

DevOps for Salesforce

Andrew Davis

Sr. Director of Research & Innovation, Copado



#1 Native DevOps for Salesforce

DevOps for Salesforce

DevOps Enterprise Summit Europe | May, 2021

DevOps for Salesforce

- or -

"Why the business has been **bypassing IT** for decades
but is now in **over their heads**,
and **how you can help** without going insane"



Andrew Davis
Sr. Director of Research & Innovation
Copado
Author of
Mastering Salesforce DevOps

adavis@copado.com
[@AndrewDavis_io](https://www.twitter.com/AndrewDavis_io)



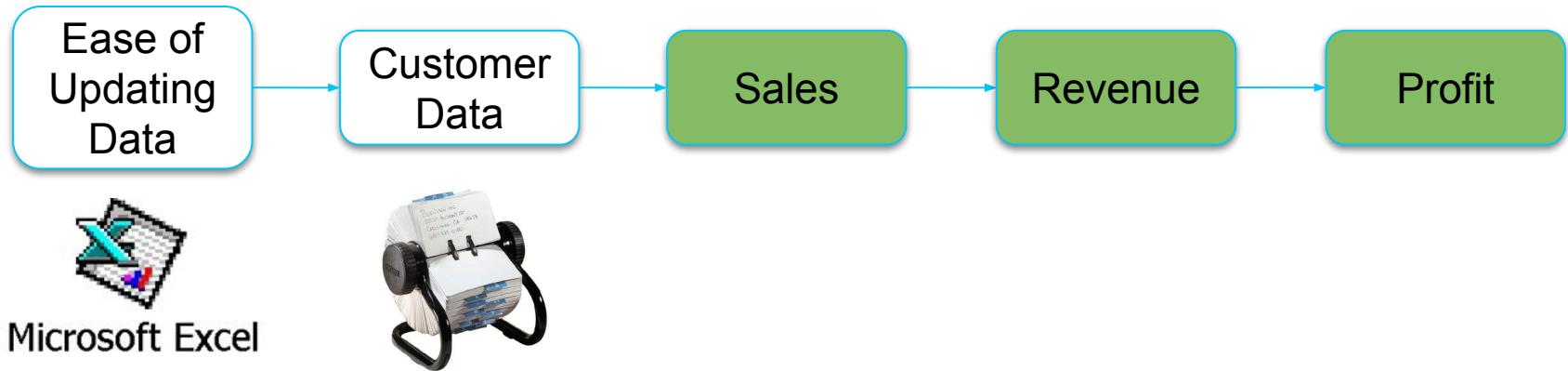
What the heck is Salesforce, and why should you care?

Salesforce ...

- The business
- The technology
- The acquisitions
- The community
- The parties
- The mascots
- The real estate

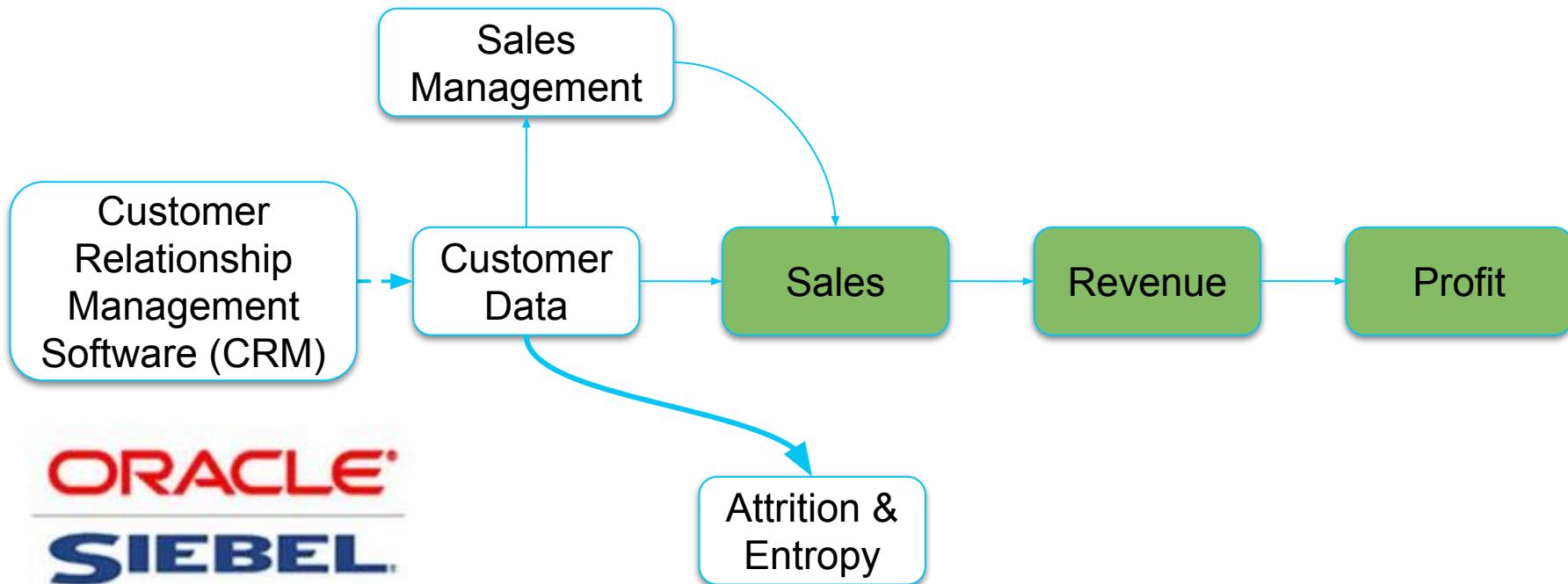
Why Start with Sales?

You've got opportunities. What's limiting your profitability?



The Rise of CRM (circa 1998)

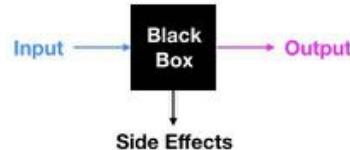
Tracking and retaining customer data



ORACLE
SIEBEL

How to Install Your Own CRM (circa 1998)

