Enhance Flows with Apex and Lightning Web Components

Flow + Apex + LWC = A Perfect Combination!

Dreamforce 2023

Forward Looking Statements

This presentation contains forward-looking statements about, among other things, trend analyses and future events, future financial performance, anticipated growth, industry prospects, environmental, social and governance goals, and the anticipated benefits of acquired companies. The achievement or success of the matters covered by such forward-looking statements involves risks, uncertainties and assumptions. If any such risks or uncertainties materialize or if any of the assumptions prove incorrect, Salesforce's results could differ materially from the results expressed or implied by these forward-looking statements. The risks and uncertainties referred to above include those factors discussed in Salesforce's reports filed from time to time with the Securities and Exchange Commission, including, but not limited to: impact of, and actions we may take in response to, the COVID-19 pandemic, related public health measures and resulting economic downturn and market volatility; our ability to maintain security levels and service performance meeting the expectations of our customers, and the resources and costs required to avoid unanticipated downtime and prevent, detect and remediate performance degradation and security breaches; the expenses associated with our data centers and third-party infrastructure providers; our ability to secure additional data center capacity; our reliance on third-party hardware, software and platform providers; the effect of evolving domestic and foreign government regulations, including those related to the provision of services on the Internet, those related to accessing the Internet, and those addressing data privacy, cross-border data transfers and import and export controls; current and potential litigation involving us or our industry, including litigation involving acquired entities such as Tableau Software, Inc. and Slack Technologies, Inc., and the resolution or settlement thereof; regulatory developments and regulatory investigations involving us or affecting our industry; our ability to successfully introduce new services and product features, including any efforts to expand our services; the success of our strategy of acquiring or making investments in complementary businesses, joint ventures, services, technologies and intellectual property rights; our ability to complete, on a timely basis or at all, announced transactions; our ability to realize the benefits from acquisitions, strategic partnerships, joint ventures and investments, including our July 2021 acquisition of Slack Technologies, Inc., and successfully integrate acquired businesses and technologies; our ability to compete in the markets in which we participate; the success of our business strategy and our plan to build our business, including our strategy to be a leading provider of enterprise cloud computing applications and platforms; our ability to execute our business plans; our ability to continue to grow unearned revenue and remaining performance obligation; the pace of change and innovation in enterprise cloud computing services; the seasonal nature of our sales cycles; our ability to limit customer attrition and costs related to those efforts; the success of our international expansion strategy; the demands on our personnel and infrastructure resulting from significant growth in our customer base and operations, including as a result of acquisitions; our ability to preserve our workplace culture, including as a result of our decisions regarding our current and future office environments or work-from-home policies; our dependency on the development and maintenance of the infrastructure of the Internet; our real estate and office facilities strategy and related costs and uncertainties; fluctuations in, and our ability to predict, our operating results and cash flows; the variability in our results arising from the accounting for term license revenue products; the performance and fair value of our investments in complementary businesses through our strategic investment portfolio; the impact of future gains or losses from our strategic investment portfolio, including gains or losses from overall market conditions that may affect the publicly traded companies within our strategic investment portfolio; our ability to protect our intellectual property rights; our ability to develop our brands; the impact of foreign currency exchange rate and interest rate fluctuations on our results; the valuation of our deferred tax assets and the release of related valuation allowances; the potential availability of additional tax assets in the future; the impact of new accounting pronouncements and tax laws; uncertainties affecting our ability to estimate our tax rate; uncertainties regarding our tax obligations in connection with potential jurisdictional transfers of intellectual property, including the tax rate, the timing of the transfer and the value of such transferred intellectual property; uncertainties regarding the effect of general economic and market conditions; the impact of geopolitical events; uncertainties regarding the impact of expensing stock options and other equity awards; the sufficiency of our capital resources; the ability to execute our Share Repurchase Program; our ability to comply with our debt covenants and lease obligations; the impact of climate change, natural disasters and actual or threatened public health emergencies; and our ability to achieve our aspirations, goals and projections related to our environmental, social and governance initiatives.

