

# DevOps for Low Code

Andrew Davis

*Sr. Director of Research & Innovation, Copado*

**DEVOPS  
ENTERPRISE  
SUMMIT**

AN  IT REVOLUTION EVENT



#1 Low Code DevOps & Testing Platform

# DevOps for Low Code

DevOps Enterprise Summit Europe | May, 2022



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[@AndrewDavis\\_io](https://www.twitter.com/AndrewDavis_io)





## What's Low Code Again?



Application development using  
visual, declarative techniques  
instead of code.



# Infrastructure



main d3-shape / src / stack.js </> Jump to ▾

mbostock Allow pie, line, and area to take iterables.

2 contributors

58 lines (46 sloc) | 1.39 KB

```
1 import array from "./array.js";
2 import constant from "./constant.js";
3 import offsetNone from "./offset/none.js";
4 import orderNone from "./order/none.js";
5
6 function stackValue(d, key) {
7   return d[key];
8 }
9
10 function stackSeries(key) {
11   const series = [];
12   series.key = key;
13   return series;
14 }
15
16 export default function() {
17   var keys = constant([1]),
18     order = orderNone,
19     offset = offsetNone,
20     value = stackValue;
21
22   function stack(data) {
23     var sz = Array.from(keys.apply(this, arguments), stackSeries),
24       i, n = sz.length, j = -1,
25       oz;
26
27     for (const d of data) {
28       for (i = 0, ++j; i < n; ++i) {
29         (sz[i][j] = [0, +value(d, sz[i].key, j, data)]).data = d;
30       }
31
32       for (i = 0, oz = array(order(sz)); i < n; ++i) {
33         sz[oz[i]].index = i;
34       }
35     }
36   }
37
38   return stack;
39 }
```

Code

Lightning App Builder

Case Details

Case Number: 00001002  
Status: New  
Subject: Seeking guidance on electrical wiring installation for GC5060  
Description:

Contact Details

Name: Ms. Stella Pavlova  
Title: CFO  
Account Name: Global Solutions Inc.  
Phone: (123) 567-8900

Feed

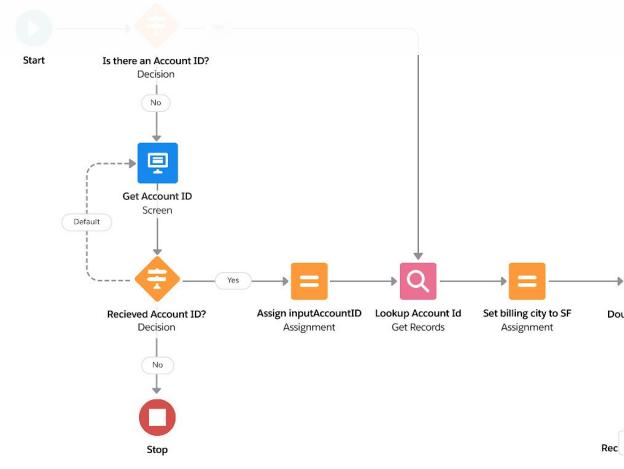
Post Poll

Most Recent Activity

All Updates

Seeking guidance on electrical wiring installation for GC5060

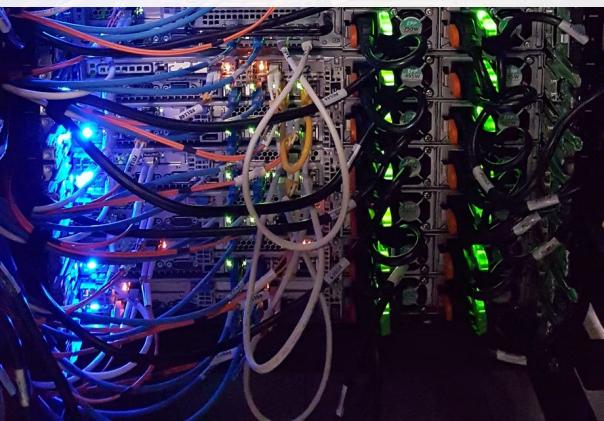
# Low-Code





200+ more

# DevOps for Infrastructure

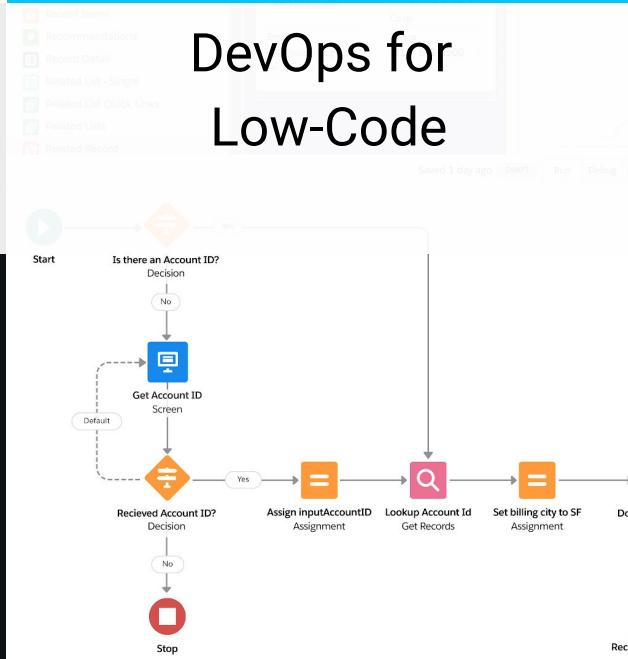


```
# Validate quality assurance for all DAGs
QA Validation:
  stage: QA Validation
  rules:
    - if: $CI_MERGE_REQUEST_ID
    - if: $CI_COMMIT_BRANCH == "master"
image:
  name: apache/airflow:1.10.11-python3.8
  entrypoint: [""]
script:
  - pip install -r requirements.txt --user
  - export PYTHONPATH="${PYTHONPATH}:/tmp/slack"
  - export AIRFLOW_HOME="${pwd}"
  - export $(cat .env/.devenv | xargs)
  - airflow initdb
  - airflow list_dags
  - python tests/dag_qa_validation.py
```

```
8 }
9
10 function stacks() {
11   const series = [];
12   series.key = key;
13   return series;
14 }
15
16 export default function() {
17   var keys = constant([]),
18     order = ordertone,
19     offset = offsetNone,
20     value = stackValue;
21
22   function stack(data) {
23     var sz = Array.from(keys.apply(this, arguments), stackSeries),
24       i, n = sz.length, j = -1,
25       oz;
26
27     for (const d of data) {
28       for (i = 0, ++j; i < n; ++i) {
29         (sz[i][j] = [0, +value(d, sz[i].key, j, data)]).data = d;
30       }
31     }
32
33     for (i = 0, oz = array(order(sz)); i < n; ++i) {
34       sz[oz[i]].index = i;
35     }
36   }
37 }
```

?????

# DevOps for Low-Code





# Low Code Platforms Emerge from Two Sources

Simplifying code-based systems

Making commercial apps more flexible



# Simplifying code-based systems (aka raising the level of abstraction)

Machine Language

01101110110000

Assembly Language

MOV R0, A1  
BNE F32C

Higher-level Language

```
function stackValue(d, key) {  
    return d[key];  
}
```

Low Code



Betty Blocks

+200 more!



# Simplifying code-based systems (aka raising the level of abstraction)

Machine Language

Assembly Language

Higher-level  
Language



## Low Code

- + Greater simplicity
- + Easier to maintain
- + Coarser granularity
- Less flexibility
- Less speed

First Name

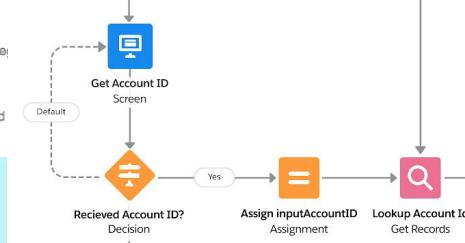
John

\* Last Name

Smith

Allocation time tracking

Makes it possible for people of the related organizations to re-allocations that are linked to their organizations.  
 Notify people when their timesheet is incomplete  
Send an email notification to each person who registered than the workweek hours.



Data

Configuration

No Code  
App Dev

HelloWorldLead.apxt \*

```
trigger HelloWorldLead on Lead (before insert) {
    for (Lead l : trigger.new) {
        l.Country1 = 'Singapore';
        l.Company = 'World';
    }
}
```

Logs	Tests	Checkpoints	Query Editor	View State	Progress	Problems
Name	Line	Problem				HelloWorldLead 3 Invalid field Country1 for SObject Lead

servicenow

workday



Low  
Code

+ more

Making commercial apps more flexible  
(aka increasing adaptability)

Data

Configuration

No Code  
App Dev

- + Greater flexibility
- + Meets more needs
- + Change the app,  
not the users
- More work required
- More complicated

Low  
Code

**Making commercial apps more flexible  
(aka increasing adaptability)**

# Making commercial apps more flexible

(Mostly  
SaaS)

(On-prem or  
cloud agnostic)

Low  
Code

Simplifying code-based systems

# The rise of Low Code

“By 2025, 70% of new applications developed by enterprises will use low-code or no-code technologies (up from less than 25% in 2020).”

“50% of all new low-code clients will come from business buyers that are outside the IT organization.”

- Gartner Forecast Analysis:  
Low-Code Development Technologies

Magic Quadrant for Enterprise Low-Code Application Platforms



Source: Gartner (September 2020)