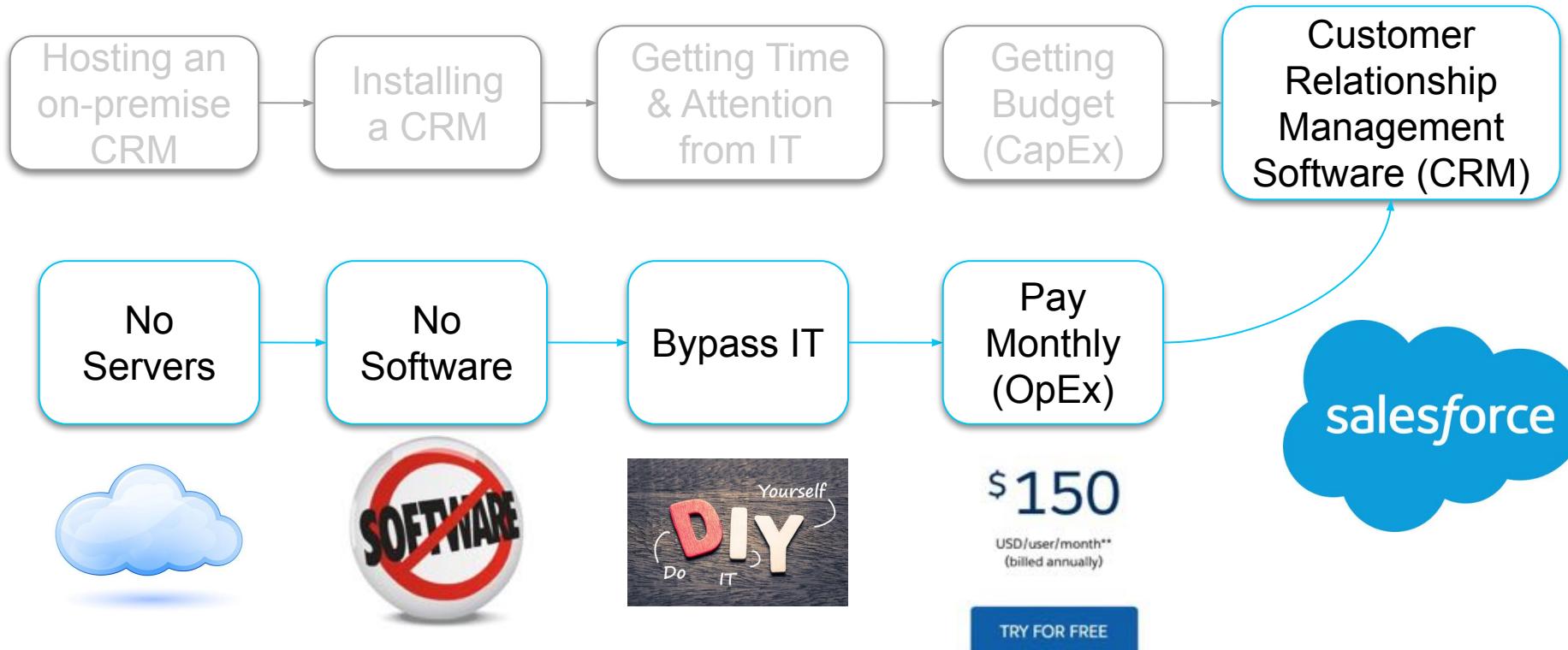
In under 3 years and \$5,000,000

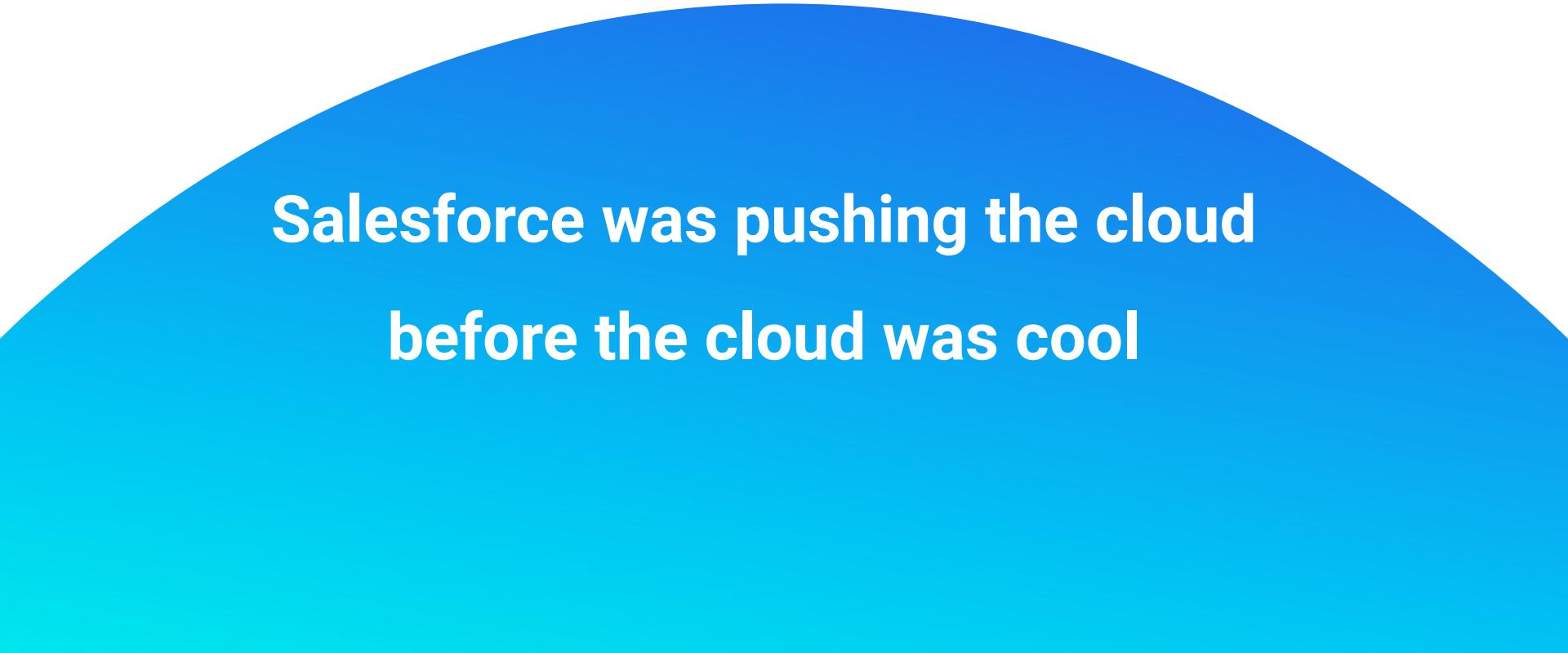


ORACLE®
SIEBEL®

The Cloud CRM Alternative (since 1999)

Get started quickly, simply, and affordably





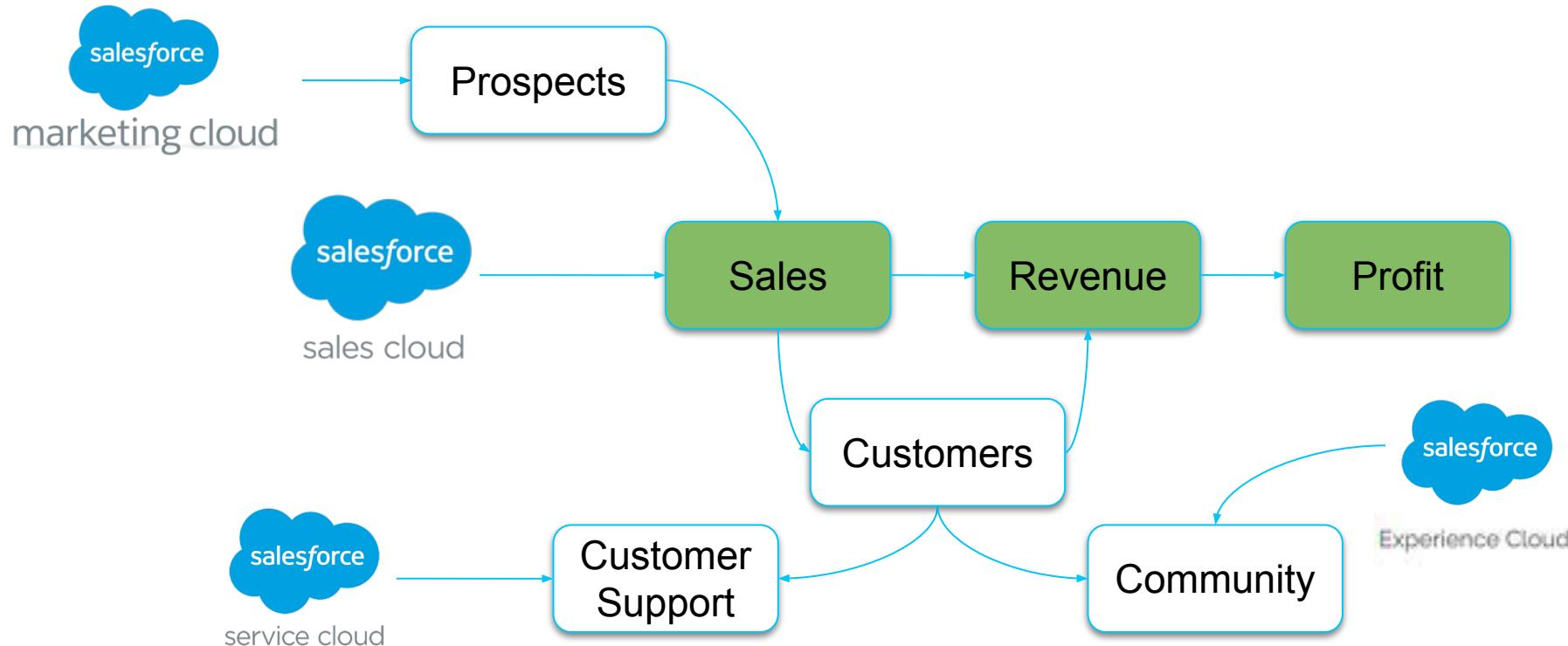
**Salesforce was pushing the cloud
before the cloud was cool**

Benefits of Salesforce in a Nutshell

- They host all the infrastructure
- Major upgrades 3x/year
- They provide support, security, training, etc
- Application addresses most common needs
- Highly customizable

Why Stop with Sales?

Salesforce continues to address adjacent needs



Salesforce Leads in Service, Marketing, and More

Leader in
multiple
Analyst
categories



MOST INNOVATIVE
COMPANIES IN
THE WORLD
Forbes
2018



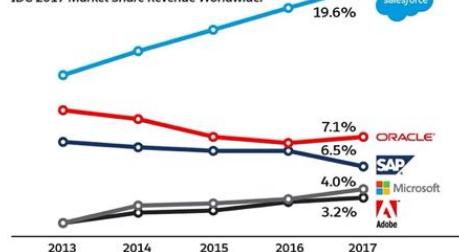
WORLD'S MOST
ADMIRERED COMPANIES
FORTUNE
2013-2019



#1 CRM 7 YEARS
IN A ROW*
IDC
Analyze the Future
2013-2020H1

Salesforce. #1 CRM.

Ranked #1 for CRM Applications based on IDC 2017 Market Share Revenue Worldwide.



Source: IDC, Worldwide Semiannual Software Tracker, April 2018.

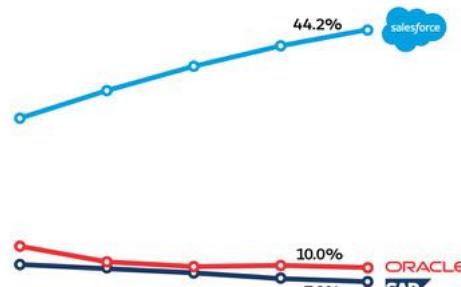


Salesforce.com/number1CRM

Salesforce.com market includes the following IDC-defined functional markets: Sales, Customer Service, Contact Center, and Marketing Applications. © 2018 Salesforce.com, Inc. All rights reserved. Salesforce.com is a registered trademark of salesforce.com, Inc., as are other names and marks.

Ranked #1 in Service.

Ranked #1 for Customer Service
Applications based on IDC 2019H1
Revenue Market Share Worldwide.



Source: IDC, Worldwide Semiannual Software Tracker, Oct. 2019.

2020 Magic Quadrant

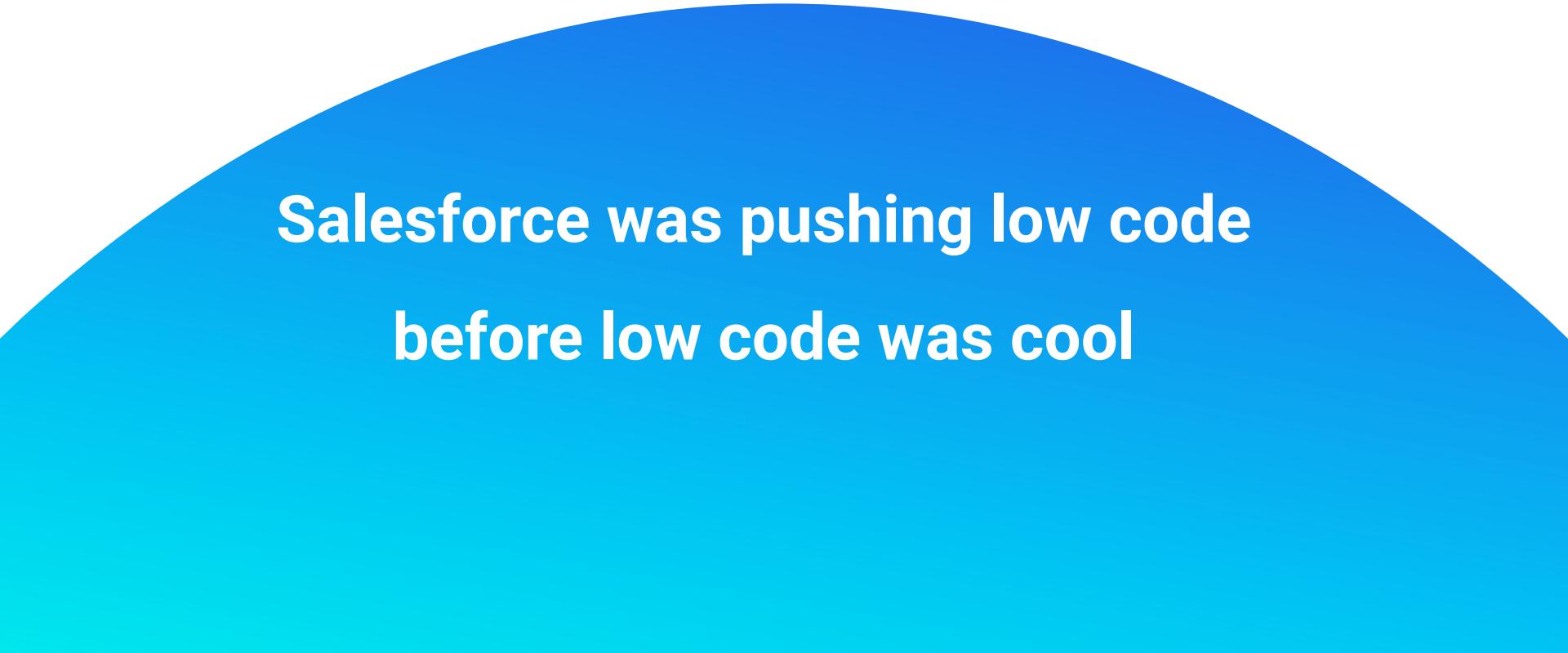
Multichannel Marketing Hubs



As of Apr 2020

© Gartner, Inc.