Updated: September 28, 2022

Copyright

Andrés Pérez

Senior Manager, Solution Architect Lead

Joseph Flowers

Senior Manager, Learning Solutions Architect

Agenda

- Record-Triggered Flows
- Use Apex In Flows
- Use LWC In Flows
- Q&A

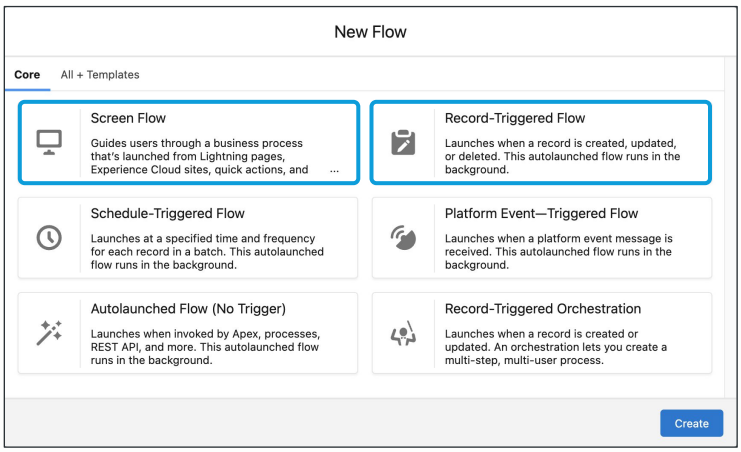
Exercise 0

Set up your environment for this session

Record-Triggered Flows

Code completion enhanced!

Types Of Flows



What Is A Record-Triggered Flow?

Automatically executed on DML events

Fast Field Updates

Update fields on the record that triggers the flow to run. This high-performance flow runs *before* the record is saved to the database.

Actions and Related Records

Update any record and perform actions, like send an email. This more flexible flow runs *after* the record is saved to the database.

Differences: Record-Trigger Flows vs. Apex Triggers

	Flows	Apex
Stops DML transaction (validations)		
Entry condition		
Asynchronous path		
Undelete Event		
How many (per object/event)?		
Queries		
Bulkification		
New record		
Old Record		

Differences: Record-Trigger Flows vs. Apex Triggers

	Flows	Apex
Stops DML transaction (validations)	No yet (GA on Winter ‘24*)	Yes
Entry condition	Automatic	Manual
Asynchronous path	Automatic	Manual
Undelete Event	No	Yes
How many (per object/event)?	Many	One (Best Practice)
Queries	Simple	Relationships, Aggregates
Bulkification	Automatic	Manual
New record	`$Record` (1 record)	`Trigger.new` (list)
Old Record	`$Record__Prior` (1 record)	`Trigger.old` (list)

Creating A Record-Triggered Flow

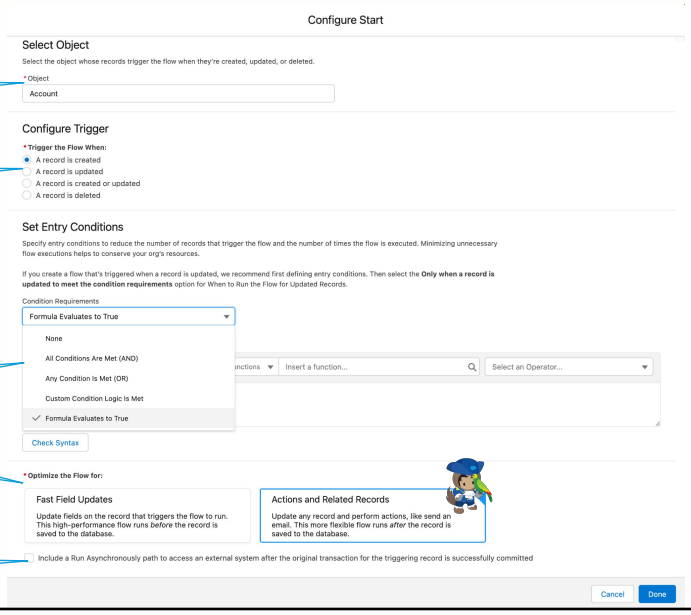
which sObject?

Select DML event

Are there any entry conditions?

Flow type

Need an Async path?



