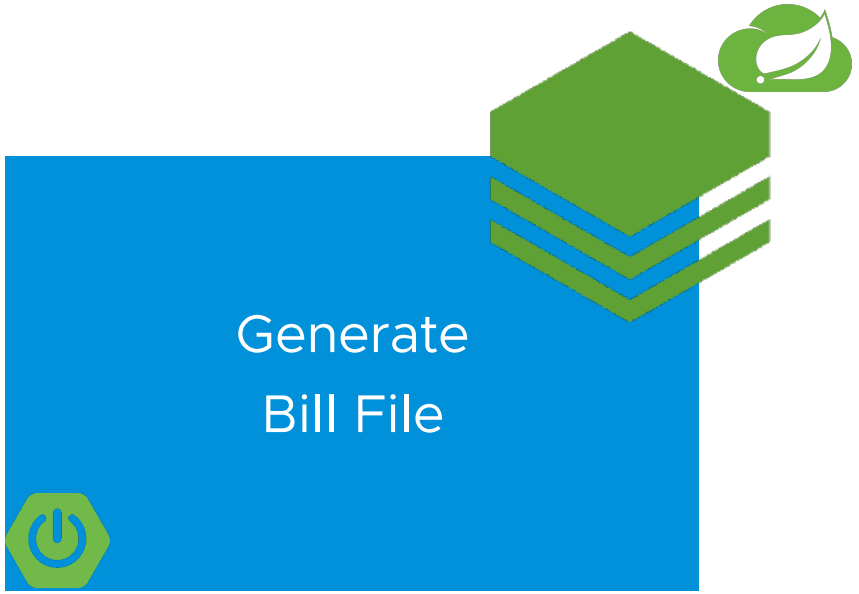
Batch Jobs



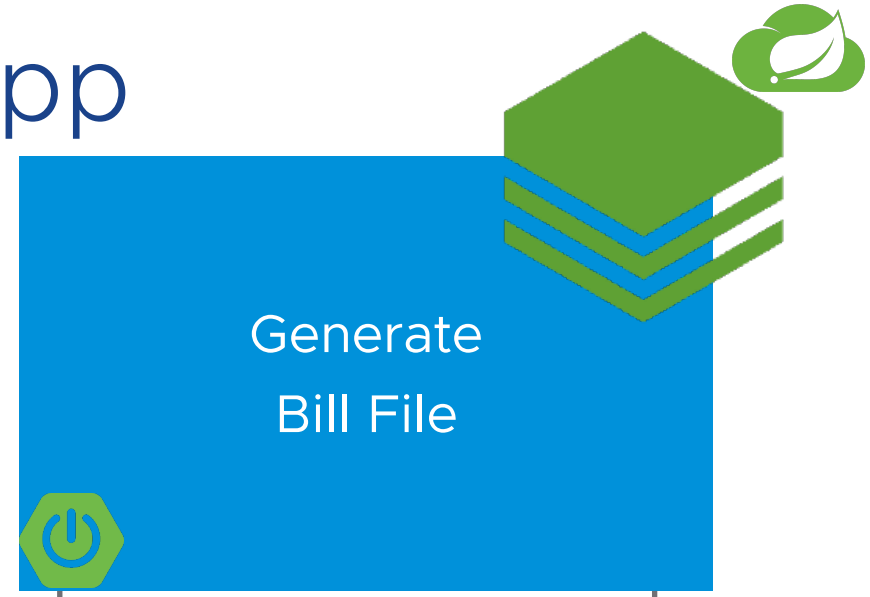
Batch Jobs

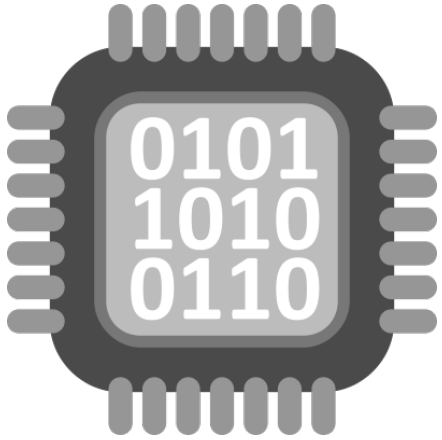


Batch Jobs

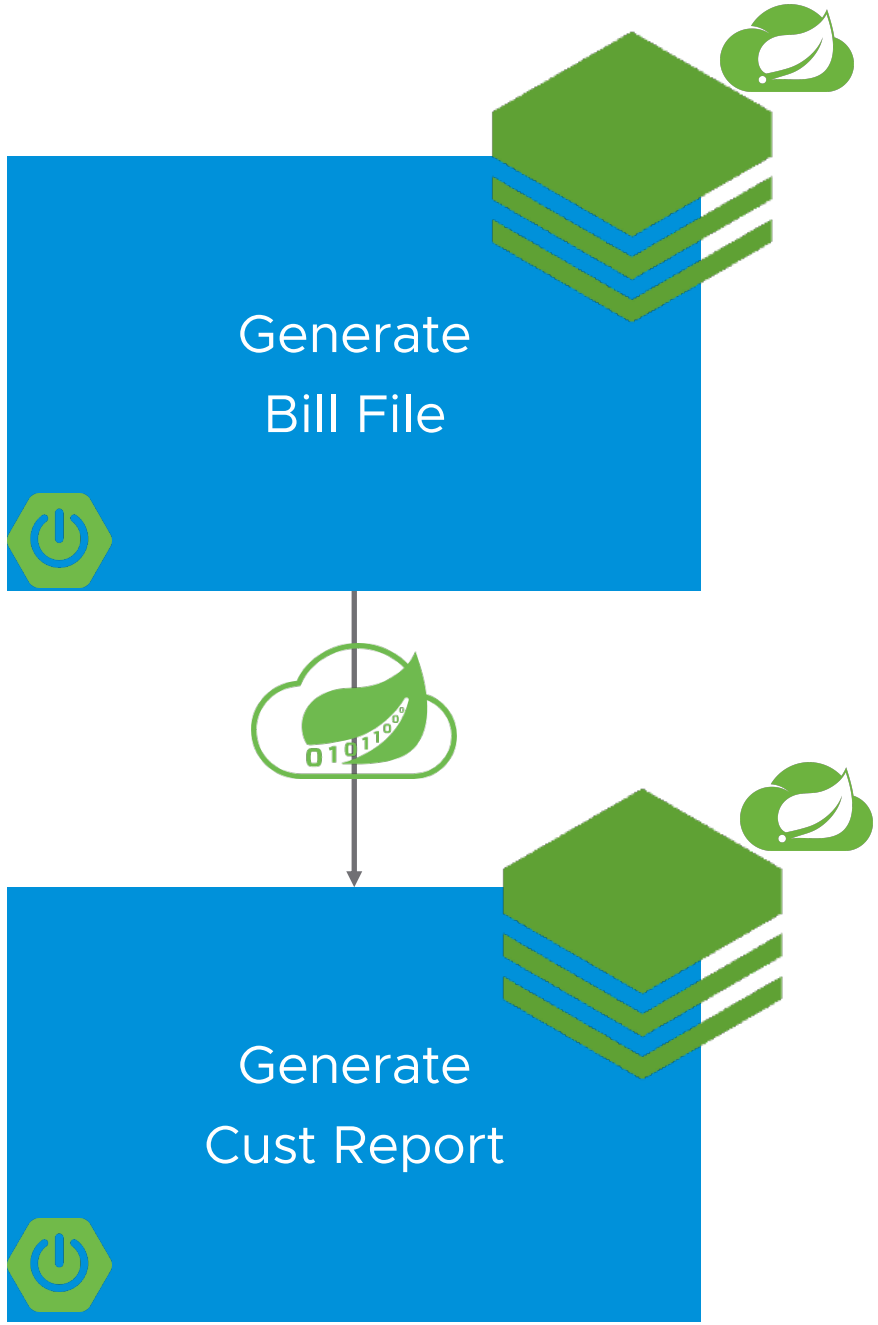


Focus on BillRun App





Batch Jobs




Demo

Chapter Three: Query Bay


Our Company Island
Existing Data Mountains
Java Sea
Mainframe-ville
Spring Cloud Stream
Data Lake
Flat File Forest
Batchington
Query Bay
Graphql-town
userId
planId
firstName
lastName

GraphQL

GraphQL is a relatively new but well-established alternative to REST for exposing web APIs that is rapidly becoming a popular choice for web and mobile clients due to its ease of use and degree of control.

GraphQL Syntax - Query

Retrieve the first 10 user ids and their associated plan ids.

```
query{users(count: 10){ id,planId }}
```


```
{
  "data": {
    "users": [
      {
        "id": 1,
        "planId": 1
      },
      {
        "id": 2,
        "planId": 1
      },
      {
        "id": 3,
        "planId": 1
      }
    ]
  }
}
```

GraphQL Syntax - Query

Retrieve the first 10 user ids and their associated plan ids.