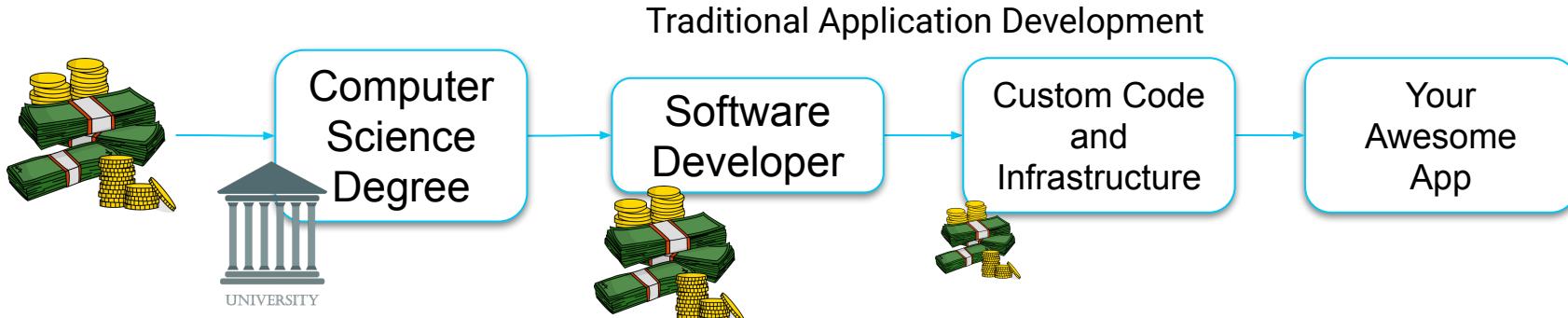
DO



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

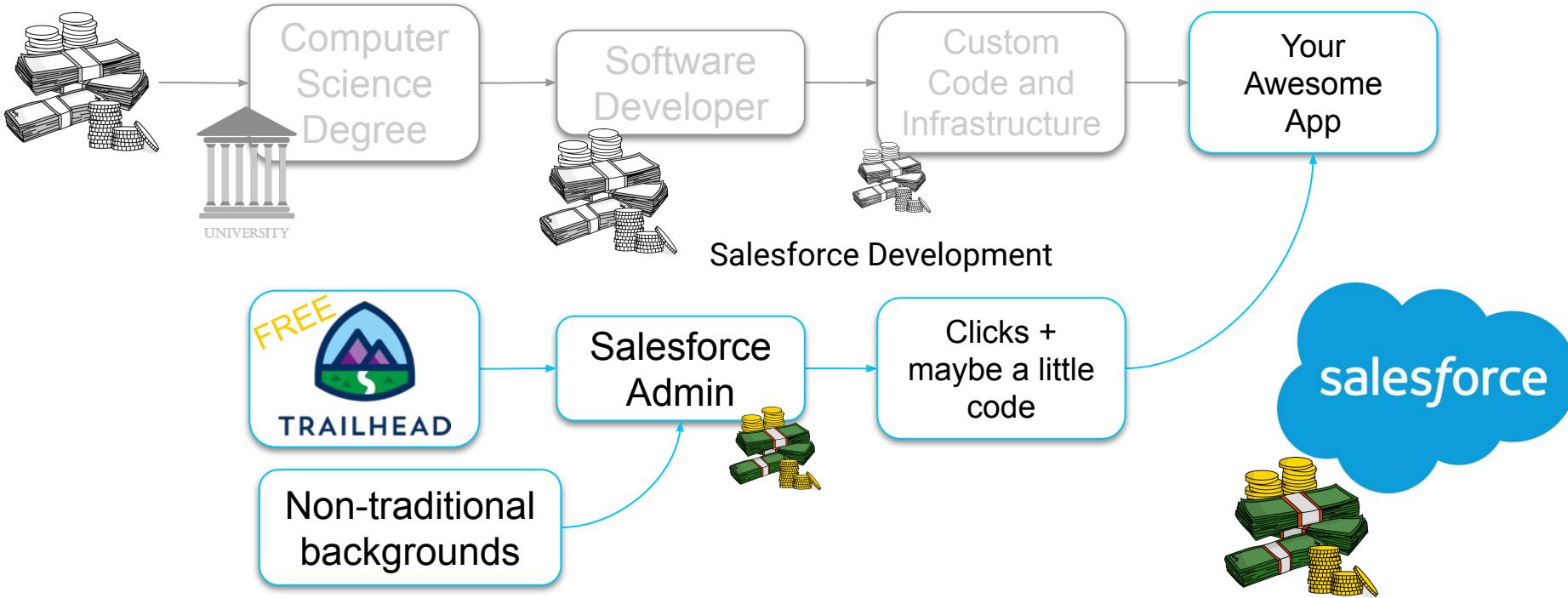
Application Development: The Traditional Way

You know it, you love it



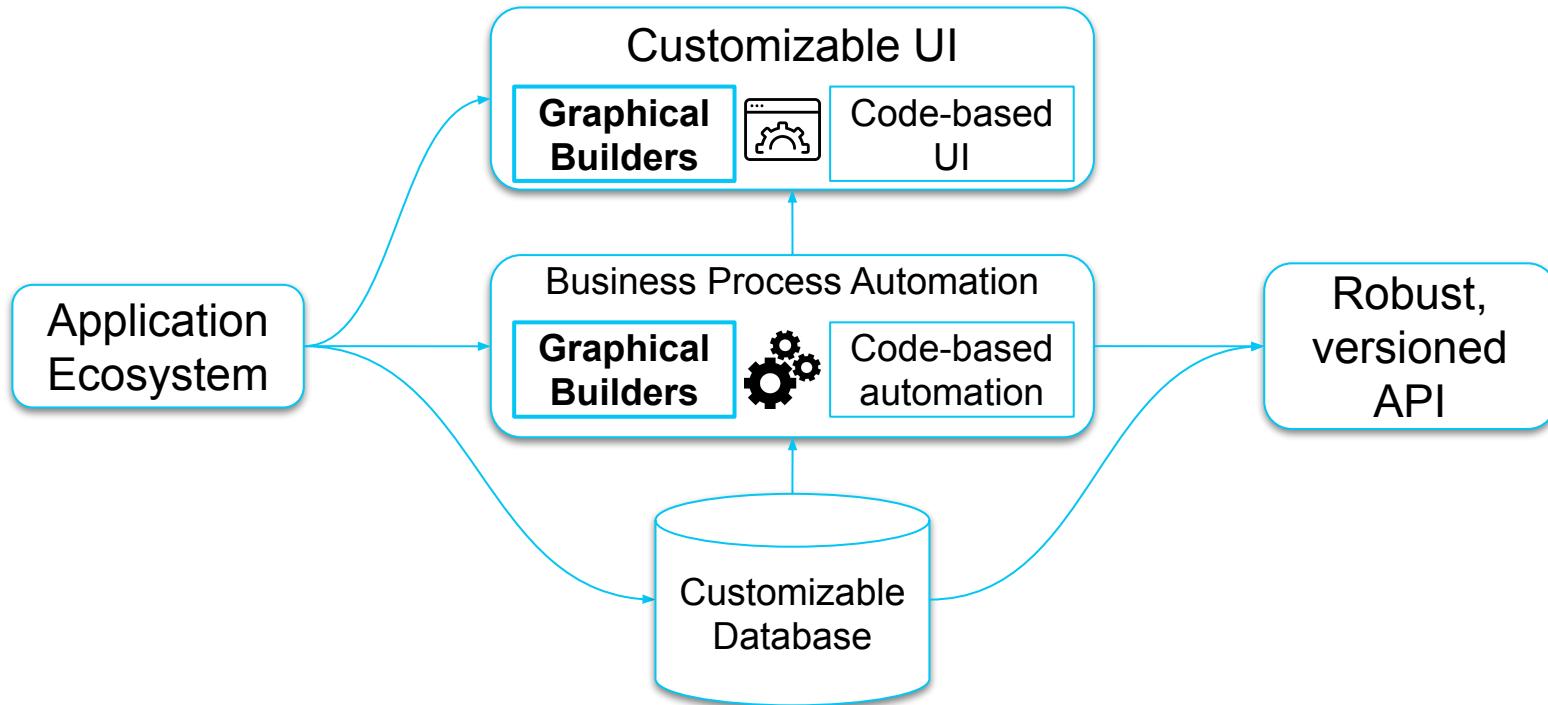
Application Development: The Salesforce Way

Oooooo ... that was kind of easy



Custom 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



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



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)



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 Home, Object Manager, and a search bar labeled "Search Setup". Below the navigation is a title bar with "Schema Builder" and a "Help for this Page" link.

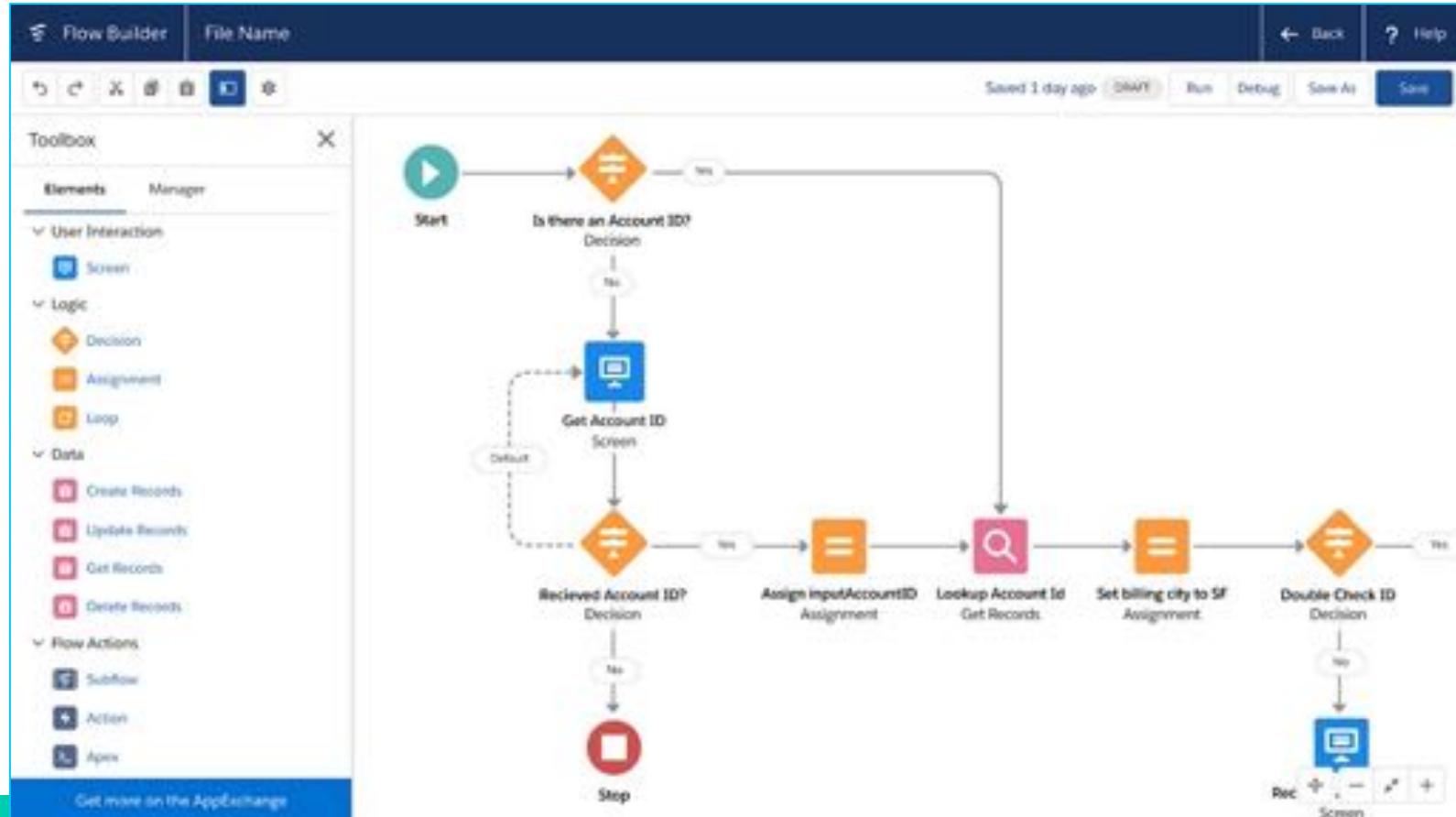
The main area contains three custom object definitions:

- Solution**:
 - Fields: Created By (Lookup), Last Modified By (Lookup), Public (Checkbox), Solution Details (Rich Text Area), Solution Number (Auto Number), Solution Title (Text), Status (Picklist), Visible in Public Knowledge Base (Checkbox).
 - Relationships: A line connects "Created By" to the "User" object.
- Lead**:
 - Fields: Address (Address), Annual Revenue (Currency), Campaign (Lookup), Company (Text), Company D-U-N-S Number (Text), Created By (Lookup), Current Generator(s) (Text).
 - Relationships: Lines connect "Address" to "D&B Company" and "Company" to "D&B Company".
- D&B Company**:
 - Fields: Annual Revenue Growth (Number), Annual Sales Volume (Number), Annual Sales Volume Indicator (Picklist), Company Description (Long Text Area), Delinquency Risk (Picklist).
 - Relationships: Lines connect "Annual Revenue Growth", "Annual Sales Volume", and "Delinquency Risk" to the "Solution" object.

A legend on the right side defines the relationship types:

- Lookup Relationship (represented by a line)
- Master-Detail Relationship (represented by a dashed line)
- Required Field (represented by a red border)

Building on Salesforce - Business Process Automation



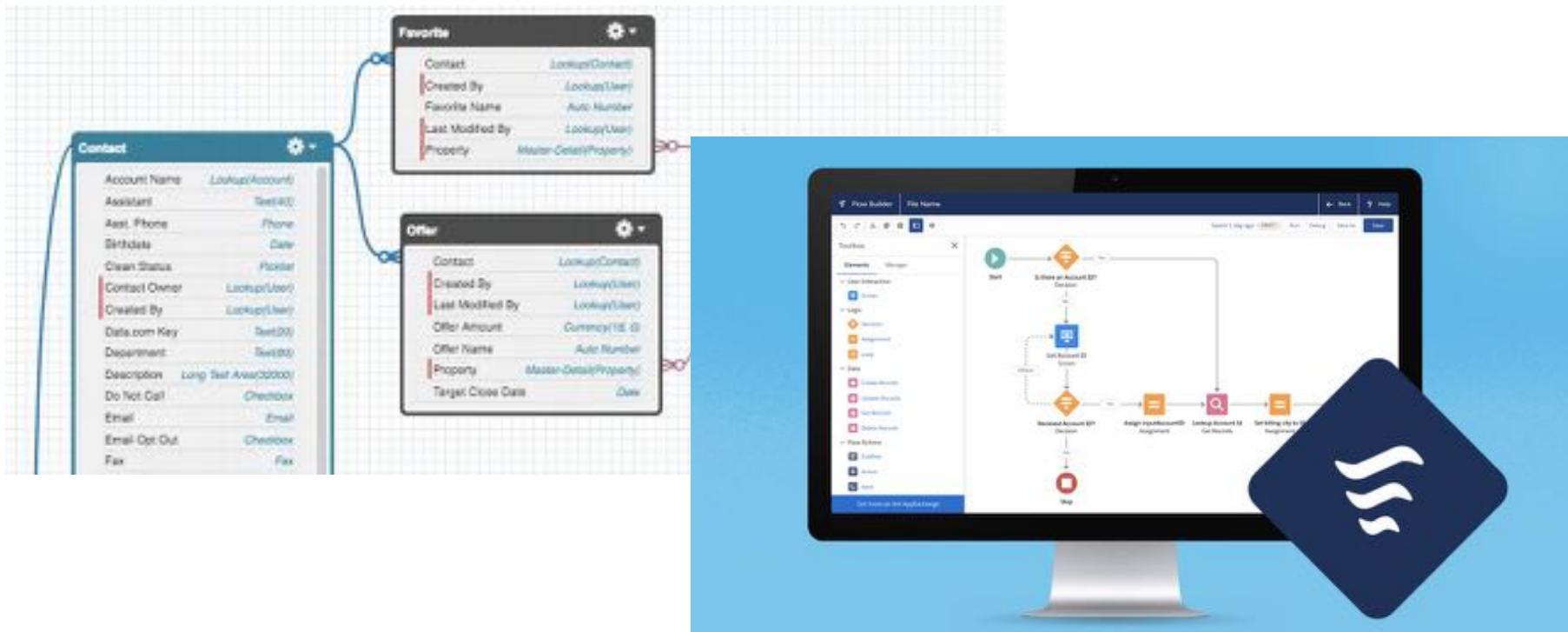
Building on Salesforce - User Interface Design

The screenshot shows the Lightning App Builder interface for creating a new home page. The top navigation bar includes 'Lightning App Builder - desktopDefault', 'Back', 'Help', 'Save', and 'Activation...' buttons. The left sidebar lists categories: 'SmartScope Recent Record', 'Today's Tasks', 'Top Deals', 'Upcoming Events', 'Visualforce', 'Custom (0)', and 'Custom - Managed (10)'. Under 'Custom - Managed', there is a list of TaskRay components: TaskRay Board, TaskRay Feed, TaskRay Kanban, TaskRay My Projects, TaskRay Project Clone, TaskRay Snapshot, TaskRay Status, TaskRay Time Entry, TaskRay To Dos, and TaskRay Today. The main workspace displays two components: 'SmartScope Recent Record' and 'TaskRay Today'. The right panel contains configuration fields: 'Page' (Label: 'desktopDefault', Developer Name: 'desktopDefault'), 'Page Type' (Home Page), 'Template' (Standard Home Page), and a 'Description' field which is empty. At the bottom left of the workspace, there is a link '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

Salesforce makes it easy to build



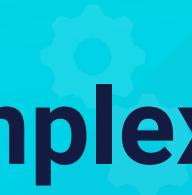


Easy is Great*

*Some conditions apply



The trouble with Easy:



Easy → Fast → More → Complex

Things add up



Bigger orgs with bigger teams
need to be increasingly careful



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



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

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

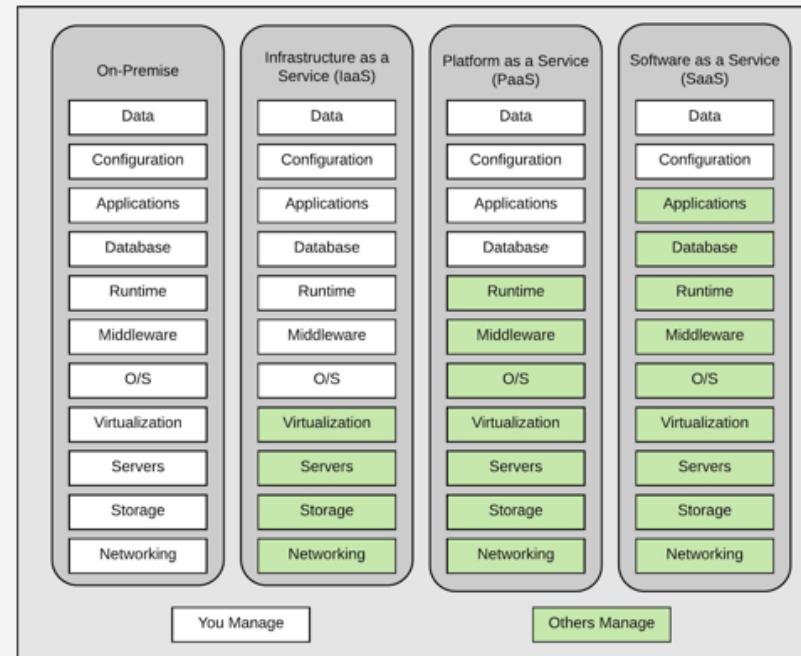
Upload code, databases, etc.

Software as a Service

Configure applications, store data

Salesforce

Functions like a PaaS, configured like SaaS



Typical Tools Used in DevOps Processes

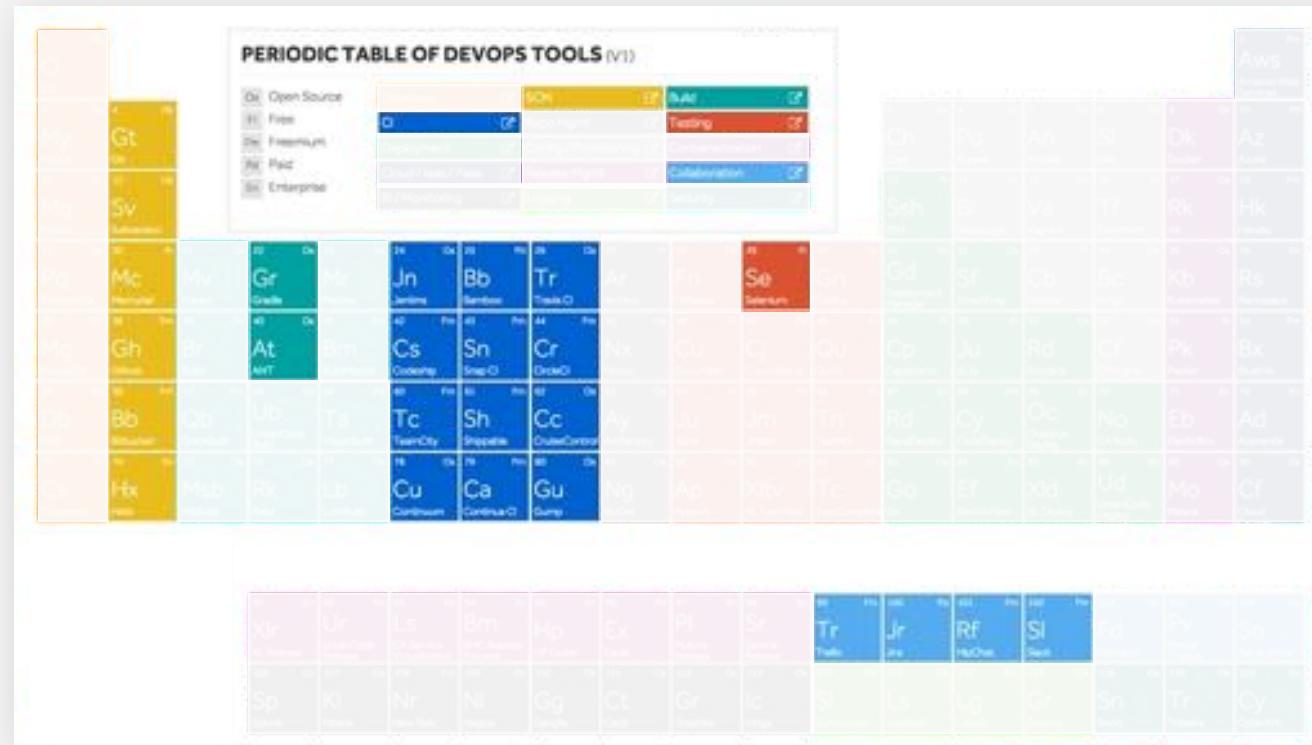
Most DevOps Tools focus on supporting IaaS or PaaS systems