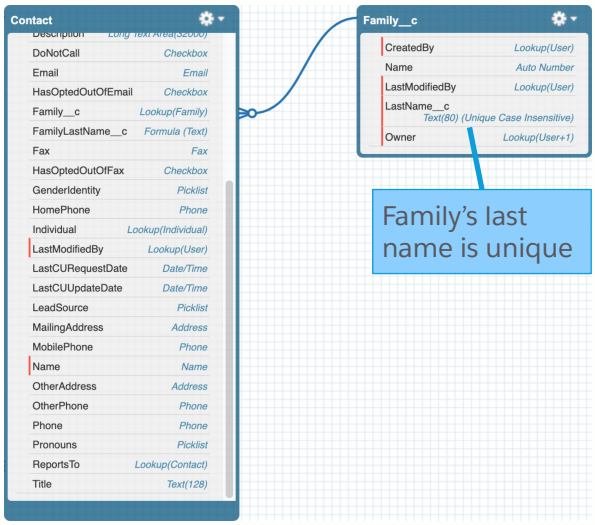
Linking Family

Business requirement for the session

Contacts should be related to their family records, based on their last name.

Whenever a contact is created or updated, find a related family record and link them together.

If a family record is not found, a new family record should be created and linked.



Random Thought ;-)

~~Apex developers don't write code!~~

We invest more time in reading code than in writing it!

- Code reviews
- Troubleshooting / Debugging
- Einstein GPT

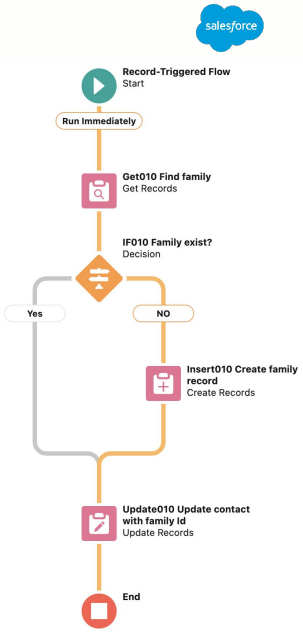
Exercise 1

Populate family lookup field

Why Did It Fail?

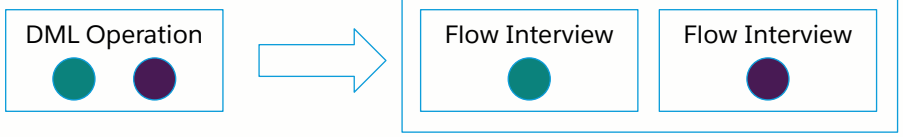
Failed to insert multiple contacts with the same new last name

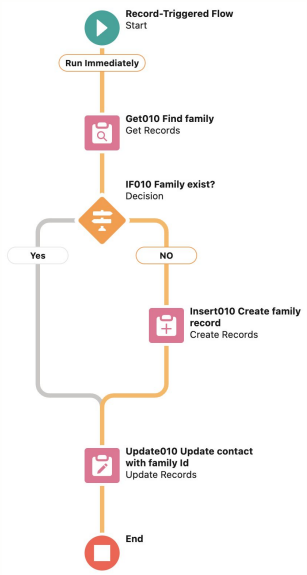
Why?



Flow Transactions vs. Flow Interviews

Working separate but together!

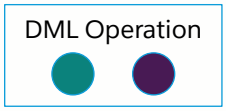


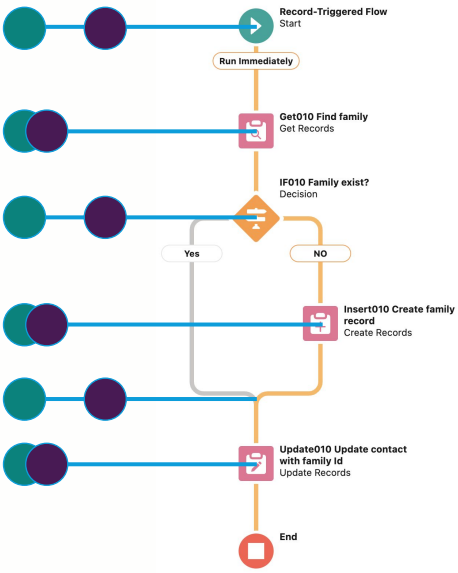


It Works!

Different new last names

- Bulkification points
  - SOQL / DML elements
  - Screen elements
  - Pause actions
  - Apex calls (optional)





It Fails!