● No-code development platform  
Topic

● Low-code development platf...  
Software

+ Add comparison

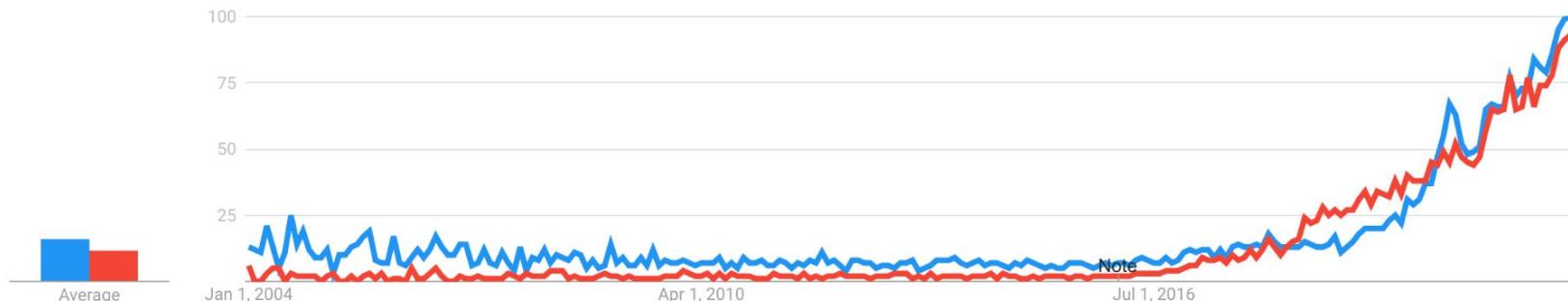
Worldwide ▾

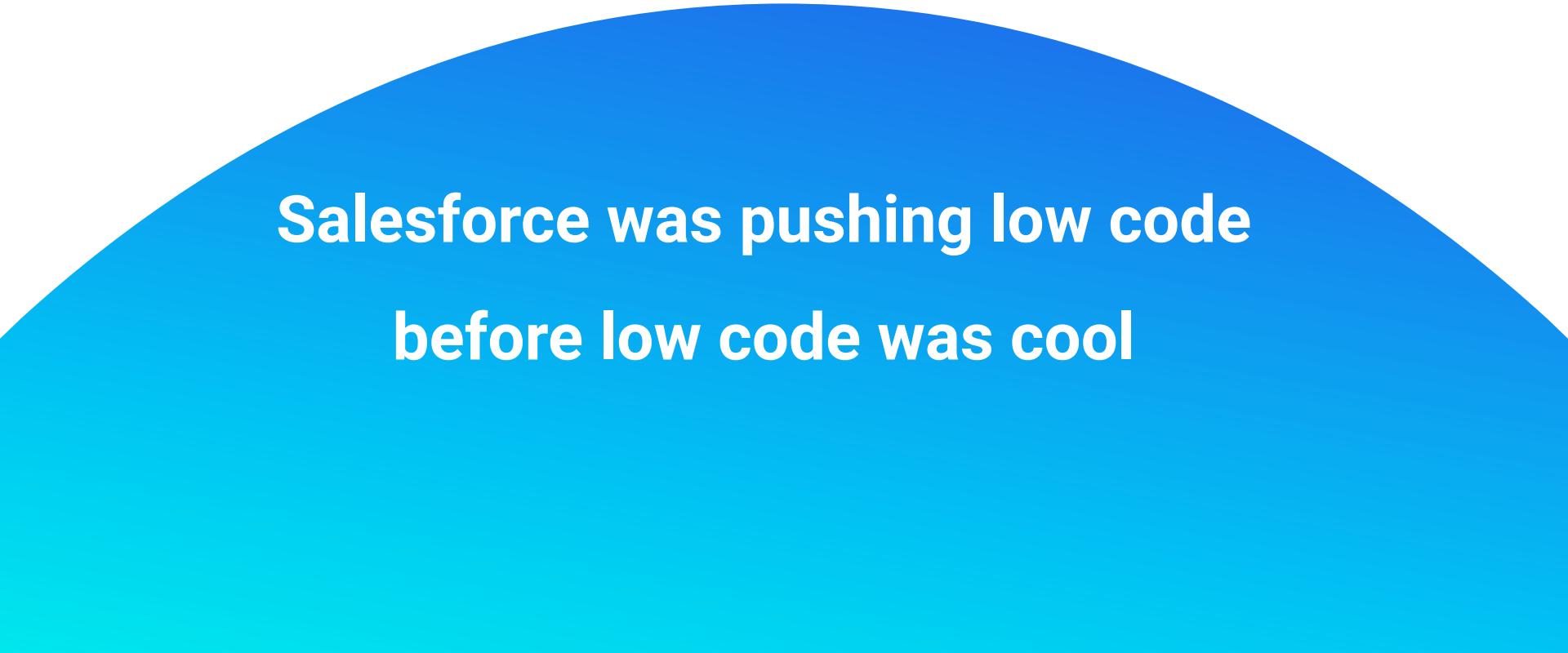
2004 - present ▾

All categories ▾

Web Search ▾

Interest over time

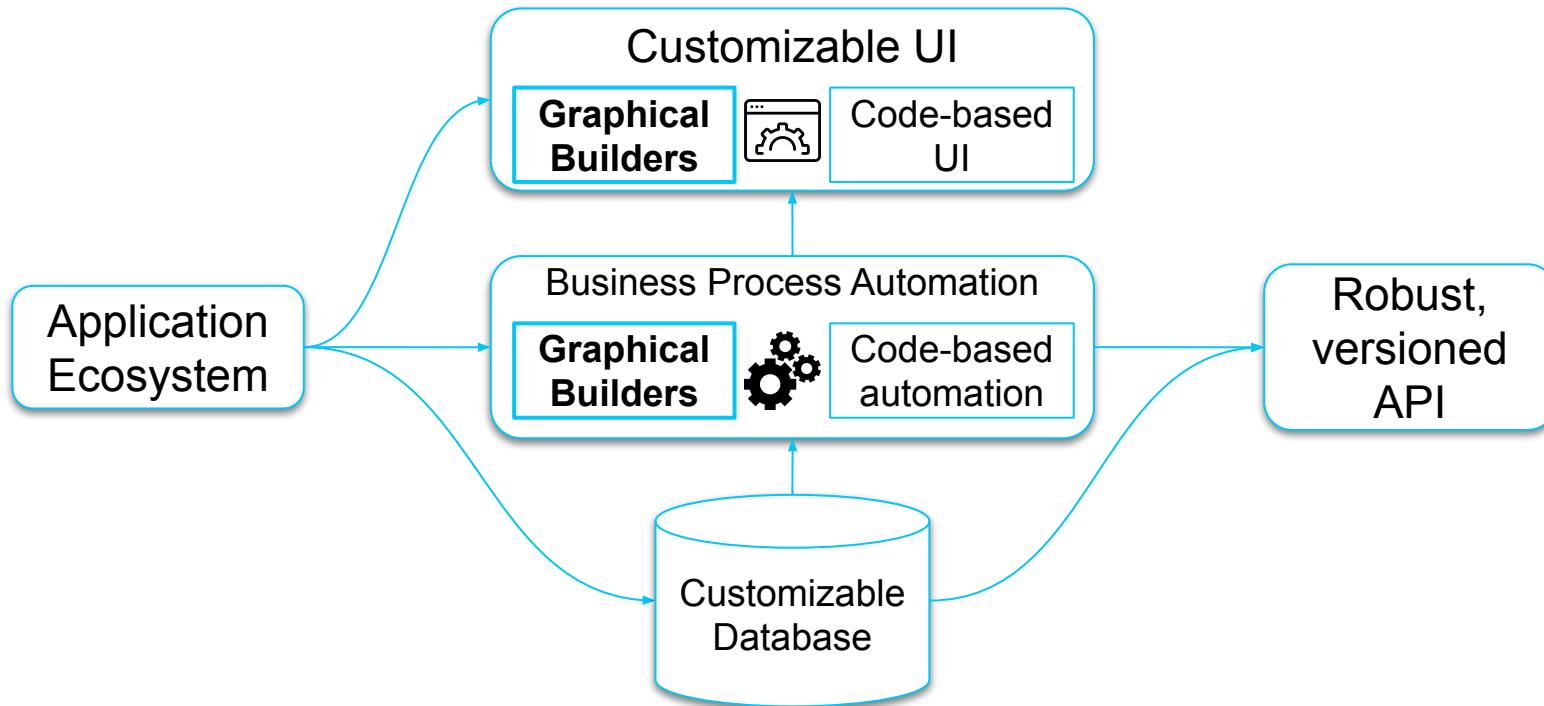




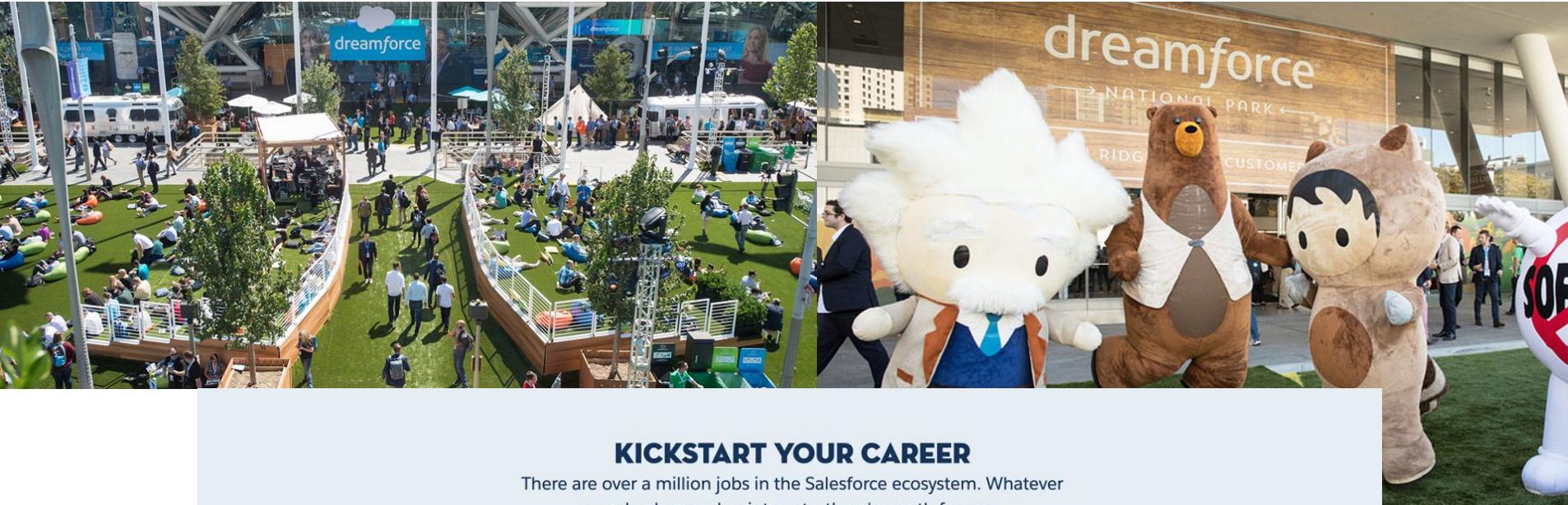
**Salesforce was pushing low code  
before low code was cool**

# Salesforce Application Development

aka: the fun bit



# Salesforce World and Culture



## KICKSTART YOUR CAREER

There are over a million jobs in the Salesforce ecosystem. Whatever your background or interests, there's a path for you.



Salesforce  
Administrator



Salesforce  
Developer



Sales  
Manager



Marketing  
Manager



Salesforce  
Technical  
Architect



Business  
Analyst



Other Roles

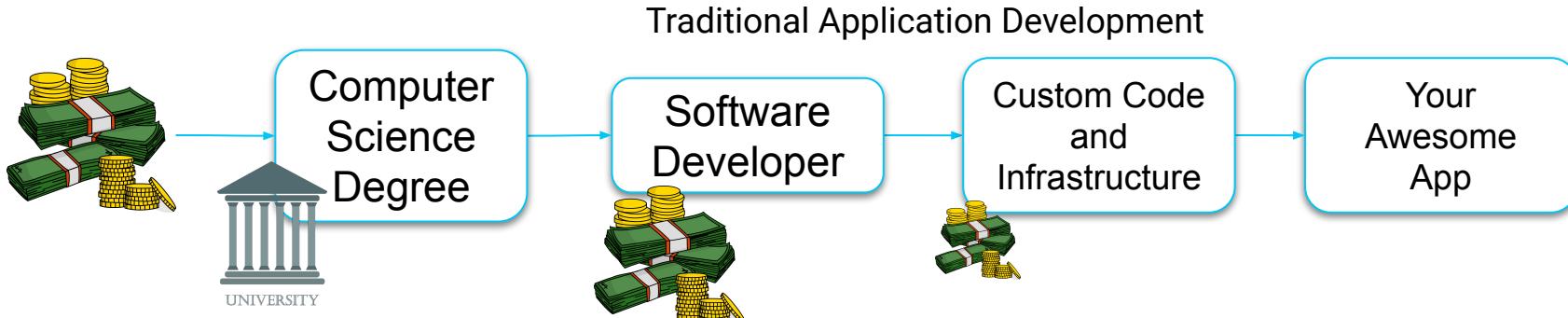


A photograph of a swimming pool from an underwater perspective looking up at the surface. Several pairs of legs and feet are visible, hanging vertically from the edge of the pool. The water is clear and blue, with light reflections on the tiled bottom. A white circular object, possibly a pool cleaner or a drain cover, is centered in the lower half of the frame.

# The Talent Pool

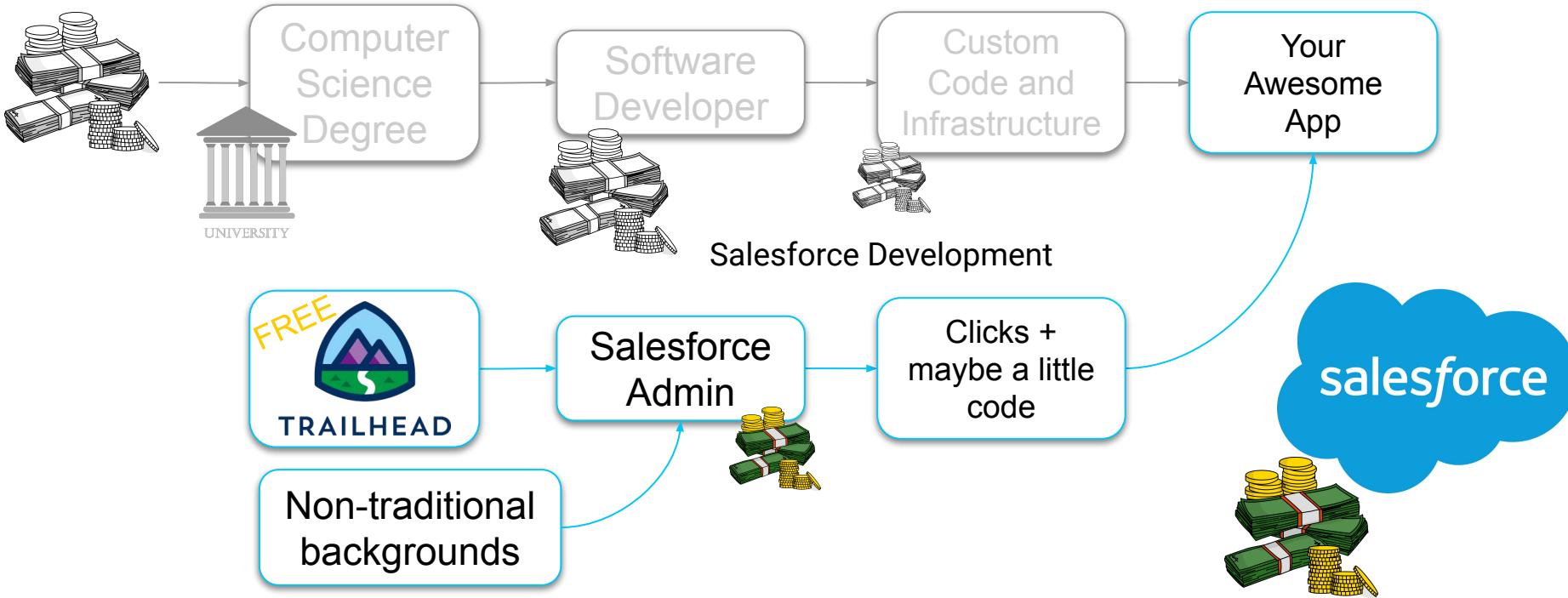
# Application Development: The Traditional Way

You know it, you love it



# Application Development: The Salesforce Way

Oooooo ... that was kind of easy



# The Salesforce Community is ... shall we say ... Dedicated



# Building on Salesforce - Customizable Data Model

The screenshot shows the Salesforce Schema Builder interface. At the top, there's a navigation bar with icons for Setup, Home, Object Manager, and a search bar labeled "Search Setup". Below the navigation is the title "Schema Builder" with a help link "Help for this Page".