PERIODIC TABLE OF DEVOPS TOOLS (V1)																	
Open Source	Commercial	Deployment	Cloud / Iaas / Paas	Bd / Monitoring	Testing	Config / Provisioning	Containerization	Release / Mgmt	Collaboration	Logging	Security	Platform	Monitoring	Metrics	Logs	Metrics	Logs
O	Ur	Ls	Bm	Hp	Ex	Pj	Sr	Tr	Jr	Rf	Sl	Fd	Pv	Sn	Ur	Sl	Fd
MySql	Gt	Repo	Hightide	HP Code	Excel	Putout	Serverless	Travis CI	Jenkins	Logstash	Graviton	HashiCorp	CloudBees	CloudWatch Metrics	CloudWatch Logs	CloudWatch Metrics	CloudWatch Logs
Mq	Sv	Redis	Memcached	Memcached	Redis	Memcached	Redis	Redis	Redis	Logstash	Amazon SQS	Amazon Lambda	Amazon CloudWatch Metrics				
Pg	Mc	Mv	Gr	Mr	Jn	Bb	Tr	Ar	Fn	Se	Gn	Gd	Sf	Cb	Kb	Rs	Hk
Redis	Memcached	Redis	Grails	Memcached	Jenkins	Redis	Redis	Ansible	Redshift	Selenium	Gatling	Deployment Manager	SmartBear	CircleCI	Kubernetes	Backstage	Heroku
Mg	Gh	Br	At	Bm	Sn	Cr	Nx	Cu	Cj	Qu	Cp	Ju	Rd	Cf	Pk	Bx	Bx
MySQL	GitHub	Redis	AHT	BuildMaster	CodeClimate	CircleCI	Nexmo	GoCD	Guacamole	Guru	Capistrano	Julia	RunDeck	Octopus	CloudBees	Bluemix	Bluemix
Db	Bb	Ub	Ta	Tc	Cc	Ay	Ju	Jm	Tn	Rd	Cy	Oc	No	Eb	Ad	Ad	Ad
DB	BigCommerce	QuickBuild	Visual Studio Code	TeamCity	ShipStation	Antifreeze	Just	Just	Tasker	RunDeck	Replicency	Octopus Deploy	CA-Native	Electrician	Apprenda	Apprenda	Apprenda
Cs	Hx	Msb	Rk	Lb	Cu	Ca	Gu	Ng	Ap	Xltv	Tc	Go	Ef	Xld	Ud	Mo	Cf
Concourse	Holmes	Holmes	Rate	LinkedIn	Continuous	Continuous-CI	Gump	NuGet	Artifactory	TestComplete	TestComplete	ElectronFlow	Go-Deploy	Open-Code Deploy	Mojo	Mojo	Cloud
Periodic Table of DevOps Tools (V1)																	
Xlr	Ur	Ls	Bm	Hp	Ex	Pj	Sr	Tr	Jr	Rf	Sl	Fd	Pv	Sn	Ur	Sl	Fd
Xl Release	UrbanCode Release	CA Service Virtualization	HP Release Process	HP Code	Excel	Putout	Serverless	Travis CI	Jenkins	HashiCorp	HashiCorp	HashiCorp	CloudBees	CloudBees	CloudBees	CloudBees	CloudBees
Sp	Ki	Nr	Ni	Gg	Ct	Gr	Ic	Sl	Ls	Lg	Gr	Sn	Tr	Cy	Ur	Sl	Fd
Spark	Kitware	New Relic	Neogex	Google	Cast	Graphite	Logstash	Logstash	Logstash	Logstash	Graphite	Smart	Trivela	CyberArk	UrbanCode Deploy	CloudBees	CloudBees

Almost None of These Tools are Relevant to Salesforce

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



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~~
- ~~You can define and create an environment to run your application~~

In short ...