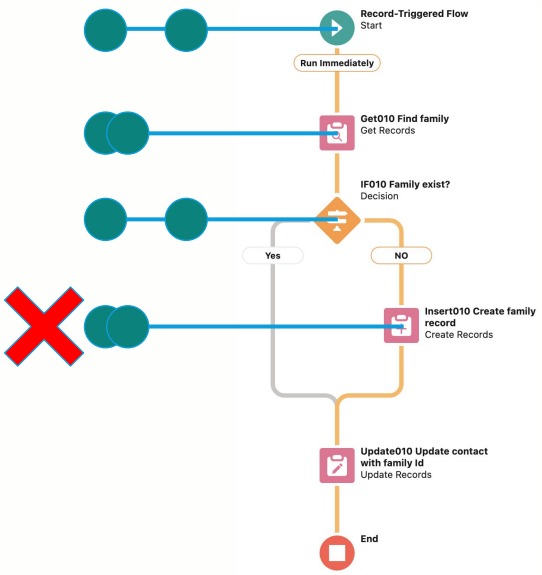
Same new last names

- Creates duplicate records!

DML Operation

Pérez

Pérez



Use Apex In Flows

Why use Apex and how?

Can We Use Flows or Do We Need Apex? (Both)

	Low-Code → Pro-Code			
		 + Apex Class		Apex Trigger
Same-Record Field Updates				
Related Records (CRUD)				
Asynchronous Processing				
Complex List Processing (Map, Set)				
High-Performance Batch Processing				
Custom Validation Errors				

https://architect.salesforce.com/decision-guides/trigger-automation

Can We Use Flows or Do We Need Apex? (Both)

	Low-Code → Pro-Code			
		 + Apex Class		Apex Trigger
Same-Record Field Updates	Available	Not Ideal	Not Ideal	Available
Related Records (CRUD)	Not Available	Available	Available	Available
Asynchronous Processing	Not Available	Available	Available	Available
Complex List Processing (Map, Set)	Not Available	Not Ideal	Available	Available
High-Performance Batch Processing	Not Ideal	Not Ideal	Not Ideal	Available
Custom Validation Errors	No yet (GA on Winter '24*)			Available

https://architect.salesforce.com/decision-guides/trigger-automation

@InvocableMethod

Only one per class

Class Access (Permission Sets/Profiles)

```
1  public without sharing class RT_LinkFamily {
2    @InvocableMethod(label='Link Families' description='...'
3      category='Contact' [Other modifiers])
4    public static List<Contact> linkFamily(List<Contact> contacts) {
5      ...
6    }
7  }
```

You must Bulkify this!

Must be a list with same size (or null)

Only one parameter And it must be a list

Exercise 2

Populate family lookup field (Fixed)

@InvocableVariable And @AuraEnabled

```
1 public with sharing class RT_Demo {
2   @InvocableMethod(label='Sample' description='...' category='Contact')
3   public static List<Result> execute(List<Request> requests) {
4     List<Results> responseWrapper = new List<Results>();
5     Results response = new Results();
6     response.outputContact = new RT_DemoAE();
7     response.outputContact.myContact = requests[0].inputContacts[0];
8     responseWrapper.add(response);
9     return responseWrapper;
10  }
11  public class Result {
12    @InvocableVariable(label='Output Contact')
13    public RT_DemoAE outputContact;
14  }
15  public class Request {
16    @InvocableVariable(label='Input Contact' required='true')
17    public List<Contact> inputContacts;
18  }
19 }
```

User types

First interview

First Record

Inner Classes

@InvocableVariable

Data types for flows
Must be a different file (outer class)

```
1  public class RT_DemoAE {
2    @AuraEnabled
3    public Contact myContact { get; set; }
4  }
```