The main area contains three object definitions:

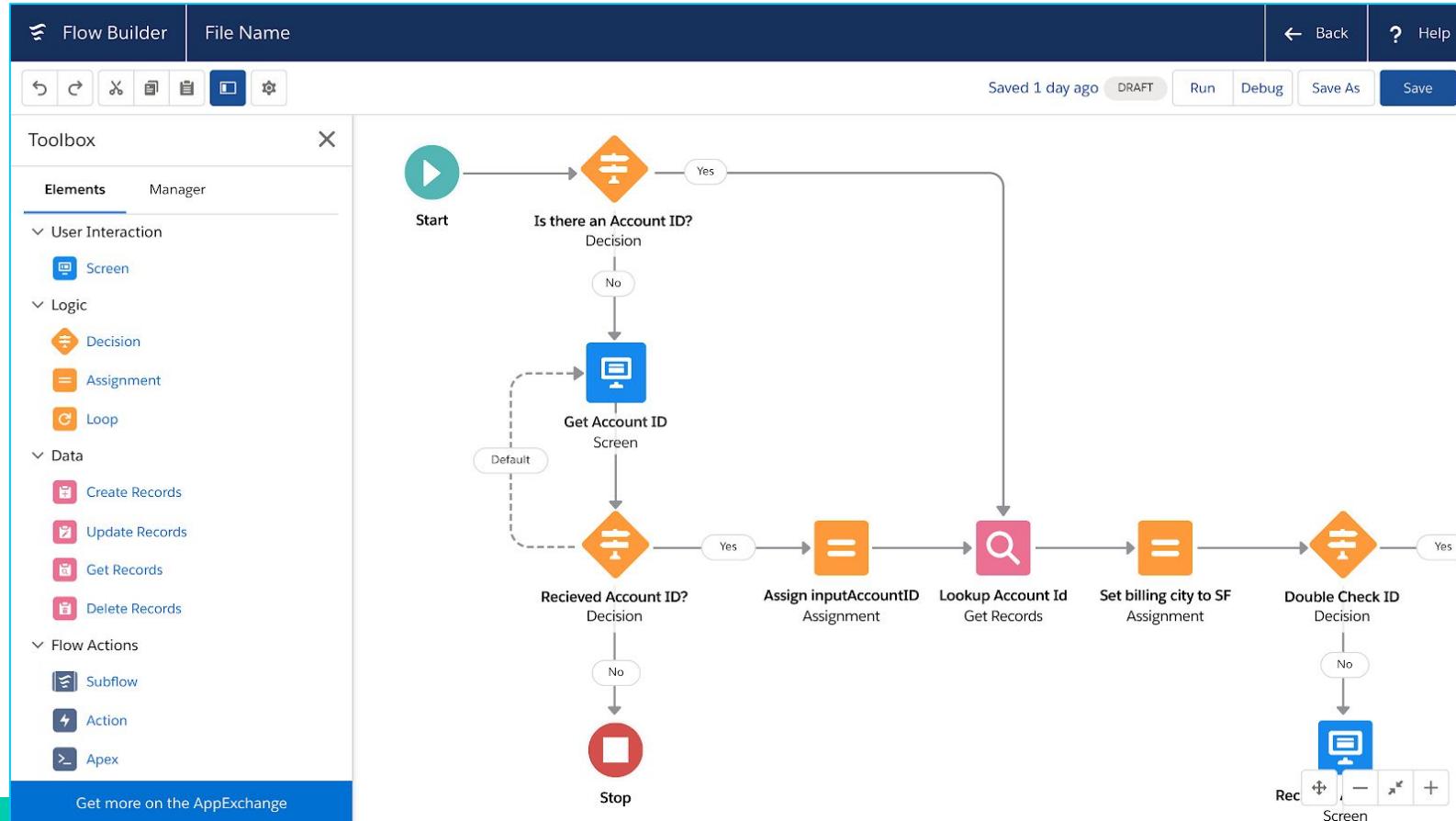
- Solution**:
  - Created By: Lookup(User)
  - Last Modified By: Lookup(User)
  - Public: Checkbox
  - Solution Details: Rich Text Area(32000)
  - Solution Number: Auto Number
  - Solution Title: Text(255)
  - Status: Picklist
  - Visible in Public Knowledge Base: Checkbox
- Lead**:
  - Address: Address
  - Annual Revenue: Currency(18, 0)
  - Campaign: Lookup(Campaign)
  - Company: Text(255)
  - Company D-U-N-S Number: Text(9)
  - Created By: Lookup(User)
  - Current Generator(s): Text(100)
- D&B Company**:
  - Annual Revenue Growth: Number(12, 6)
  - Annual Sales Volume: Number(18, 0)
  - Annual Sales Volume Indicator: Picklist
  - Company Description: Long Text Area(32000)
  - Delinquency Risk: Picklist

A legend on the right side defines the relationship types:

- Lookup Relationship (blue line)
- Master-Detail Relationship (red line)
- Required Field (red border)

Relationships are shown as lines connecting the objects. There are two blue lines (Lookup Relationships) connecting the Lead and D&B Company objects. There is one red line (Master-Detail Relationship) connecting the Lead and Solution objects. A red border surrounds the "Required Field" status in the Solution object definition.

# Building on Salesforce - Business Process Automation



# Building on Salesforce - User Interface Design

Lightning App Builder - desktopDefault

← Back ? Help

Desktop Shrink To View Refresh Save Activation...

Lightning Components Search components... SmartScope Recent Record Today's Tasks Top Deals Upcoming Events Visualforce

Custom (0) No components available.

Custom - Managed (10)

- TaskRay Board
- TaskRay Feed
- TaskRay Kanban
- TaskRay My Projects
- TaskRay Project Clone
- TaskRay Snapshot
- TaskRay Status
- TaskRay Time Entry
- TaskRay To Dos
- TaskRay Today

TaskRay Feed

WHAT'S HAPPENING ON YOUR TASKS

Request company invasion

Post Poll Question

Share an update

TaskRay Today

Today TUESDAY - 9/22/2015

Congratulations, you have no tasks due today!

TaskRay Time

Week of 28 Sep

M T W Th F S S

Go To Timeline

Add Component(s) Here Add Component(s) Here

Page

\* Label desktopDefault

\* Developer Name desktopDefault

Page Type Home Page

Template Standard Home Page

Description

Get more on the AppExchange



# The weird world of DevOps for Salesforce

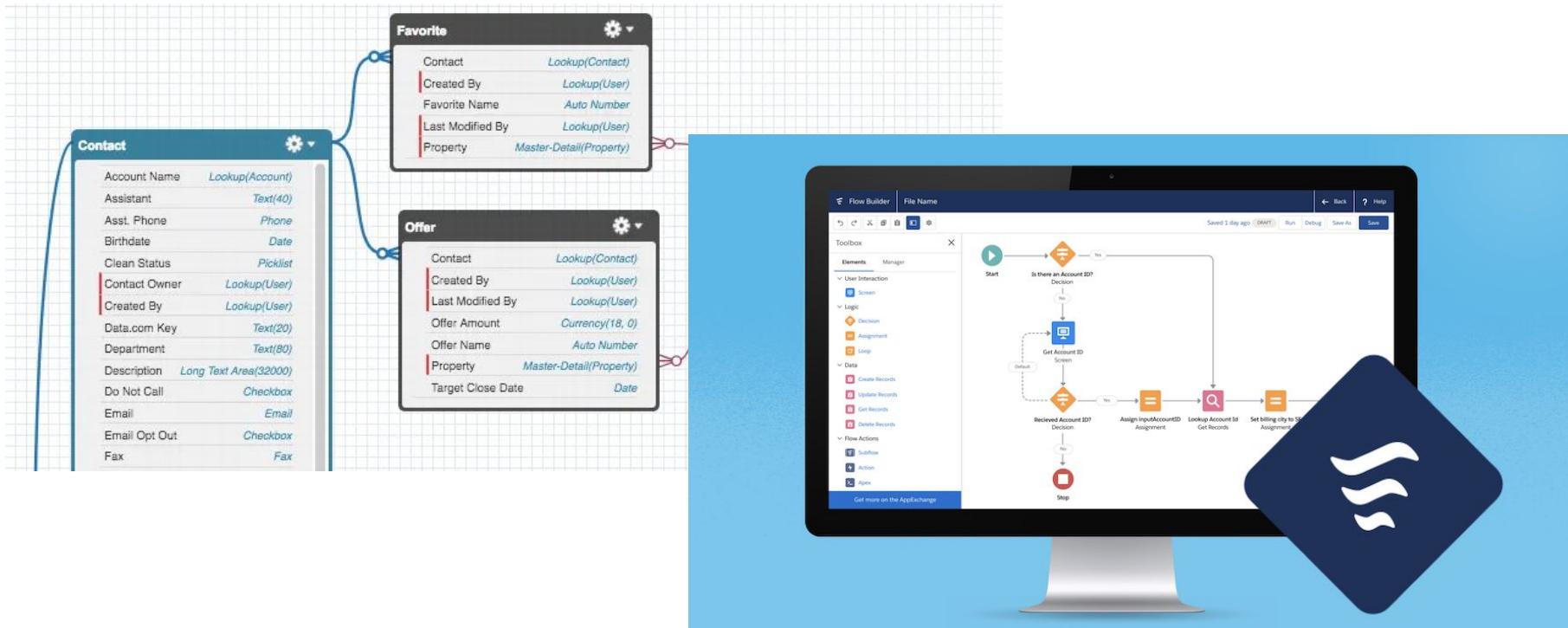
- “Salesforce” vs. Salesforce
- Check your tools at the door
- Salesforce Metadata
- XML Hell
- Salesforce DX
- Commercial Tools



# What's Different about DevOps for Low Code?

DISCLAIMER:  
This varies a lot by platform

# Salesforce makes it easy to build





# Easy is Great\*

\*Some conditions apply

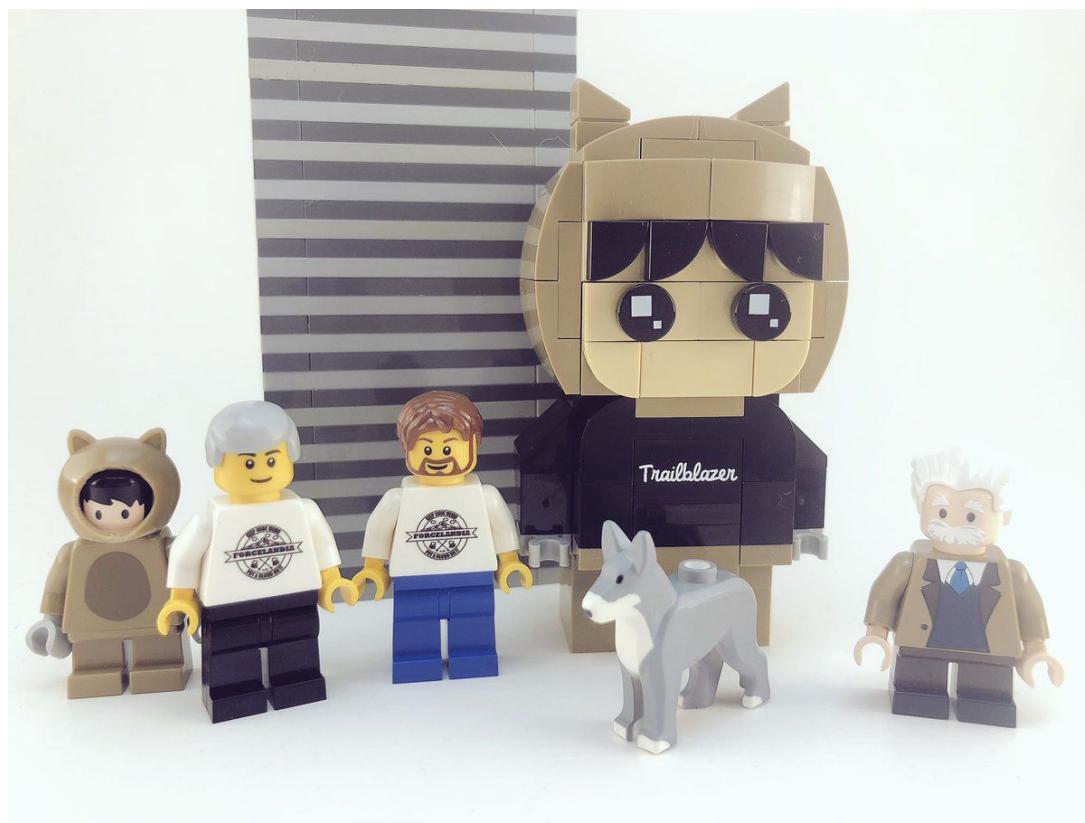


The trouble with Easy:



**Easy → Fast → More → Complex**

# Things add up

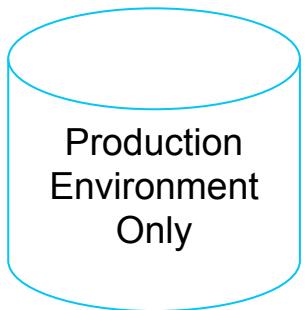


Bigger orgs with bigger teams  
need to be increasingly careful



# DevOps for Low Code - Level 0

Seduction

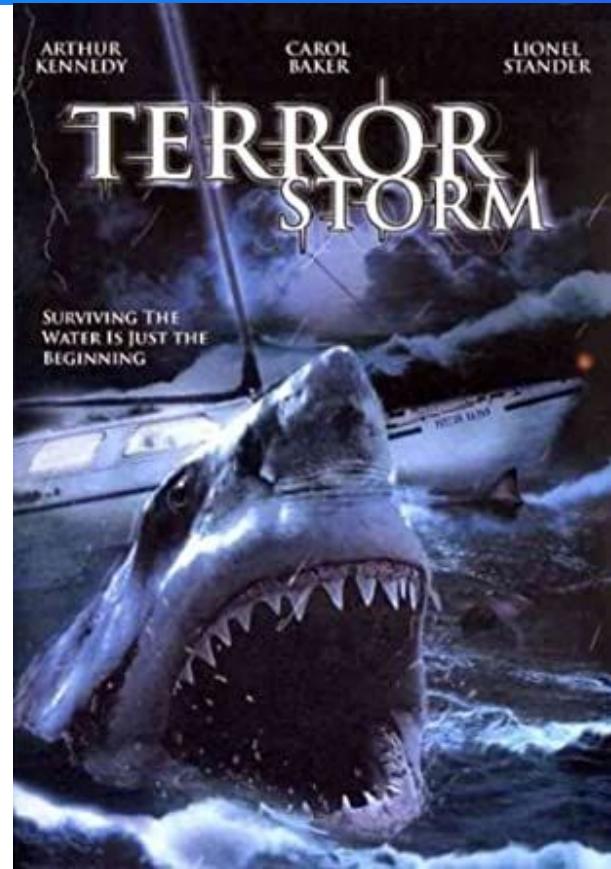
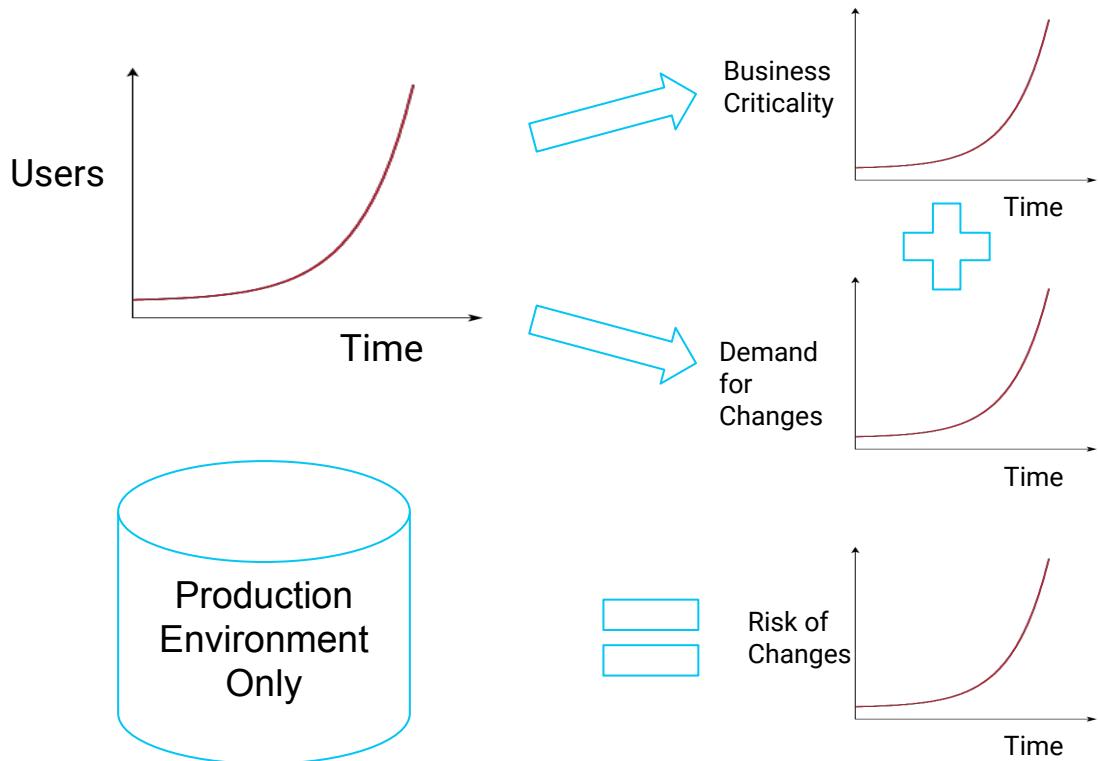


Life is simple



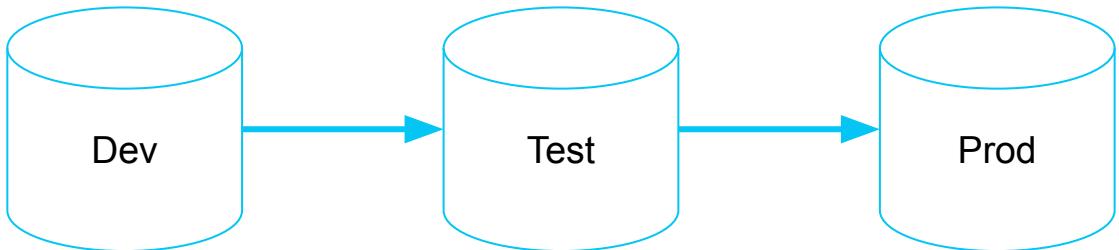
# DevOps for Low Code - Level 1

## The Price of Success

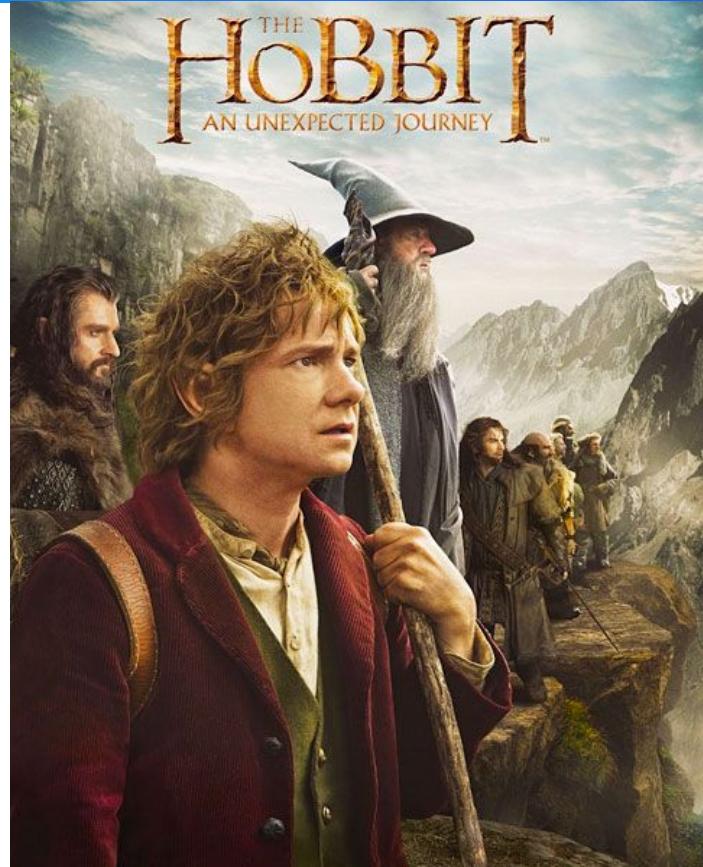


# DevOps for Low Code - Level 2

## The Hero's Journey



How hard could it be?



# DevOps for Low Code - Level 3

## Where Things Get Complicated



Learning to Drive  
with Trailhead



Traffic Engineering  
The largest  
Salesforce orgs



### Challenges

- Keeping Orgs in Sync
- Tracking Changes
- Propagating Changes Systematically
- Risk of Interactions and Side-effects
- Accumulating Technical Debt



<https://www.behance.net/gallery/113621/mio-gps>  
CC BY-NC-ND 3.0

# The Development Lifecycle

Where Things Get Complicated



Learning to Drive  
with Trailhead



Traffic Engineering  
The largest  
Salesforce orgs



## Challenges

- Keeping Orgs in Sync
- Tracking Changes
- Propagating Changes Systematically
- Risk of Interactions and Side-effects
- Accumulating Technical Debt



# Notable Acquisitions

Salesforce has acquired more than 60 companies



**HEROKU**

Platform as a Service



**MuleSoft®**

Data Integration



**+ a b | e a u®**

Analytics



Collaboration



**MetaMind**

AI / Deep Learning

# The Salesforce Marketecture

Includes both core capabilities and acquired companies



# But Only a Subset of this is the “Salesforce Platform”

Many Salesforce tools are totally disconnected



# On-premise vs. IaaS vs. PaaS vs. SaaS

Most DevOps Tools focus on supporting IaaS or PaaS systems

## Infrastructure as a Service

Create virtual servers, networks, storage, etc.

## Platform as a Service

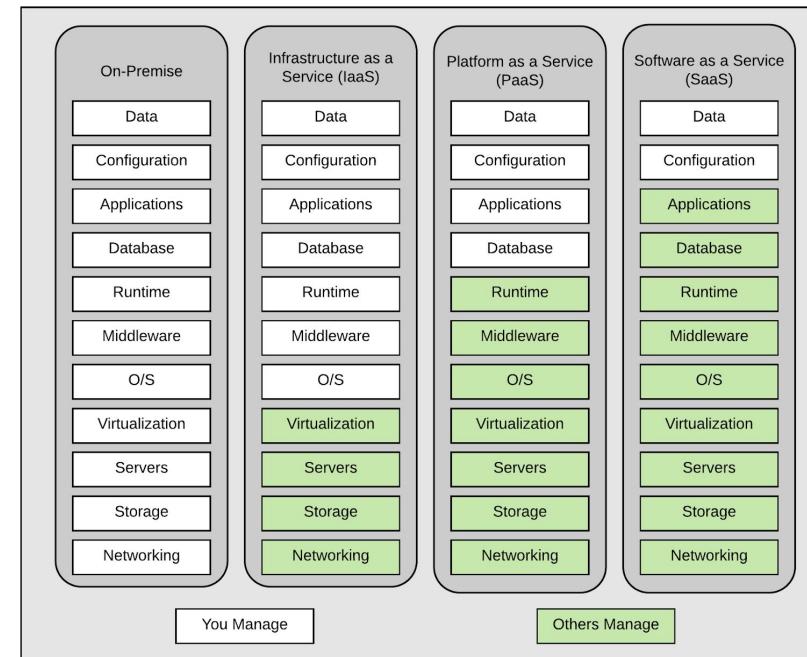
Upload code, databases, etc.

## Software as a Service

Configure applications, store data

## Salesforce

Functions like a PaaS, configured like SaaS



# On-premise vs. IaaS vs. PaaS vs. SaaS

Most DevOps Tools focus on supporting IaaS or PaaS systems

## Infrastructure as a Service

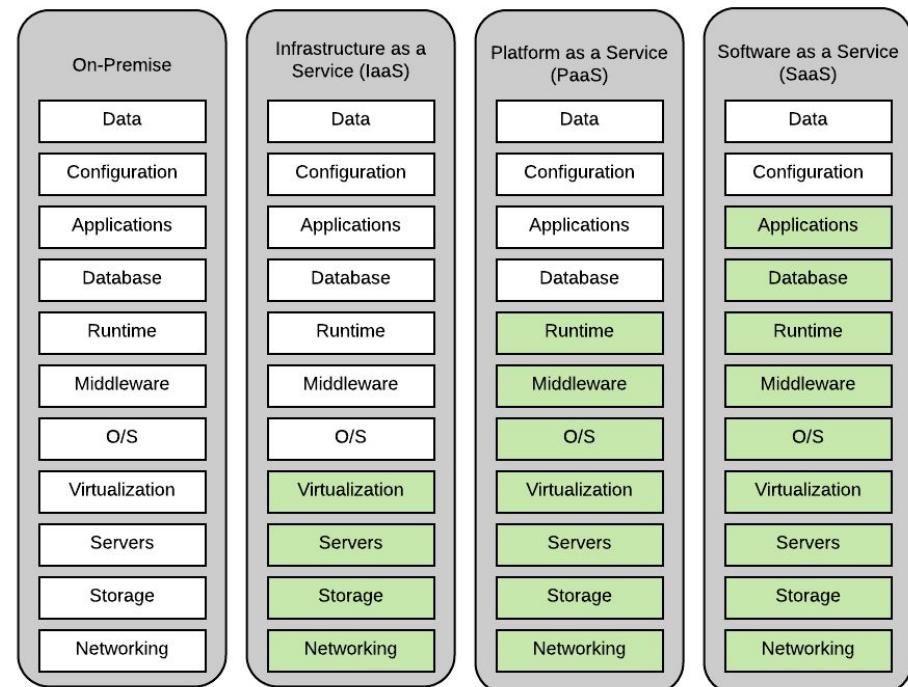
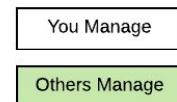
Create virtual servers, networks, storage, etc.

## Platform as a Service

Upload code, databases, etc.