Environments



Salesforce controls the underlying environments

Production Orgs

Hosted by Salesforce

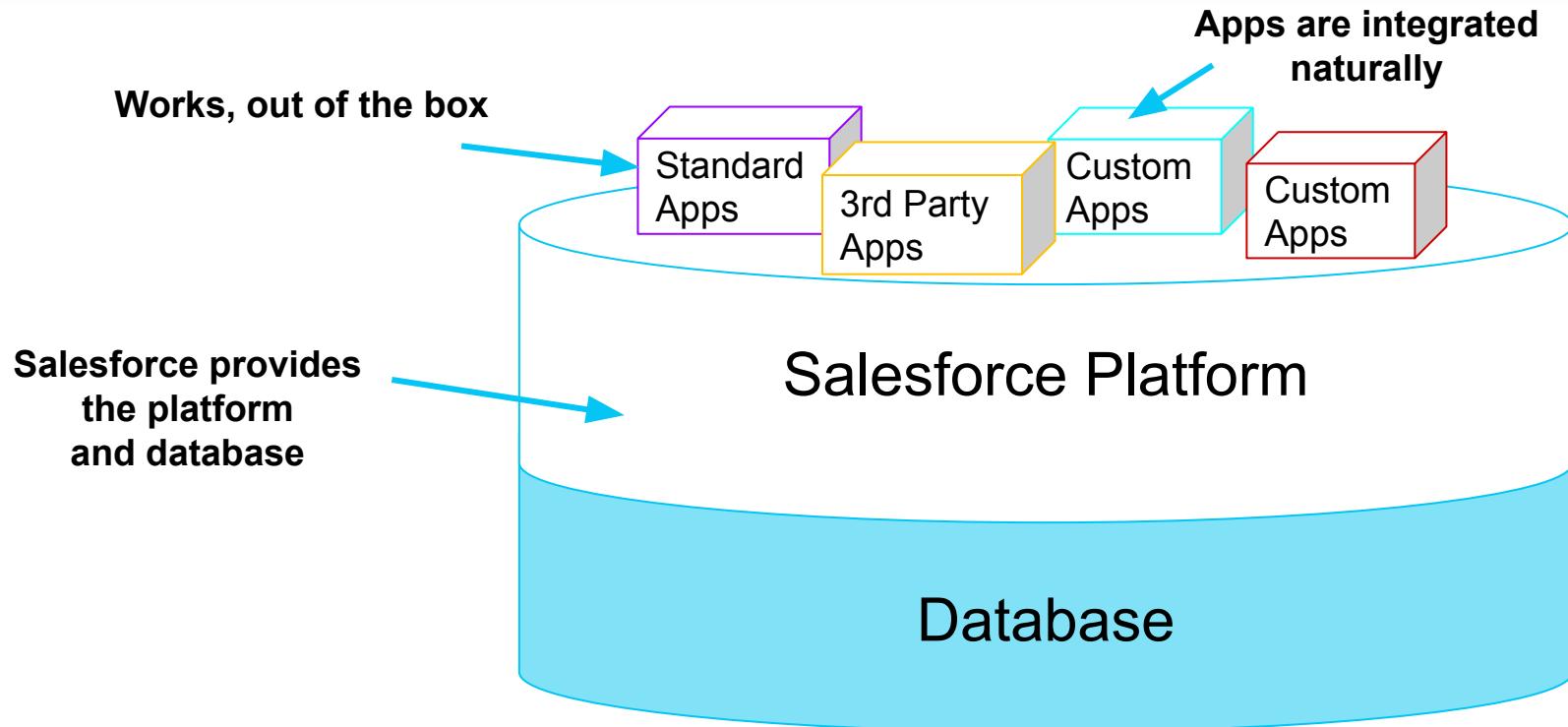
Long-lived Sandboxes

Hosted by Salesforce

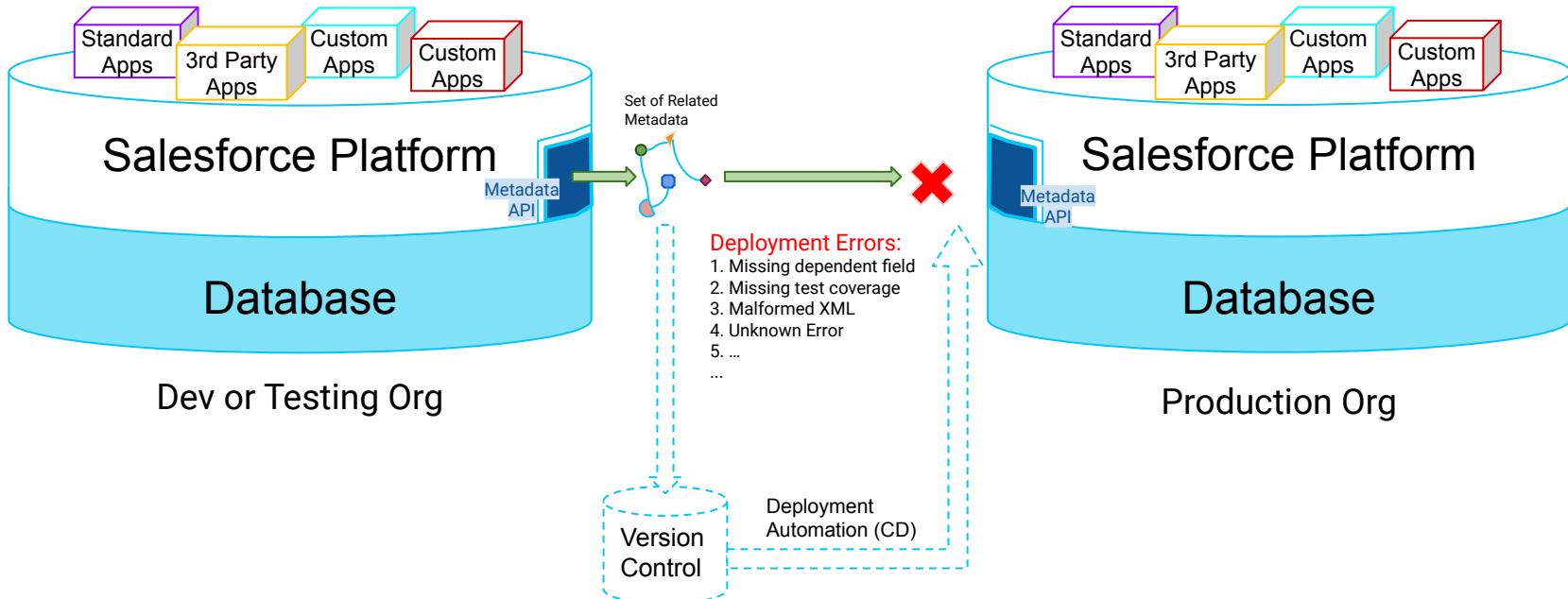
Short-lived Scratch Orgs

Hosted by Salesforce. Can be used in limited situations

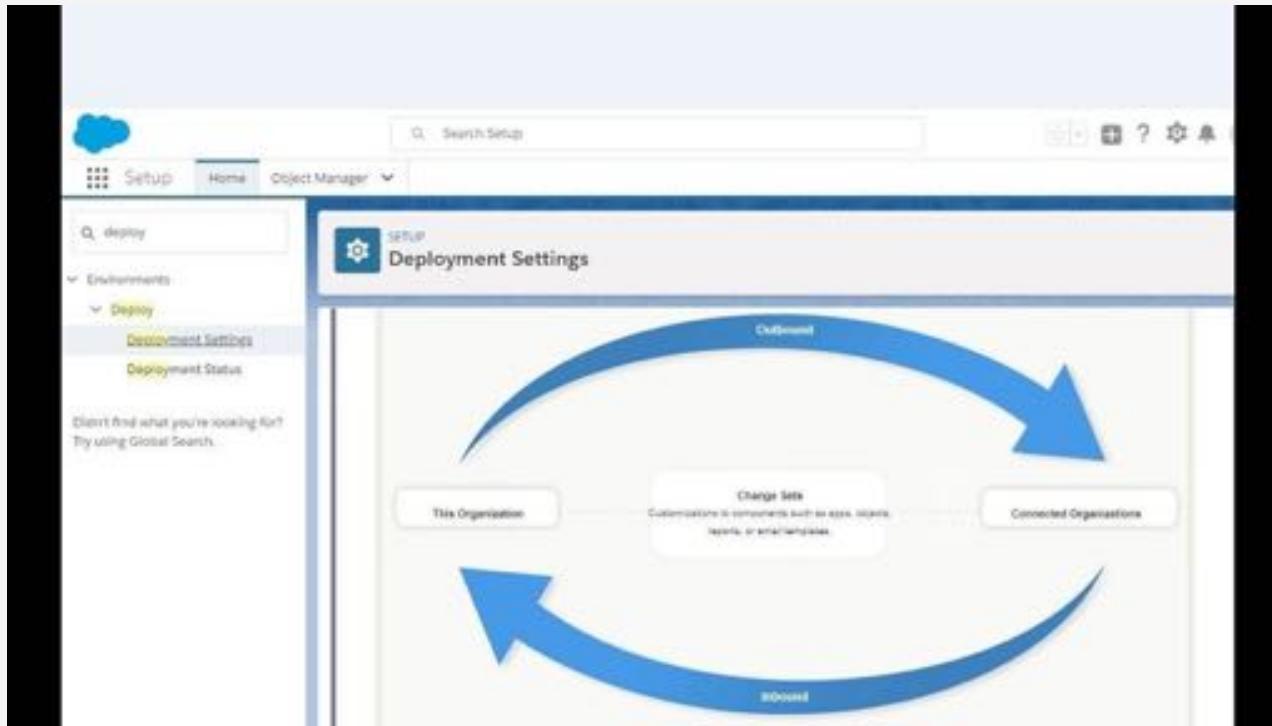
Each Salesforce instance is a monolithic database



The Metadata API is the only gateway for deployments



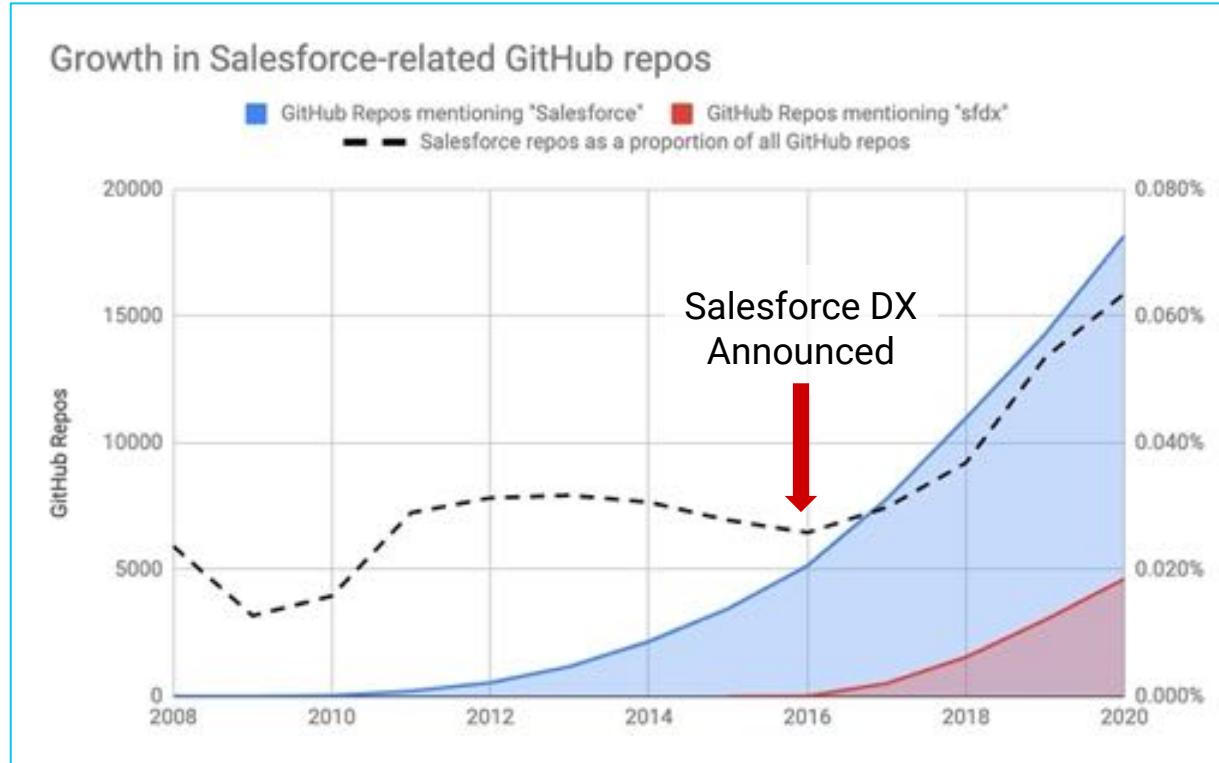
The Default Method to Move Changes: Change Sets



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



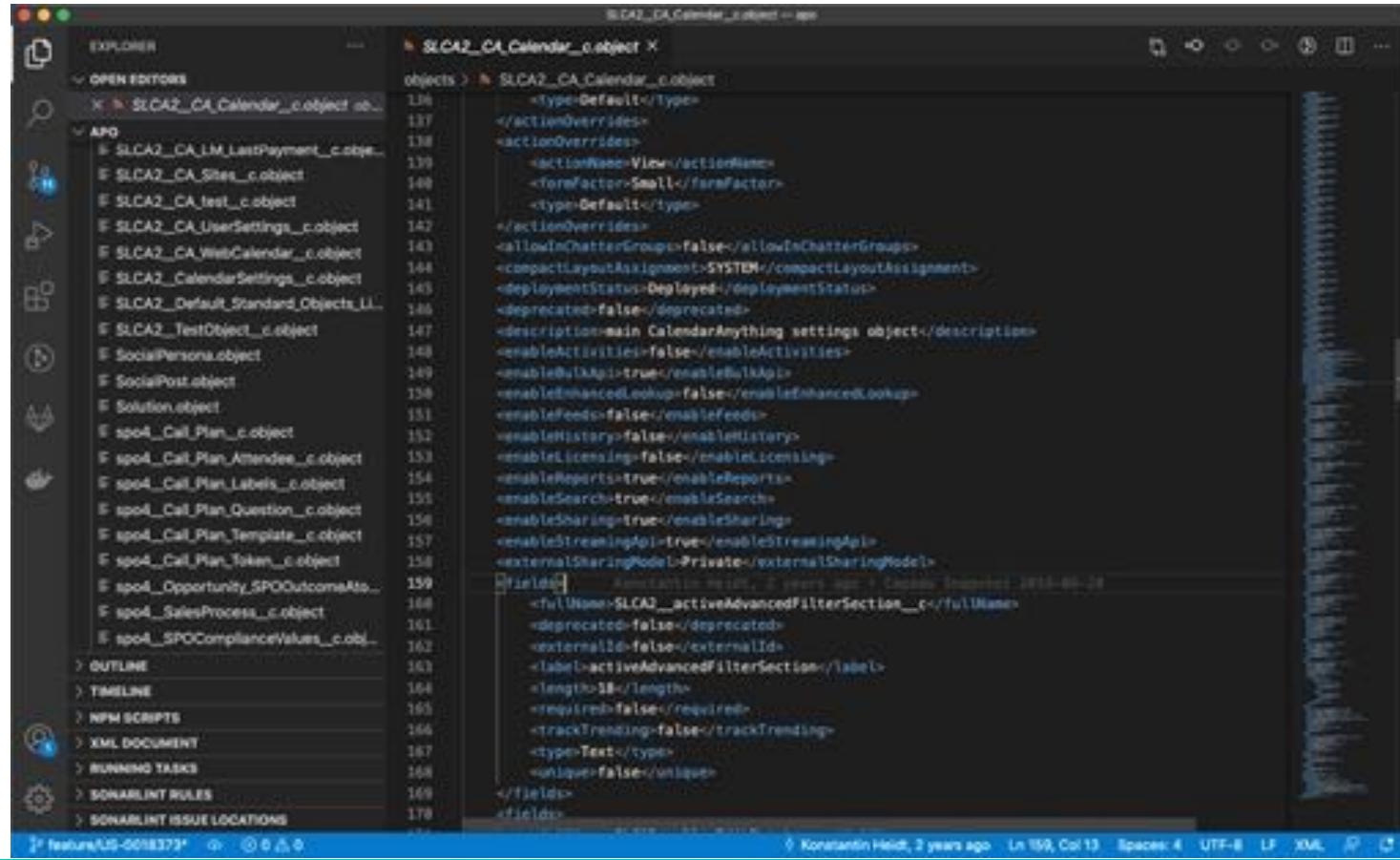
How Salesforce Scripts Work



There is **no other way**. It all comes down to scripts.