Exercise 3

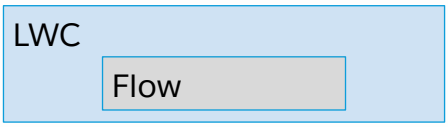
@invocableMethods with Complex data

Use LWC In Flows

Three use cases

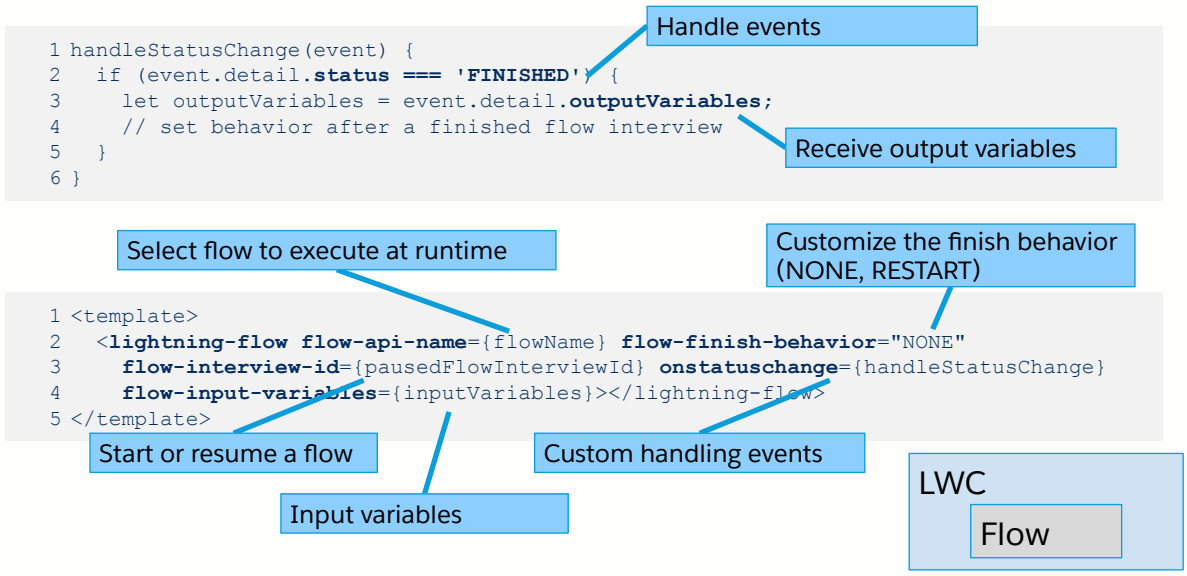
- LWC (Flow)
- Flow (LWC)
- Custom Property Editors

Why: LWC with Flows

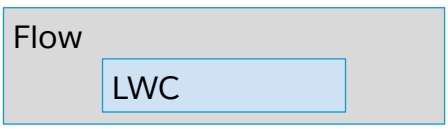


- Control where the flow is available (targets)
- Special handling of flow events (finish behavior, status change)

How: LWCs with Flows



Why: Flows with LWC



- Advanced UI (pixel perfect, 4+ columns, tabs, colors, buttons, sliders, ...)
- Interactive screens (onblur, onfocus, onchange)
  - Controlled requiredness, formatting, visibility, and/or read-only

How: Flows with LWC

```
<?xml version="1.0" encoding="UTF-8"?>
<LightningComponentBundle xmlns="http://soap.sforce.com/2006/04/metadata">
  <apiVersion>57.0</apiVersion>
  <isExposed>true</isExposed>
  <masterLabel>Best Component Ever</masterLabel>
  <targets>
    <target>lightning__FlowScreen</target>
  </targets>
  <targetConfigs>
    <targetConfig targets="lightning__FlowScreen">
      <property name="startDate" label="Start Date" type="Date" role="inputOnly"/>
      <property name="name" label="Account Name" type="String" role="outputOnly"/>
      <property name="account" label="Account" type="@salesforce/schema/Account[]"/>
      <property name="data" label="Custom Data" type="apex://CustomClass"/>
    </targetConfig>
  </targetConfigs>
</LightningComponentBundle>
```

Available for flow

Input/output only

Complex data types

Flow

LWC

Events from LWC to Flow

Control the flow from your LWC

```
import { LightningElement, api, track} from 'lwc';
import { FlowAttributeChangeEvent, FlowNavigationNextEvent } from 'lightning/flowSupport';

export default class LwcInFlow extends LightningElement {
  @track _someData;
  @api availableActions = [];
  @api get someData() { return this._someData; }
      set someData(value) { this._someData = {...
  ...
  demo() {
    this.dispatchEvent(new FlowAttributeChangeEvent('someData', this._someData));
    ...
    if (this.availableActions.find((action) => action === 'NEXT'))
      this.dispatchEvent(new FlowNavigationNextEvent());
  }
}
```

Notify values changed
("Reactive Screens" GA Winter '24)