## Software as a Service

Configure applications, store data



**Salesforce:**

Functions like PaaS,  
Configured like SaaS

# Environments

Salesforce controls the underlying environments

## Production Orgs

Hosted by Salesforce

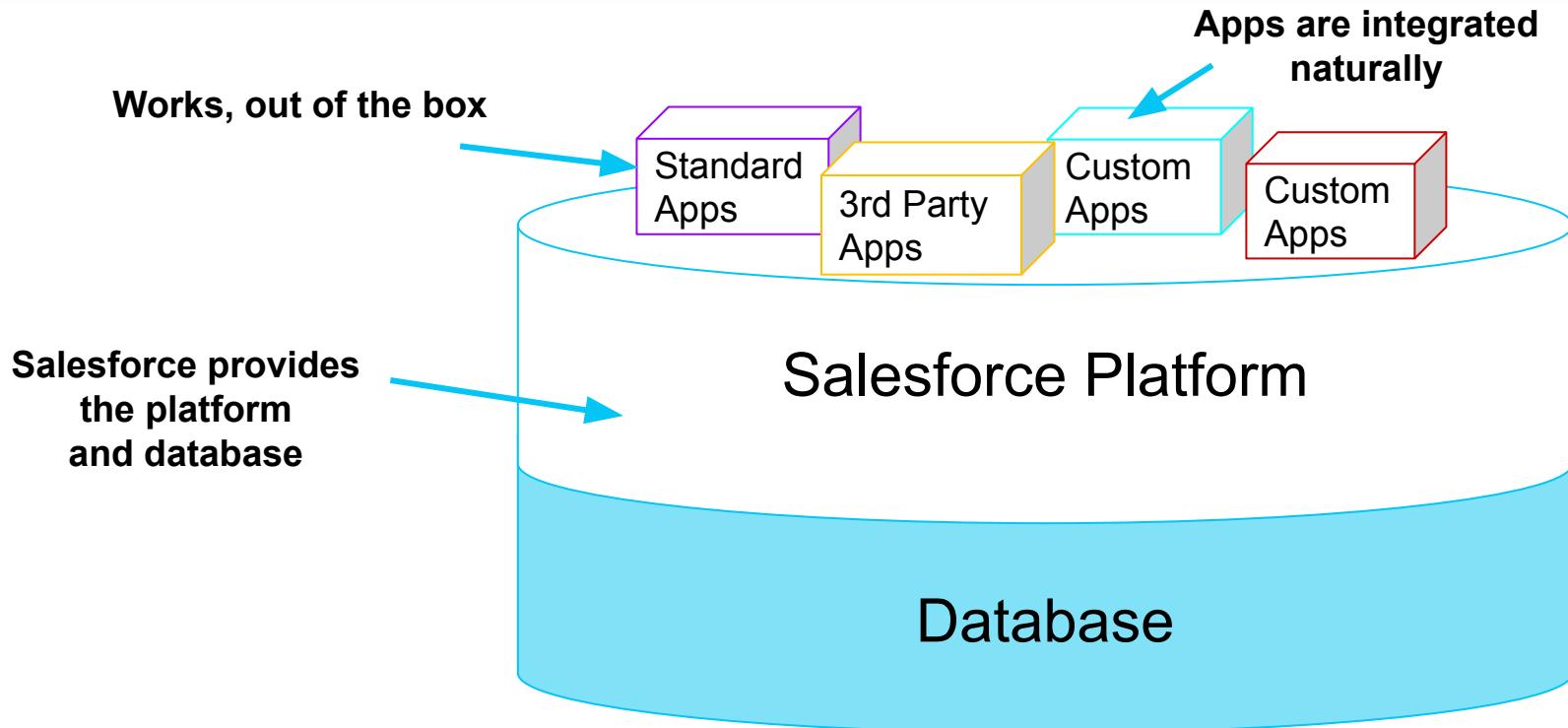
## Long-lived Sandboxes

Hosted by Salesforce

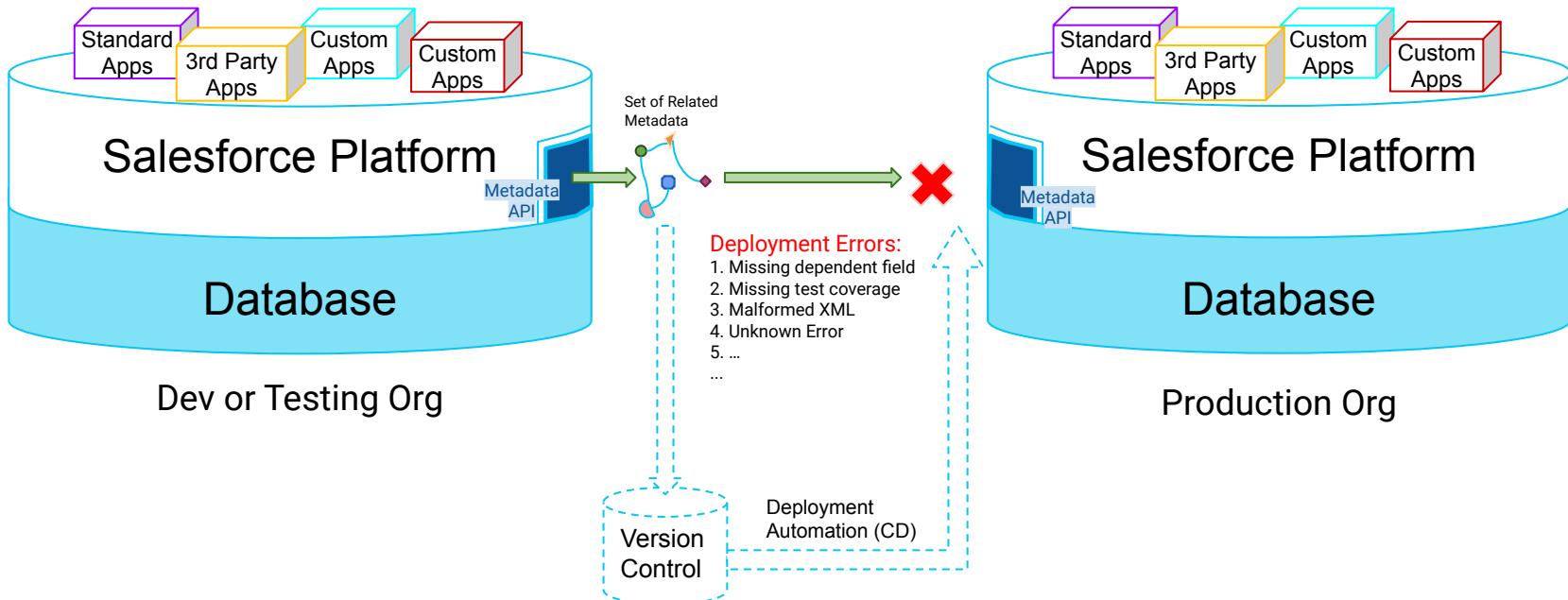
## Short-lived Scratch Orgs

Hosted by Salesforce. Can be used in limited situations

# Each Salesforce instance is a monolithic database



# The Metadata API is the only gateway for deployments



# Typical Tools Used in DevOps Processes

Most DevOps Tools focus on supporting IaaS or PaaS systems

PERIODIC TABLE OF DEVOPS TOOLS (V1)																	
1	En	2	Os	3	Fr	4	Fm	5	Pd	6	En	7	Os	8	En	9	Os
O	12c	My	MySQL	My	Git	Gt	Git	Mq	MSSQL	Sv	Subversion	Sv	Subversion	Aws	Aws	Pd	Pd
Pq	Os	Mc	Mercurial	Mv	Os	Gr	Gradle	Mr	En	Jn	Bb	Tr	Ar	Fn	Se	Gn	Fr
Mg	Os	Gh	Github	Br	Os	At	ANT	Bm	Fm	42	43	Fm	44	Fm	45	Os	46
Db	En	Bb	Bitbucket	Qb	Fm	Ub	UrbanCode Build	Ta	En	59	Pd	60	Fm	61	Fm	62	Os
Cs	Fr	Hx	Helix	Msb	Os	Rk	Rake	Lb	Os	76	Os	77	Os	78	Os	79	Fm
Xlr	En	Ur	UrbanCode Release	Ls	En	Bm	CA Service Virtualization	Hp	En	95	En	94	En	95	En	96	Pd
Sp	En	Ki	Kibana	Nr	Os	Ni	New Relic	Gg	Os	106	Os	107	Os	108	Fm	109	Os
Pl	En	Ex	HP Coder	Excel	En	94	BMC Release Process	Ex	En	95	En	96	Pd	97	En	98	En
Gr	En	Plutora Release	Trello	Jr	En	98	Serena Release	Sr	En	99	Fm	100	Pd	101	Fm	102	Fm
Ic	En	Tr	Jira	Rf	Fm	100	HipChat	Sl	En	101	Fm	102	Fm	103	Fm	104	Pd
Sl	En	Ls	Slack	Fd	En	102	Flowdock	Lg	En	105	En	106	Fm	107	Os	108	En
Lg	En	Gr	Graylog	Sn	En	108	ServiceNow	Tr	En	109	Os	110	Os	111	Os	112	Os
Logstash	En	Snort	Tripwire	Cy	En	110	CyberArk	Sp	En	111	Os	112	Os	113	Os	114	Fm
Graylog	En	Snort	Tripwire	CyberArk	En	115	En	116	Os	115	Os	116	Fm	117	Os	118	Os
Loggly	En	Snort	Tripwire	CyberArk	En	117	En	118	Os	117	Os	118	Os	119	Os	120	En

# Almost None of These Tools are Relevant to Salesforce

Only version control, ALM/collaboration, build and CI tools are at all relevant

PERIODIC TABLE OF DEVOPS TOOLS (V1)																								
<small>Os Open Source Fr Free Fm Freemium Pd Paid En Enterprise</small>																								
O	Os	Gt	Cl	Scm	Build	Test	Ch	Pu	An	Sl	Dk	Az	Ch	Pu	An	Sl	Dk	Az						
M	Fr	Git	CI	Deployment	Config / Provisioning	Containerization	Ci	Rpm	Available	Self	Docker	Azure	Ch	Pu	An	Sl	Dk	Az						
Y	Fm	Sv	Deployment	Cloud / IaaS / PaaS	Release Mgmt	Collaboration	Ch	Rpm	Available	Self	Docker	Azure	Ch	Pu	An	Sl	Dk	Az						
Mq	Pd	Subversion	Cloud / IaaS / PaaS	Release Mgmt	Collaboration	Security	Br	Config	Managed	Self	Docker	Azure	Ch	Pu	An	Sl	Dk	Az						
P	En	Mc	Gr	Jn	Bb	Tr	Ar	Fn	Se	Gn	Ch	Pu	An	Sl	Dk	Az	Ch	Pu	An	Sl	Dk	Az		
Pq	Fr	Mercurial	Gradle	Jenkins	Bamboo	Travis CI	Archiva	Fn	Selenium	Gathering	Ch	Pu	An	Sl	Dk	Az	Ch	Pu	An	Sl	Dk	Az		
Mg	Fm	Mv	Mr	Mr	Pd	Travis CI	Archiva	Fn	Gathering	Ch	Ch	Pu	An	Sl	Dk	Az	Ch	Pu	An	Sl	Dk	Az		
Mg	En	Mc	Gr	Jn	Bb	Tr	Ar	Fn	Se	Gn	Ch	Pu	An	Sl	Dk	Az	Ch	Pu	An	Sl	Dk	Az		
B	Fr	Br	At	Bm	Cs	Sn	Nx	Cu	Cj	Qu	Cp	Ju	Rd	Cf	Pk	Bx	Ch	Pu	An	Sl	Dk	Az		
B	Fm	Br	ANT	Buildahub	CodeShip	Snap CI	Nexus	Cucumber	Cucumber	Quandl	Capistrano	Juju	Rundeck	CFEngine	Packer	Buemix	Ch	Pu	An	Sl	Dk	Az		
B	En	Qb	Ub	Ta	Tc	Sh	Cc	Ay	Ju	Jm	Rd	Cy	Oc	No	Eb	Ad	Ch	Pu	An	Sl	Dk	Az		
B	Fr	Bucket	QuickBuild	UrbanCode	VisualBuild	Shipible	CruiseControl	Artifactory	Jira	Matteo	Jenkins	Replicency	CodaDeploy	Octopus Deploy	CA Nitro	Castillejo	Apprenda	Ch	Pu	An	Sl	Dk	Az	
B	Fm	Bb	Qb	Ub	Ta	Tc	Sh	Cc	Ay	Ju	Jm	Tn	Rd	Cy	Oc	No	Eb	Ad	Ch	Pu	An	Sl	Dk	Az
B	En	Qb	Ub	Ta	Tc	Sh	Cc	Ay	Ju	Jm	Tn	Rd	Cy	Oc	No	Eb	Ad	Ch	Pu	An	Sl	Dk	Az	
Cs	Fr	Hx	Msb	Rk	Lb	Cu	Ca	Gu	Ng	Ap	Xltv	Tc	Go	Ef	Xld	Ud	Mo	Cf	Ch	Pu	An	Sl	Dk	Az
Cs	Fm	Helix	Huboard	Rate	LinkedIn	Continuum	ContinuCI	Gump	NGC	Apache	Ant TestNG	FastComet	Go	ElectricFlow	XL Deploy	UrbanCode Deploy	Mesos	Cloud Foundry	Ch	Pu	An	Sl	Dk	Az
Cr	En	Xlr	Ur	Ls	Bm	Hp	Ex	Pi	Sr	Tr	Jr	Rf	Sl	Ed	Pv	Sn	Ch	Pu	An	Sl	Dk	Az		
Cr	Fm	XLR8	UrbanCode Releases	UrbanCode Virtualization	CA Service Virtualization	BMC Release Process	HP Color	Zuora	Putzus Release	Serena Release	Trello	Jira	HipChat	Slack	Eden	PowerShell	Snapper	Ch	Pu	An	Sl	Dk	Az	
Cr	En	Sp	Ki	Nr	Ni	Gg	Ct	Gr	Ic	Tr	Jr	Rf	Sl	Ed	Pv	Sn	Ch	Pu	An	Sl	Dk	Az		
Cr	Fm	Spurk	Albana	New Relic	Negocios	Ganglia	Cacti	Graphite	Logstash	Trello	Jira	HipChat	Slack	Eden	PowerShell	Snapper	Ch	Pu	An	Sl	Dk	Az		

Source: <https://digital.ai/periodic-table-of-devops-tools/>

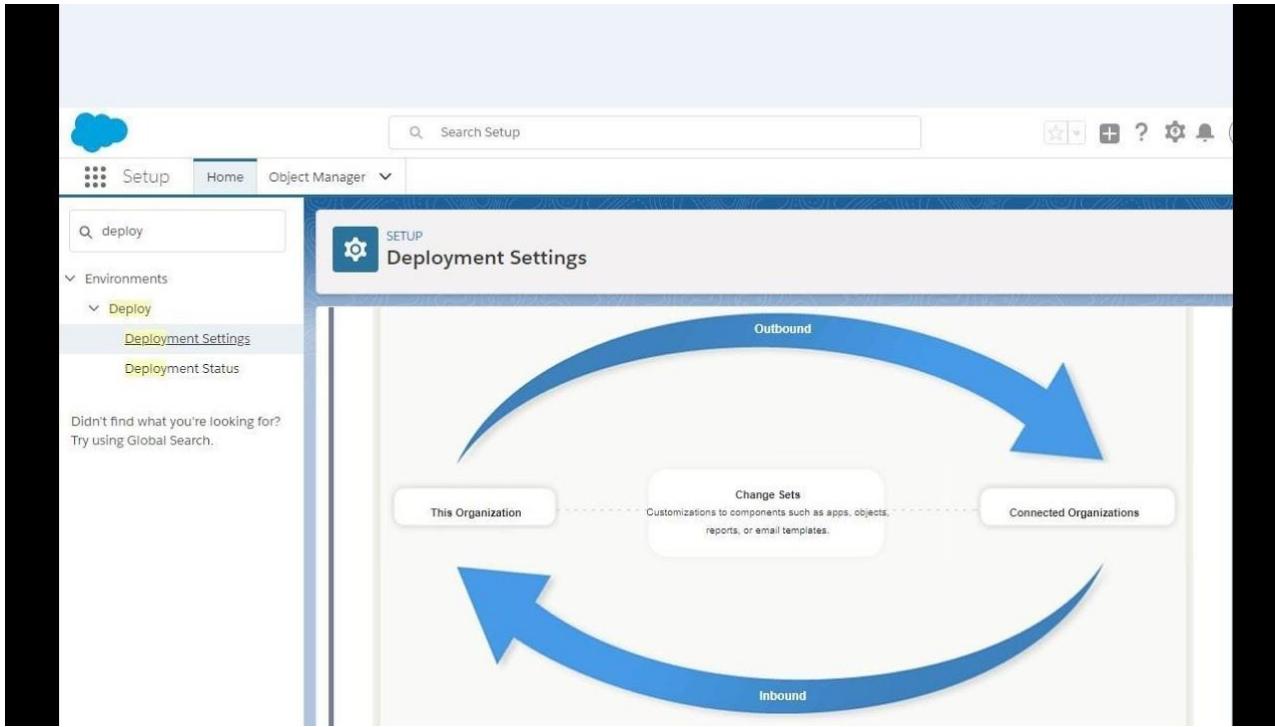
# DevOps Team Assumptions vs. Salesforce Reality

- Developers can all use Git
- The application is totally defined by its files
- Files can easily be merged using Git
- Comprehensive build scripts are available
- Build, test, and deploy jobs run quickly
- You can build, run, and test the application on any computer

In short ...