And the publicly available scripts are **very limited**.

Salesforce Metadata Behind the Scenes



The screenshot shows a code editor with an XML file open. The file path is indicated at the top right as `SLCA2__CA_Calendar_c.object -- 180`. The left sidebar contains a tree view of the project structure under the `EXPLORER` tab, with the `SLCA2__CA_Calendar_c.object` file selected. The main pane displays the XML code for the `SLCA2__CA_Calendar_c` object. The code includes various metadata elements such as `<actions>`, `<actionOverrides>`, `<actionOverrides>`, `<actionName>`, `<formFactor>`, `<label>`, `<type>`, `<allowInChatterGroup>`, `<compactLayoutAssignment>`, `<deploymentStatus>`, `<deprecated>`, `<description>`, `<enableActivities>`, `<enableBulkAPI>`, `<enableEnhancedLookup>`, `<enableFeeds>`, `<enableHistory>`, `<enableLicensing>`, `<enableReports>`, `<enableSearch>`, `<enableSharing>`, `<enableStreamingAPI>`, `<externalSharingModel>`, `<fields>`, and `<label>`. The XML uses standard XML syntax with opening and closing tags and nested elements.

```
<objects>
  <object name="SLCA2__CA_Calendar_c">
    <actions>
      <actionOverrides>
        <actionName>View</actionName>
        <formFactor>Small</formFactor>
        <type>Default</type>
      </actionOverrides>
      <allowInChatterGroup>false</allowInChatterGroup>
      <compactLayoutAssignment>SYSTEM</compactLayoutAssignment>
      <deploymentStatus>Deployed</deploymentStatus>
      <deprecated>false</deprecated>
    </actions>
    <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>
      <field name="SLCA2__activeAdvancedFilterSection_c">
        <fullNames>
          <fullName>SLCA2__activeAdvancedFilterSection_c</fullName>
        </fullNames>
        <deprecated>false</deprecated>
        <externalId>false</externalId>
        <label>Active Advanced Filter Section</label>
        <length>38</length>
        <required>false</required>
        <trackTrending>false</trackTrending>
        <type>Text</type>
        <unique>false</unique>
      </field>
    </fields>
  </object>
</objects>
```

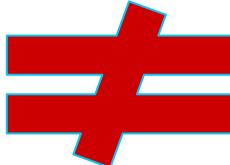


Salesforce XML must be parsed to be merged properly

```
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>
```

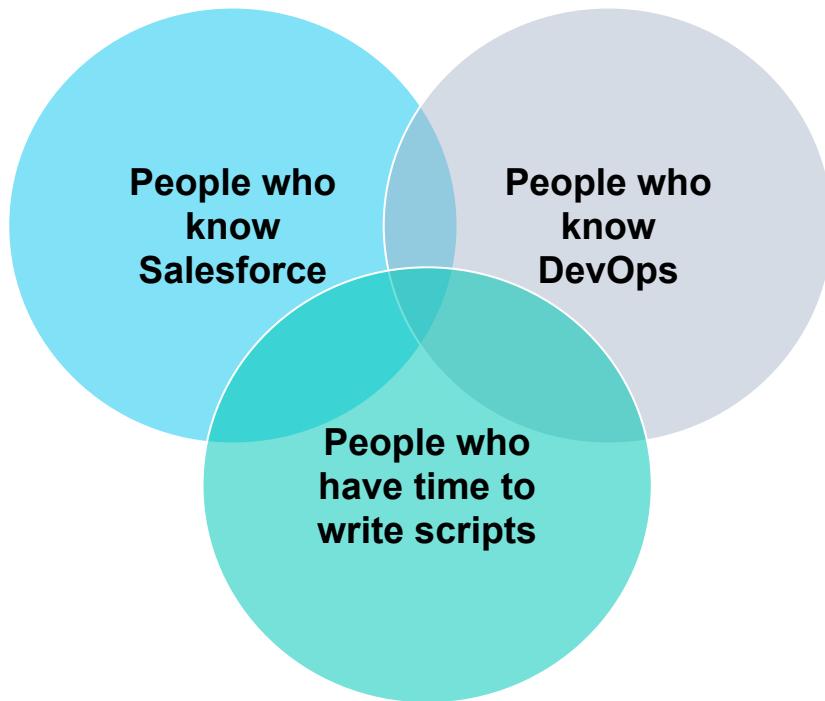
Performing a small Git merge in Salesforce