Available actions

Control flow navigation
Back, Next, Pause, Finish

Flow

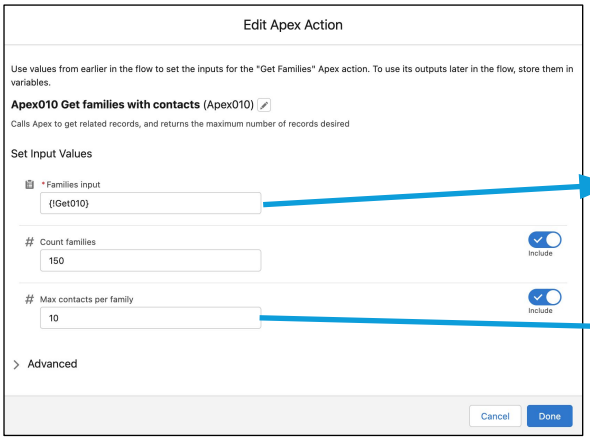
LWC

Exercise 4

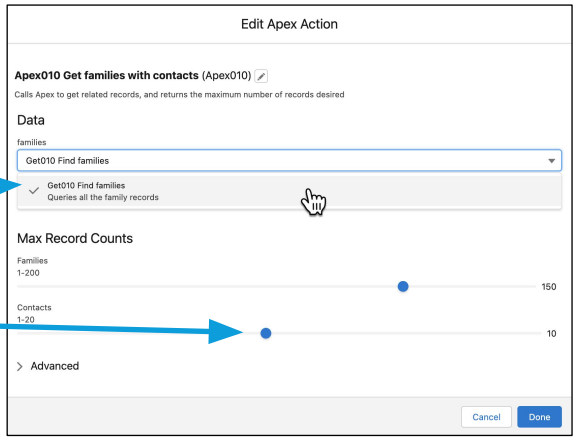
Display contacts grouped by families

LWC As Custom Property Editors

Without Custom Property



With Custom Property



LWC As Custom Property Editors

```
1  import { api, LightningElement } from "lwc";
2  export default class CustomConfiguration extends LightningElement {
3    @api inputVariables;
4    @api builderContext;
5    @api
6    validate() {
7      let errorString
8      this.refs.families.setCustomValidity(errorString);
9      this.refs.families.reportValidity();
10     return [{ key: "families", errorString }];
11   }
17   }
18 }
```

Array(3)
- 0: {name: 'countFamilies', value: '150', valueDataType: 'Number'}
- 1: {name: 'families', value: 'Get010', valueDataType: 'reference'}
- 2: {name: 'countContacts', value: '10', valueDataType: 'Number'}
- length: 3
- [[Prototype]]: Array(0)

Current values to be edited

Flow definition

App builder clicked “Done” button

Display errors on screen
- Flow only shows **count**

Return array of errors
- Flow only shows **count**

Report values changed

Use **@api** properties to capture data from flow builder
Use **events** to report changes to flow builder

What is builderContext?

Actions

Describes flow allowing reflection (introspection)

Get Records

Screens

Variables

```
Object
▼ actionCalls: Array(1)
  ▶ 0: {name: 'Apex010', description: 'Calls Apex to get related records, and re
    length: 1
  ▶ [[Prototype]]: Array(0)
▶ apexPluginCalls: []
▶ assignments: []
▶ choices: []
▶ collectionProcessors: []
▶ constants: []
▶ decisions: []
▶ dynamicChoiceSets: []
▶ formulas: []
▶ loops: []
▶ recordCreates: []
▶ recordDeletes: []
▼ recordLookups: Array(1)
  ▶ 0: {name: 'Get010', description: 'Queries all the family records', label: 'G
    length: 1
  ▶ [[Prototype]]: Array(0)
▶ recordRollbacks: []
▶ recordUpdates: []
▼ screens: Array(1)
  ▶ 0: {name: 'Screen010', description: '', label: 'Screen010', locationX: 176,
    length: 1
  ▶ [[Prototype]]: Array(0)
▶ stages: []
▶ start: {name: undefined, description: undefined, label: undefined, locationX:
▶ textTemplates: []
▼ variables: Array(1)
  ▶ 0: {name: 'familyTypes', description: '', apexClass: 'UI_FamilyTypeAE', data
    length: 1
  ▶ [[Prototype]]: Array(0)
▶ waits: []
  Symbol(@@lockerLiveValue): undefined
▶ [[Prototype]]: Object
```

Remember…

- Access the slides and other resources here
  https://sfdc.co/devFlow

Dreamforce 2023 Survey

We love feedback!

https://www.surveymonkey.com/r/DF23HOW

Thank you