# The Default Method to Move Changes: Change Sets



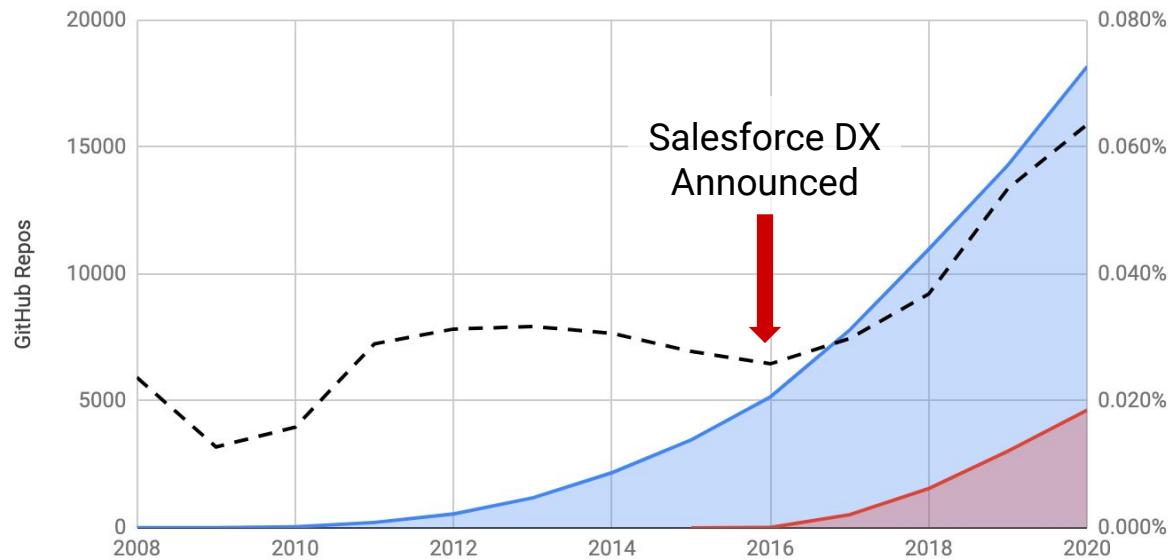
# Salesforce DX (Development Experience)

- Moonshot project announced in 2016, launched in 2017
- Increased funding for developer tooling teams
- Improved API support
- Visual Studio Code as the IDE of choice
- New command line interface
- New type of ephemeral environment: scratch orgs
- Packaging for enterprises
- Easier change tracking

# DevOps scripting is spurring Salesforce open source growth

Growth in Salesforce-related GitHub repos

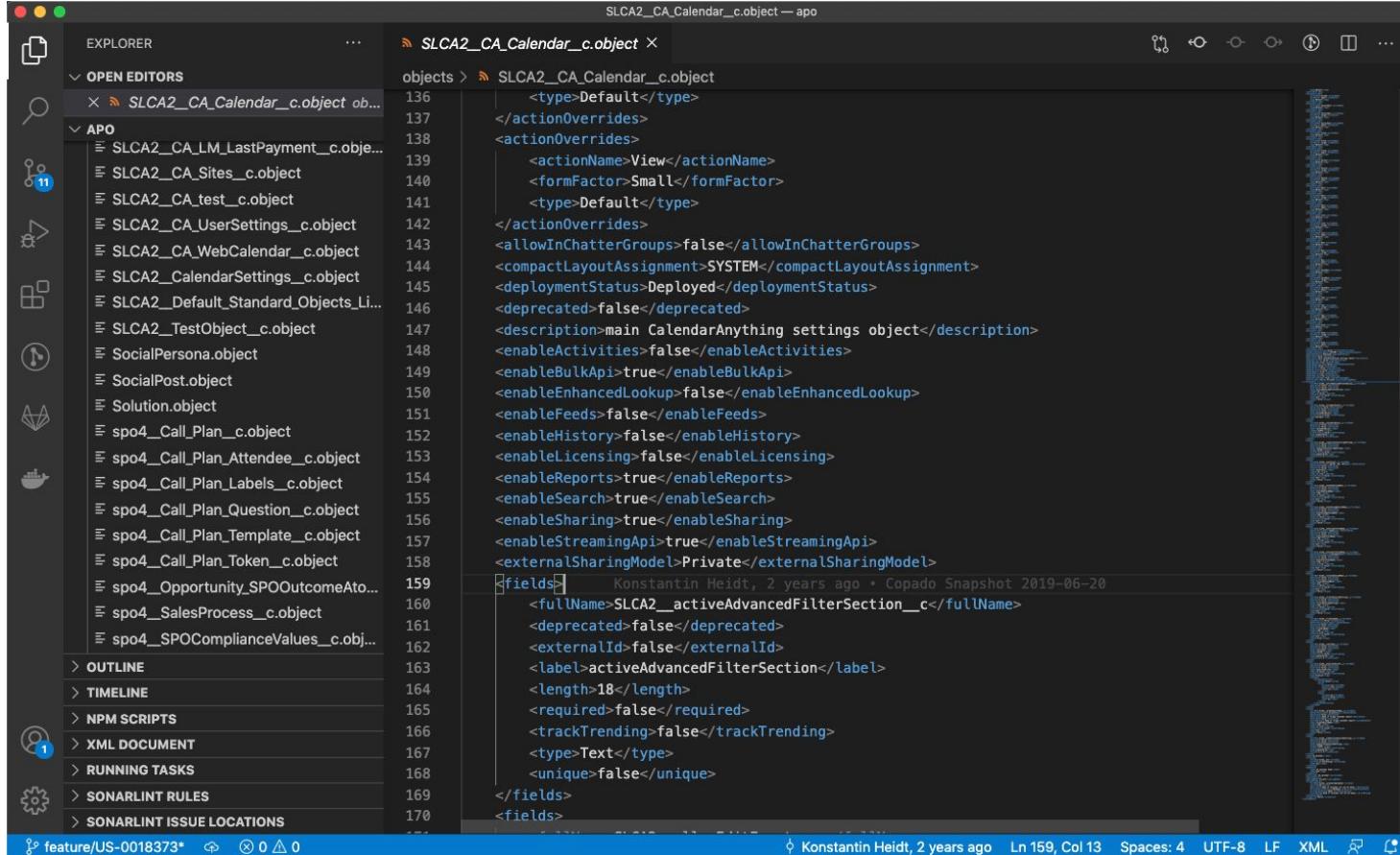
GitHub Repos mentioning "Salesforce"    GitHub Repos mentioning "sfdx"  
— — — Salesforce repos as a proportion of all GitHub repos



# How Salesforce Scripts Work



# Salesforce Metadata Behind the Scenes



The screenshot shows a code editor interface with a dark theme, displaying Salesforce metadata in XML format. The left sidebar contains an 'EXPLORER' view with a tree structure showing various objects under 'APO'. The main area is titled 'SLCA2\_\_CA\_Calendar\_c.object' and shows the XML definition for this object. The XML includes details like object type, actions, deployment status, and fields. A cursor is visible over the 'fields' section, which contains definitions for fields like 'activeAdvancedFilterSection'. The bottom status bar provides information about the file: 'feature/US-0018373\*' (version), '0 △ 0' (changes), 'Konstantin Heidt, 2 years ago' (author and date), 'Ln 159, Col 13' (location), 'Spaces: 4' (formatting), 'UTF-8' (encoding), 'LF' (line separator), 'XML' (file type), and several small icons.

```
<objects><object name="SLCA2__CA_Calendar_c">
<type>Default</type>
<actionOverrides>
<actionName>View</actionName>
<formFactor>Small</formFactor>
<type>Default</type>
<actionOverrides>
<allowInChatterGroups>false</allowInChatterGroups>
<compactLayoutAssignment>SYSTEM</compactLayoutAssignment>
<deploymentStatus>Deployed</deploymentStatus>
<deprecated>false</deprecated>
<description>main CalendarAnything settings object</description>
<enableActivities>false</enableActivities>
<enableBulkApi>true</enableBulkApi>
<enableEnhancedLookup>false</enableEnhancedLookup>
<enableFeeds>false</enableFeeds>
<enableHistory>false</enableHistory>
<enableLicensing>false</enableLicensing>
<enableReports>true</enableReports>
<enableSearch>true</enableSearch>
<enableSharing>true</enableSharing>
<enableStreamingApi>true</enableStreamingApi>
<externalSharingModel>Private</externalSharingModel>
<fields>
<fullName>SLCA2__activeAdvancedFilterSection__c</fullName>
<deprecated>false</deprecated>
<externalId>false</externalId>
<label>activeAdvancedFilterSection</label>
<length>18</length>
<required>false</required>
<trackTrending>false</trackTrending>
<type>Text</type>
<unique>false</unique>
</fields>
<fields>
```

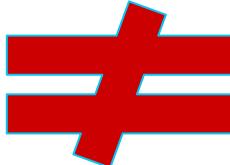


# Salesforce XML must be parsed to be merged properly

```
1  <xml_merge>
2    <how/>
3    <hard/>
4    <could/>
5    <it/>
6    <be/>
7  </xml_merge>
```

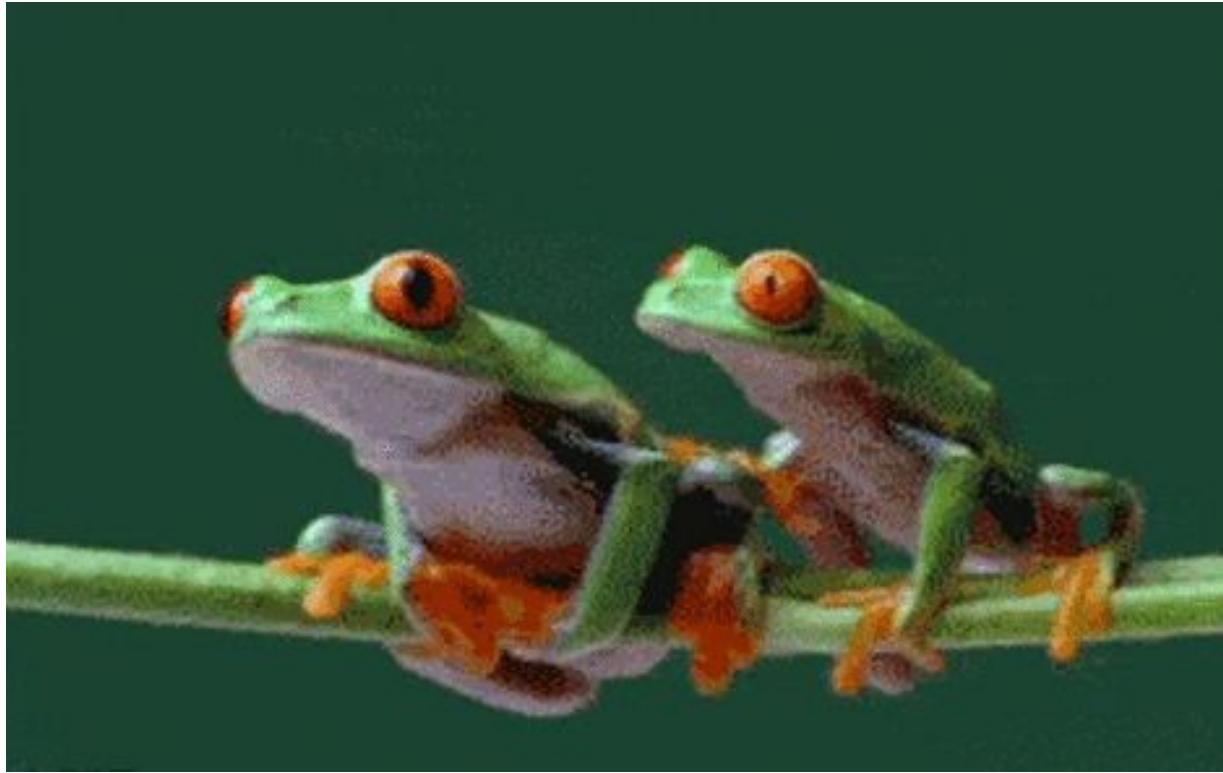


```
1  <xml_merge>
2    <you/>
3    <dont/>
4    <want/>
5    <to/>
6    <know/>
7  </xml>
```



```
1  <xml_merge>
2    <how/>
3    <you/>
4    <hard/>
5    <dont/>
6    <could/>
7    <want/>
8    <it/>
9    <to/>
10   <be/>
11   <know/>
12  </xml>
```