```
query{users(count: 10){ firstName,lastName }}
```


```
{
  "data": {
    "users": [
      {
        "firstName": "doe",
        "lastName": "jane"
      },
      {
        "firstName": "doe",
        "lastName": "john"
      },
      {
        "firstName": "doe",
        "lastName": "pat"
      }
    ]
  }
}
```

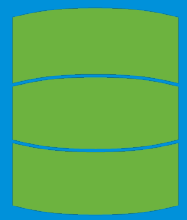
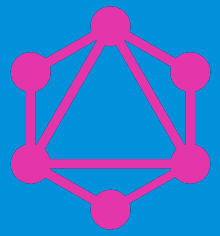
GraphQL Syntax - Mutate

Create a new User and have the result contain the new userId

```
mutation {createUser( lastName: \"doe\", firstName: \"ruby\", planId: 1) { id } }"}
```

```
{
  "data": {
    "createUser": {
      "id": 1162
    }
  }
}
```

Spring GraphQL

	
Entities	Queries
Repositories	Mutations
Services	GraphQLS Configuration


Demo

Application Size

Stay Connected.

Spring For Architects

https://springone.io/2021/sessions/spring-for-architects

Proactively Designing for Diversity, Equity, and Inclusion

https://springone.io/2021/sessions/proactively-designing-for-diversity-equity-and-inclusion

@s1p #springone

Thank You!

https://github.com/cppwfs/S12021Demo