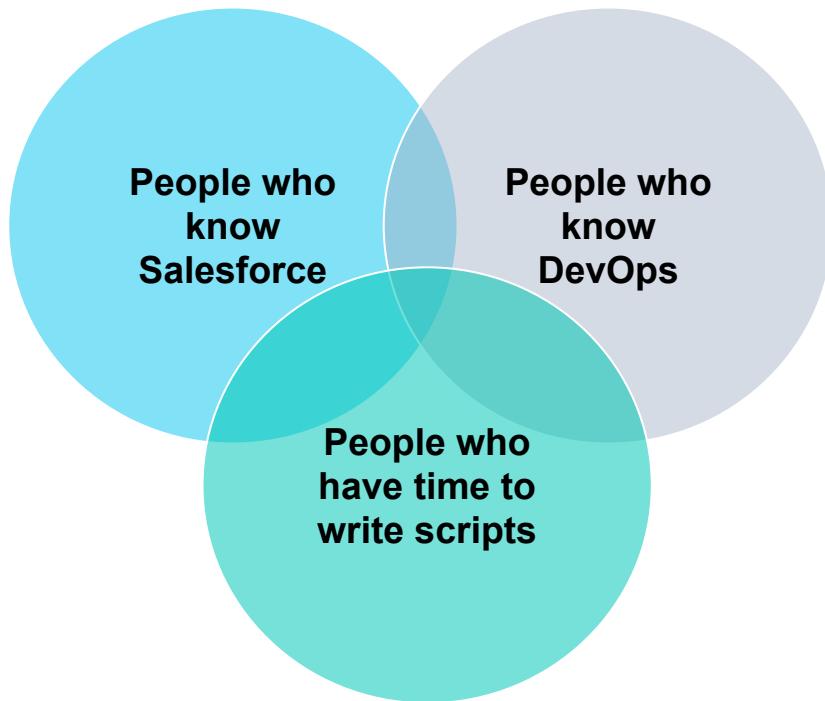
# Performing a small Git merge in Salesforce



# Performing a large Git merge in Salesforce

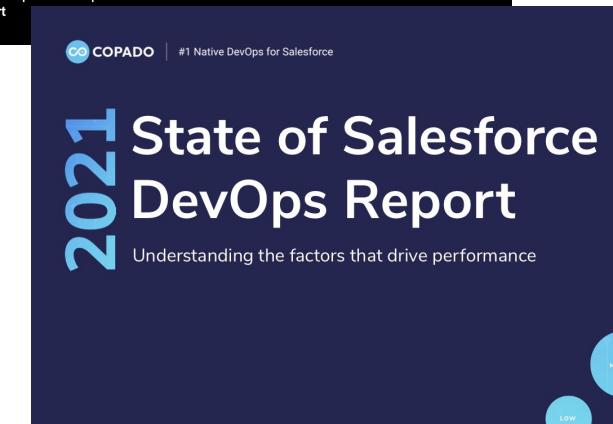


# The limiting factor on homegrown Salesforce DevOps tools



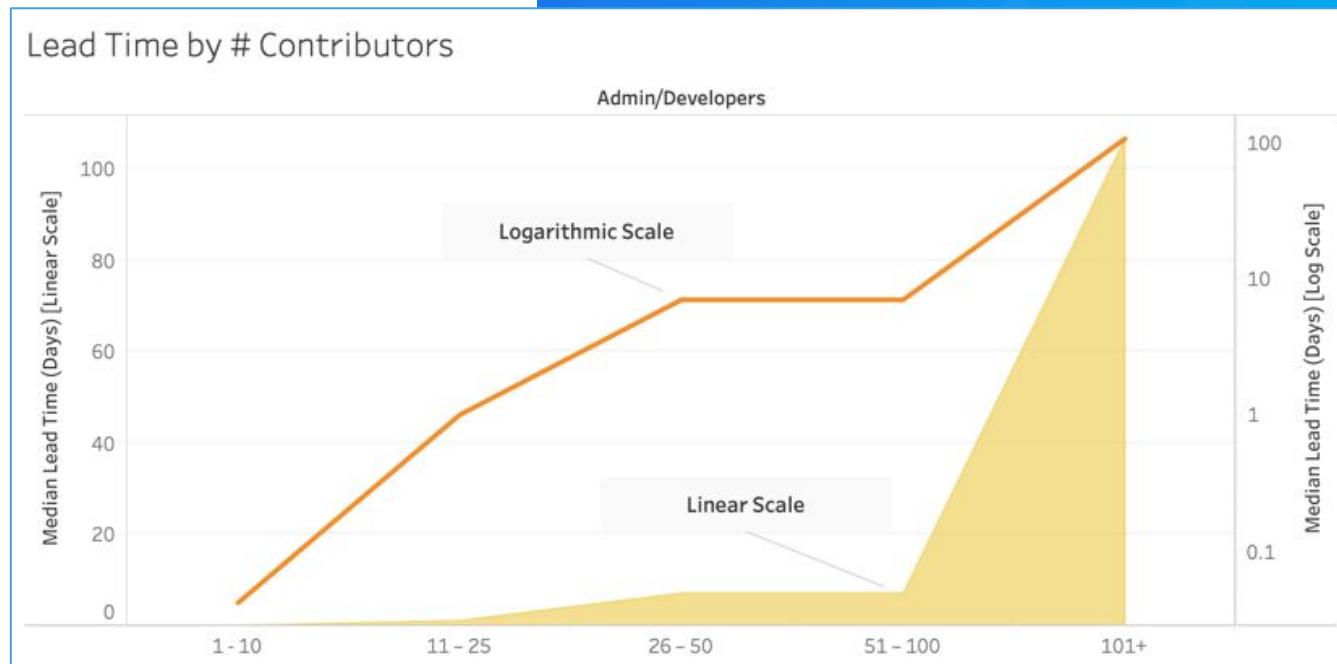
# State of Salesforce DevOps Reports

- Conclusions
  - Technical practices of DevOps are **less mature** vs. broader IT industry
  - But software delivery **performance is comparable**
- Why?
  - Salesforce is inherently stable and fast
- But
  - Teams struggle as they get bigger



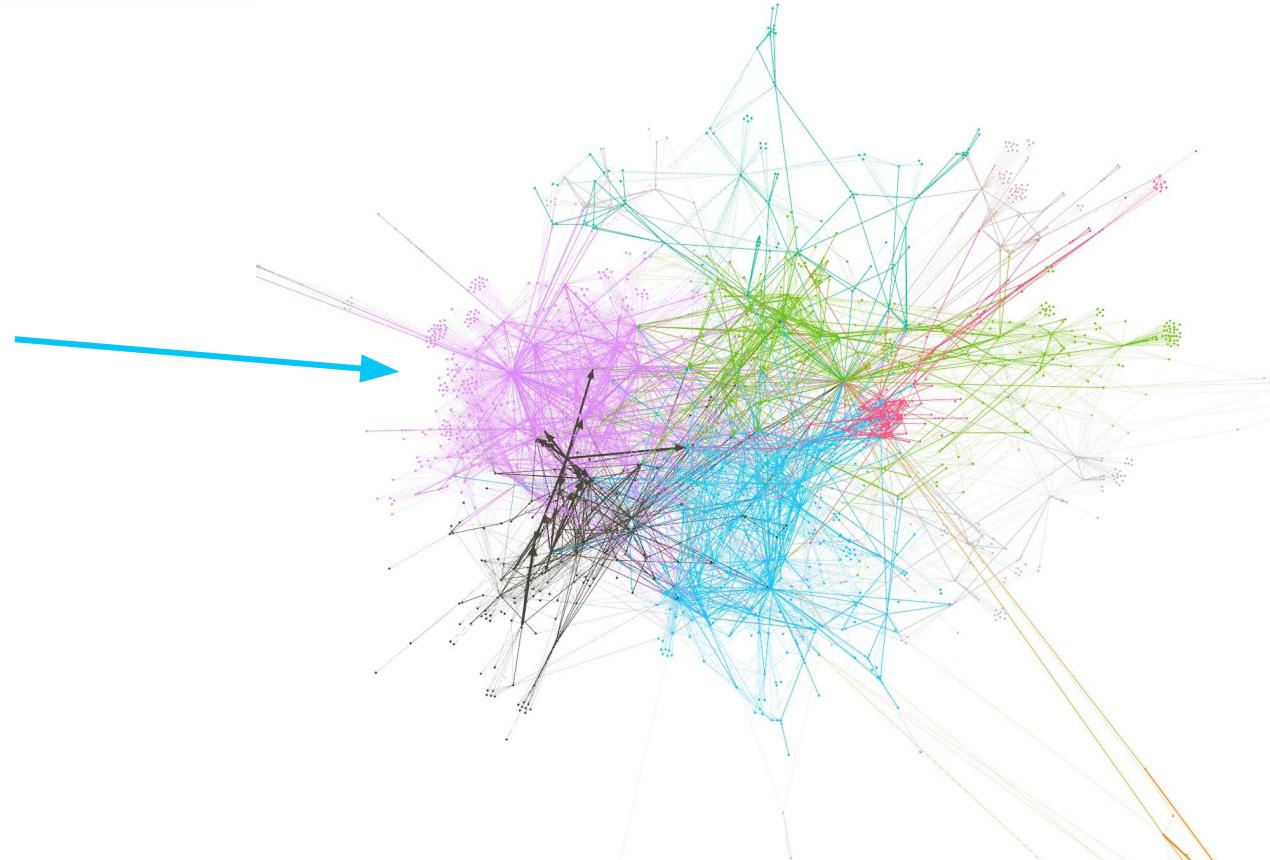
# Main Conclusions

Companies struggle as they get bigger.  
Especially with Lead Time

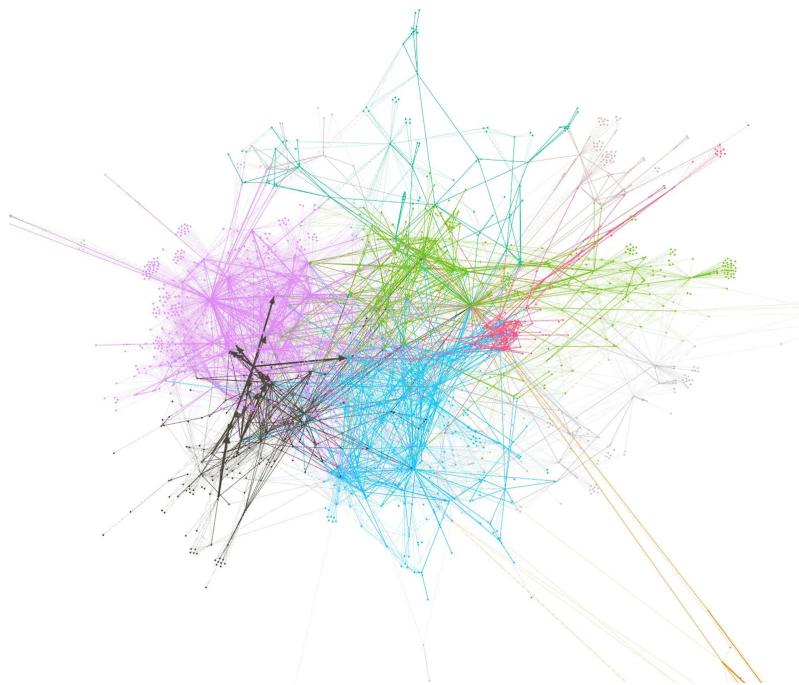


# Metadata tends to be tightly coupled

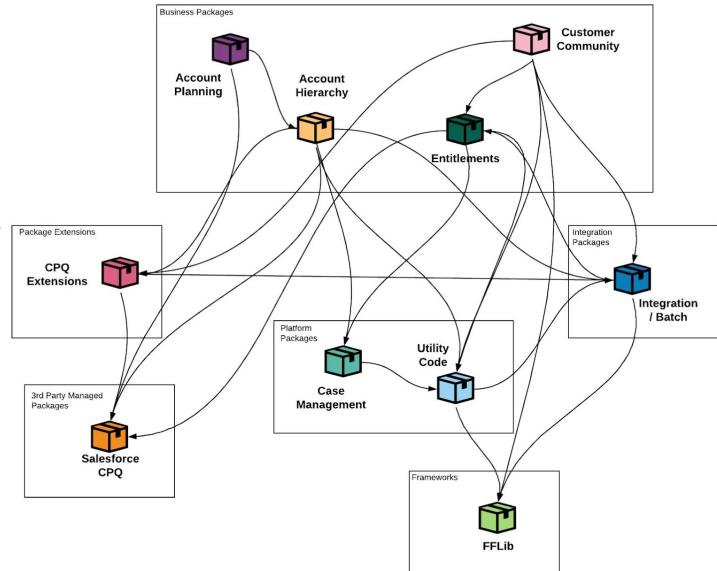
Components become highly interdependent



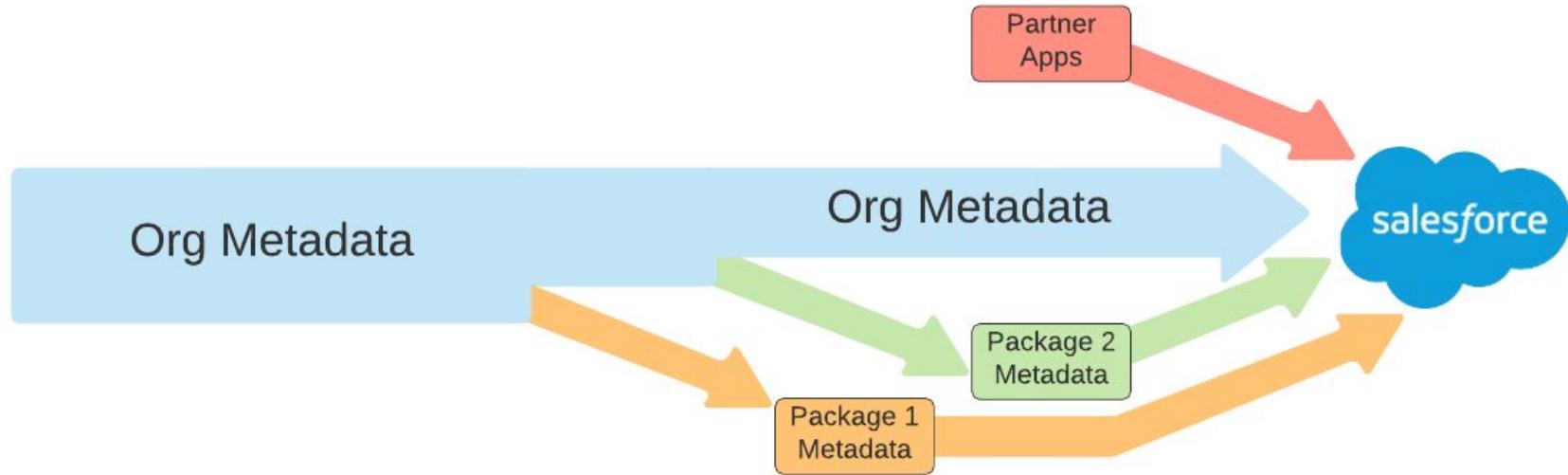
# Salesforce “unlocked packages” promise modularization



Proposed Packaging Structure



# The goal of packaging: Reduce complexity



# But the obstacles to packaging are *Legion*

Requires **refactoring** much of the codebase

No immediate value add (hard to get **investment** buy-in)

Requires **sophisticated** software engineering

Development **environments** (scratch orgs) can be hard to provision

Package **dependencies** become tricky

**Multi-pipeline** builds become required

# Why commercial DevOps tools for Salesforce

- GUI for Salesforce admins to track their work in version control
- GUI for managing flow of changes
- Intelligent Salesforce metadata handling
- Deploying complex configuration data
- Tools for reporting and team collaboration
- Some (ex: Copado) are customizable Salesforce apps

# Two CI/CD and testing options for any Low Code platform

## Build

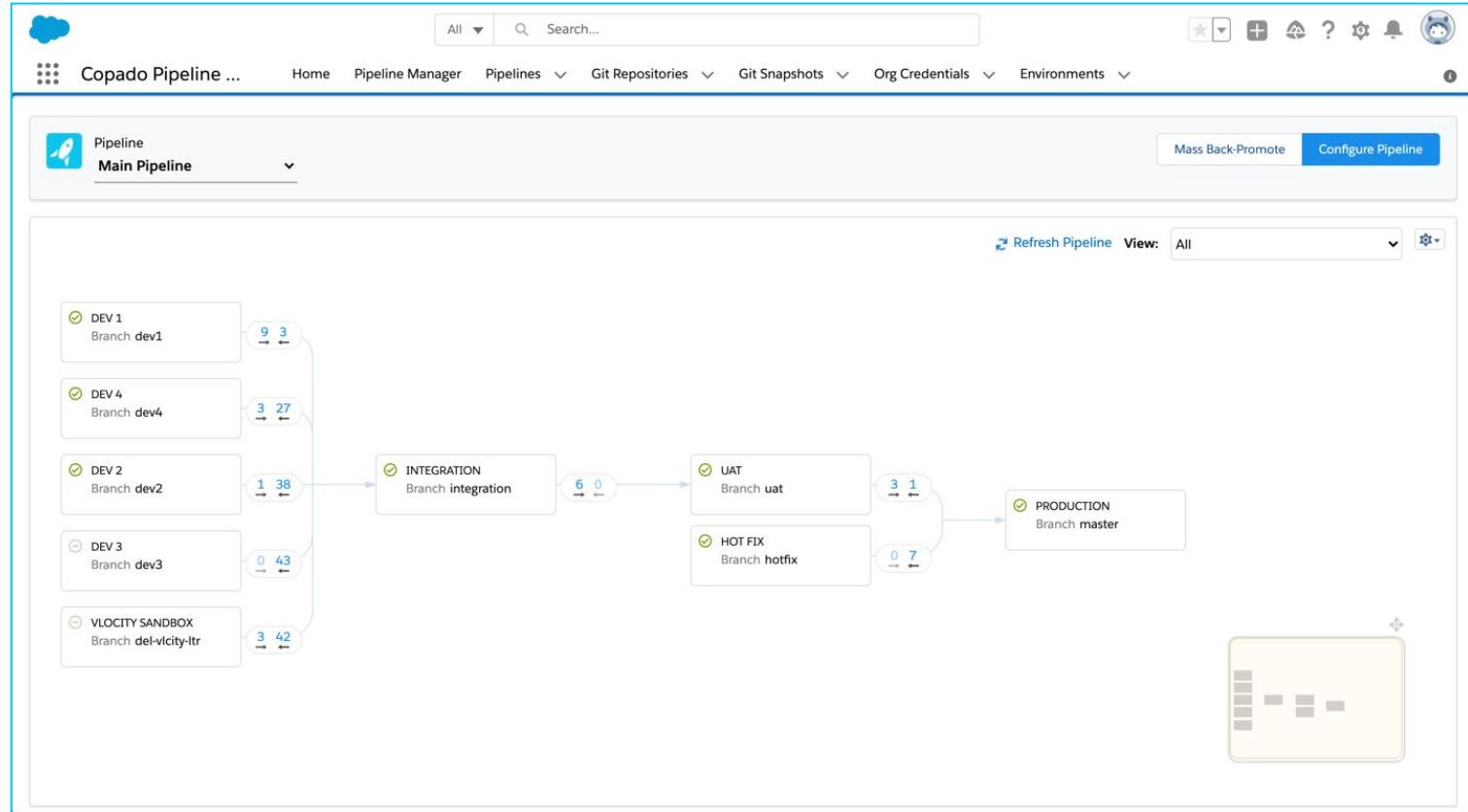
- Dev tools have improved greatly
- Commit time to building scripts
- Costs are hidden
- Easier for teams with many coders
- Brace yourself for merge conflicts
- Train non-coders in Git

## Buy

- Growing number of commercial options
- Still requires **process** training
- Costs are explicit
- Easier for teams with fewer coders

# Collaboration: Centralize on a Common Platform

The Salesforce Platform is a perfect place for DevOps collaboration too!!



# Automated testing designed for low code apps

Easy to build, run, understand, and maintain

The screenshot shows a browser window with the URL `slockard-dev-ed.lightning.force.com/lightning/o/Lead/new?count=1&nooverride=1&useRecordTypeCheck=1&navigationLocation=L...`. The page title is "New Lead | Salesforce". The browser status bar indicates "Chrome is being controlled by automated test software." The main content is a "New Lead" form in the Salesforce Lightning interface. The form fields include:

- Lead Owner:** TEST ROBOT
- Name:** Demo McTest (highlighted with a yellow box)
- Salutation:** Mr. (highlighted with a yellow box)
- First Name:** Demo
- Last Name:** McTest
- Company:** ExampleCorp
- Title:**
- Email:**
- Lead Source:** --None--
- Industry:** --None--
- Lead Status:** Open - Not Contacted
- Annual Revenue:**
- Rating:**

At the bottom of the form are buttons for "Cancel", "Save & New", and "Save".

The left side of the image shows the QWord test script code, which includes sections for settings, resource loading, suite setup, teardown, and test cases. The test cases section contains various actions like `Enter And Convert Lead`, `Fill out form and perform data validations`, and `Fill in remaining fields, save form`.

# Track metrics on your value stream

Value stream management is now on Salesforce

The screenshot displays the COPADO DevOps 360 interface. At the top, there's a navigation bar with links for DevOps 360, Dashboards, DevOps Analytics, Value Stream Maps, Reports, User Stories, and DevOps 360 Setup. The main area shows a summary card for 'My DevOps Process' created on 7/7/2020. The card includes fields for Object (User Story), Record Type (User\_Story), Active (Yes), Last Execution (4/22/2021, 09:00 PM), Rolled % C/A (23%), Total Cycle Time (7d 18h), Total Idle Time (2M 22h), Total Lead Time (2M 8d 16h), Total Work Items in Progress (31), and Business Value (\$212000.00). Below this, a grid shows four columns: Define & Plan, Build, Test, and Release. Each column contains two boxes: Design and Refinement, Front End Development, Automated QA, and Deploy & Release! respectively. The 'Define & Plan' section also has Back End Development, Manual QA, and a Feed tab at the bottom.

Object	Record Type	Active	Last Execution
User Story	User_Story	Yes	4/22/2021, 09:00 PM

Rolled % C/A	Total Cycle Time	Total Idle Time	Total Lead Time	Total Work Items in Progress	Business Value
23%	7d 18h	2M 22h	2M 8d 16h	31	\$212000.00

View	All
DEFINE & PLAN	1d 9h 4
Design and Refinement	2 1
Lead Time:	4d 8h
Cycle Time:	2d 23h
% C/A:	40.00%
Business Value:	\$12000.00
BUILD	1d 4h 5
Front End Development	4 1
Lead Time:	2d 9h
Cycle Time:	1d 5h
% C/A:	50.00%
Business Value:	\$12500.00
TEST	1M 25d 8h 4
Automated QA	2 1
Lead Time:	1M 28d 9h
Cycle Time:	3d 1h
% C/A:	100.00%
Business Value:	\$4000.00
RELEASE	3d 1h 5
Deploy & Release!	5 1
Lead Time:	4d 4h
Cycle Time:	1d 3h
% C/A:	100.00%
Business Value:	\$13500.00
Back End Development	0 0
Manual QA	0 0

Feed

# Want to Learn More?

Search for “DevOps” on Salesforce’s [trailhead.com](#)

The screenshot shows the Trailhead website interface. At the top, there's a search bar with the placeholder "Search for modules, trails, and more...". Below the search bar is a navigation menu with links for Home, Learn (with dropdowns for "Sponsored content" and "Community"), Credentials, Community, For Companies, and COVID-19. On the right side of the header, there's a user profile for "Andrew Davis" showing "56 badges, 33,375 points".

The main content area displays a trail titled "Salesforce DevOps and Continuous Innovation with Copado". A banner for this trail states: "Sponsored content: Discover the big ideas in DevOps and make your Salesforce development process faster and more reliable." It offers "+1,000 Points" for completion.

Two modules are listed under this trail:

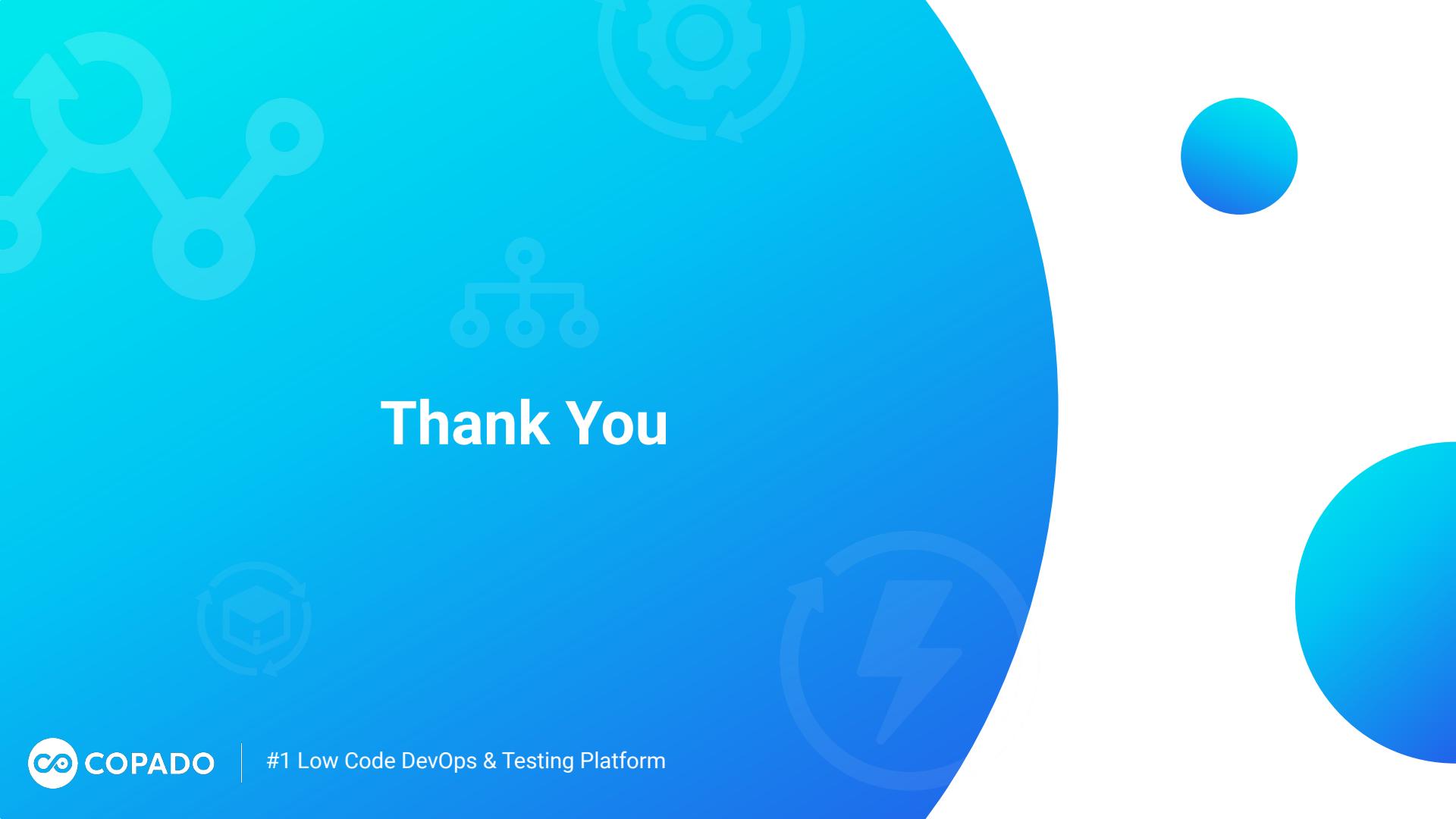
- Salesforce DevOps with Copado**: This module is completed on 8/12/20. It offers "+500 POINTS" and includes icons for a heart, a plus sign, and a gift.
- Continuous Innovation with Copado**: This module is also completed on 8/12/20. It offers "+500 POINTS" and includes the same three icons.

# The Help I Need

---

- Are you working on other low-code platforms?
- If so, what challenges are you facing?
- If you're struggling with DevOps for Salesforce please get in touch!

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[@AndrewDavis\\_io](https://twitter.com/AndrewDavis_io)



# Thank You



TEAMWORK



INSPIRATION



ENGAGEMENT



TRUST



TALENT



TRANSPARENCY



COMMUNITY



DIVERSITY



QUALITY



RESPECT

Build On  COPADO