Performing a large Git merge in Salesforce



The limiting factor on homegrown Salesforce DevOps tools



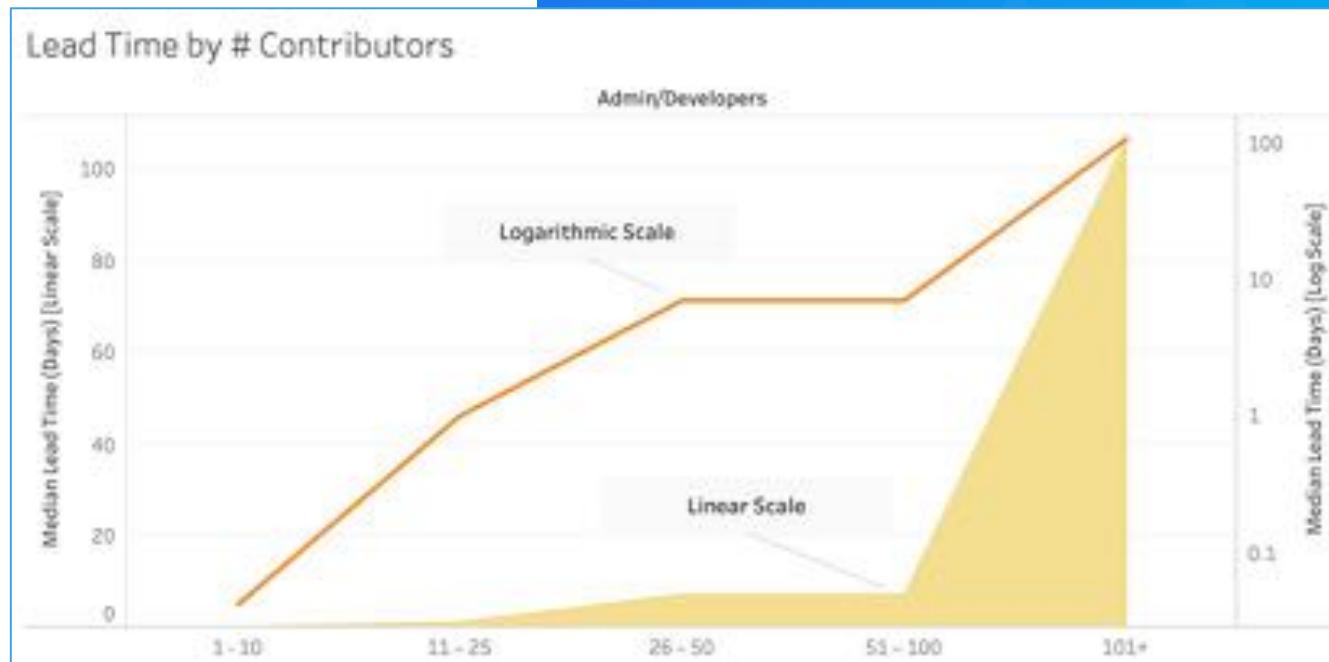
State of Salesforce DevOps Reports

- 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



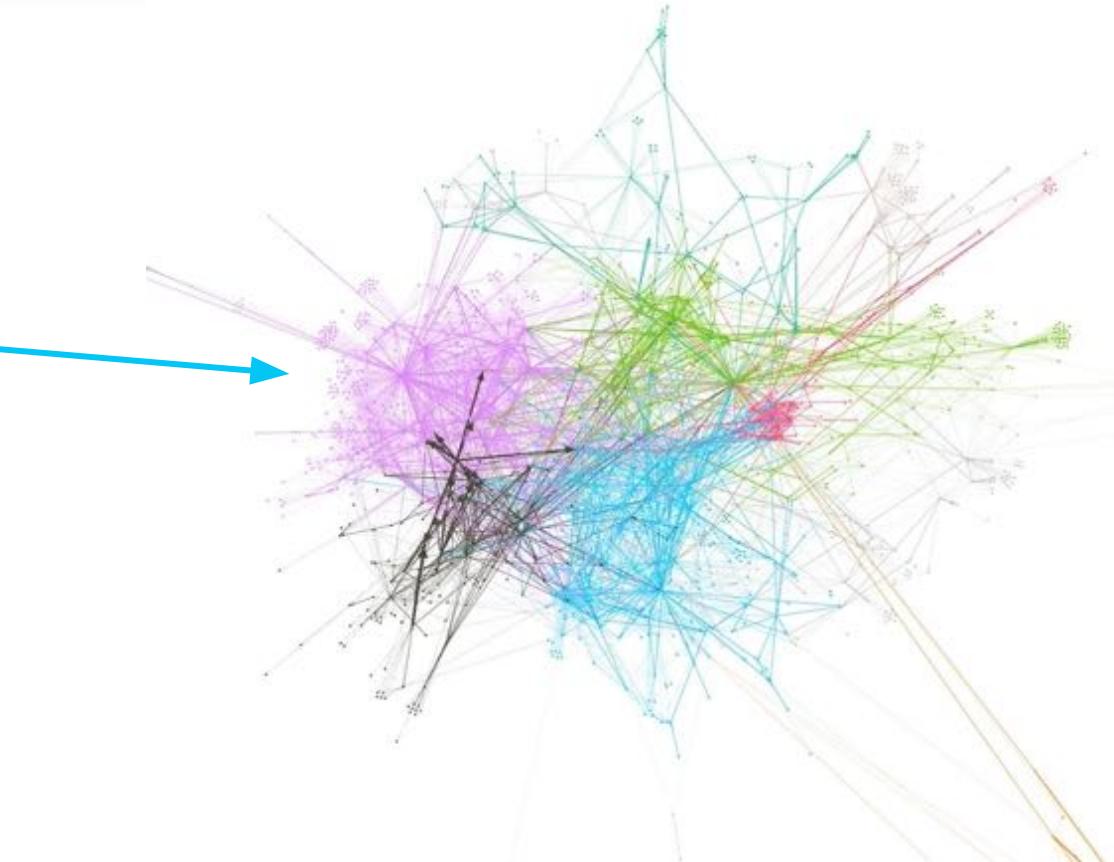
Main Conclusions

Companies struggle as they get bigger.
Especially with Lead Time

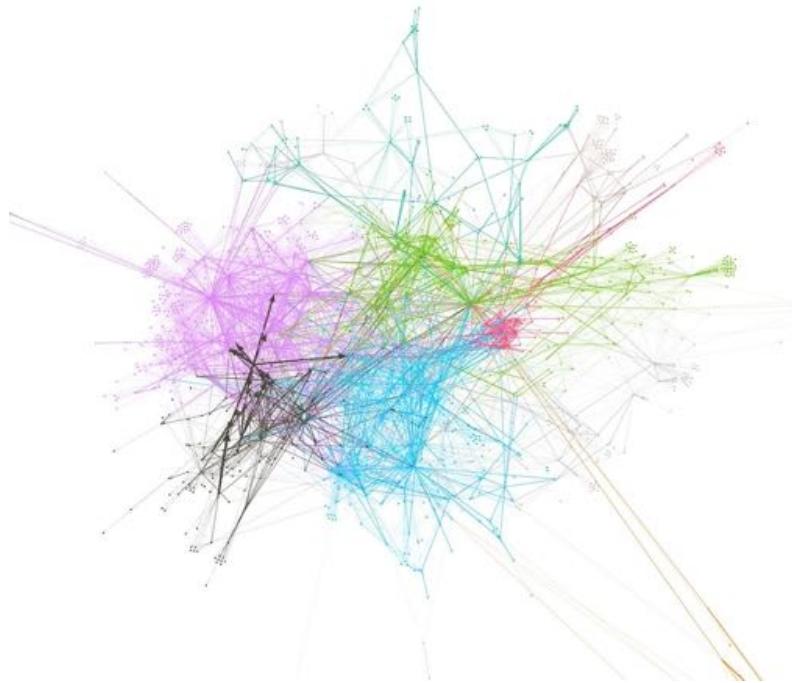


Metadata tends to be tightly coupled

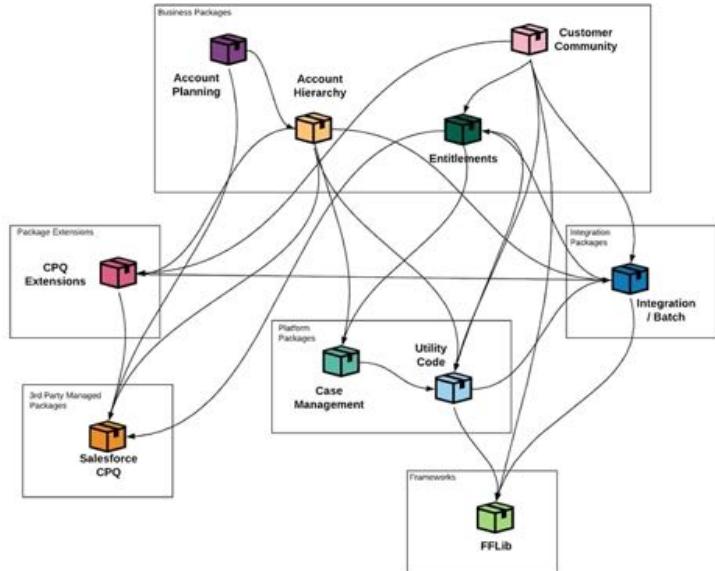
Components become highly interdependent



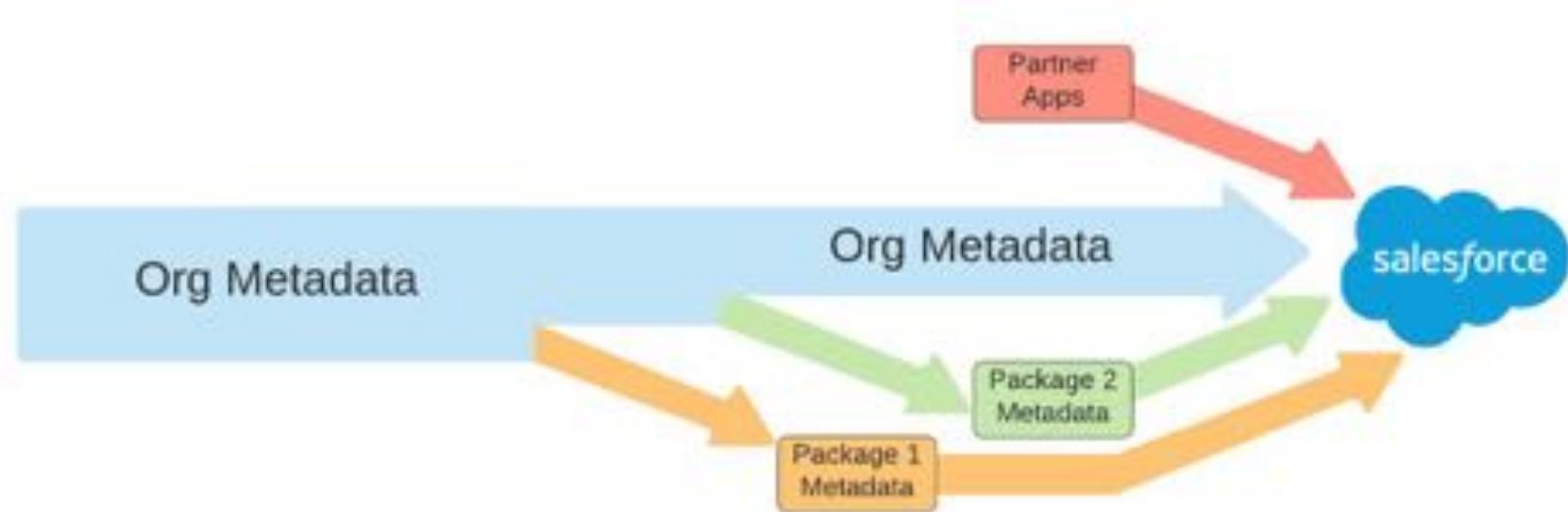
Salesforce “unlocked packages” promise modularization



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

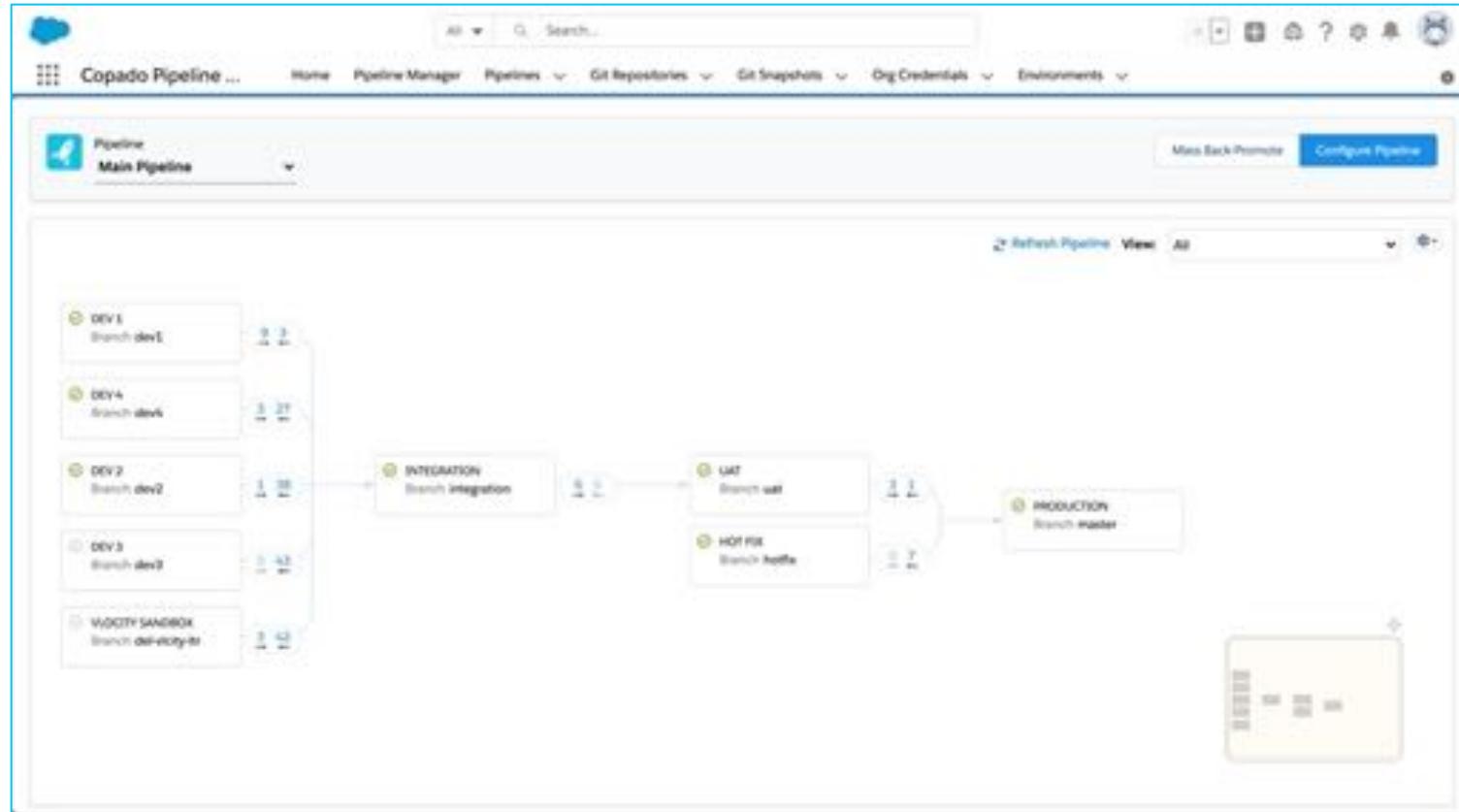
Multi-pipeline builds become required

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

Collaboration: Centralize on a Common Platform

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



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. A search bar and a user profile icon are also present.

The main area is titled "My DevOps Process" and shows the following summary statistics:

Routed % 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

Below this, the interface is divided into four main phases of a value stream:

- DEFINE & PLAN**: Contains two boxes: "Design and Refinement" (Lead Time: 4d 8h, Cycle Time: 24 23h, % C/A: 40.00%, Business Value: \$12000.00) and "Front-End Development" (Lead Time: 2d 9h, Cycle Time: 3d 5h, % C/A: 50.00%, Business Value: \$12000.00).
- BUILD**: Contains two boxes: "Back-End Development" (Lead Time: 1d 4h, Cycle Time: 2d, % C/A: 100%, Business Value: \$0.00) and "Automated QA" (Lead Time: 2M 25d 8h, Cycle Time: 3d 2h, % C/A: 100.00%, Business Value: \$1000.00).
- TEST**: Contains two boxes: "Manual QA" (Lead Time: 2M 25d 8h, Cycle Time: 2d, % C/A: 100%, Business Value: \$0.00) and "Automated QA" (Lead Time: 2M 25d 8h, Cycle Time: 3d 2h, % C/A: 100.00%, Business Value: \$1000.00).
- RELEASE**: Contains two boxes: "Deployment & Release" (Lead Time: 4d 8h, Cycle Time: 24 23h, % C/A: 100.00%, Business Value: \$1000.00) and "Deployment & Release" (Lead Time: 4d 8h, Cycle Time: 24 23h, % C/A: 100.00%, Business Value: \$1000.00).

At the bottom left, there's a "New" button, and at the bottom right, there are "View" and "Edit" buttons.

Want to Learn More?

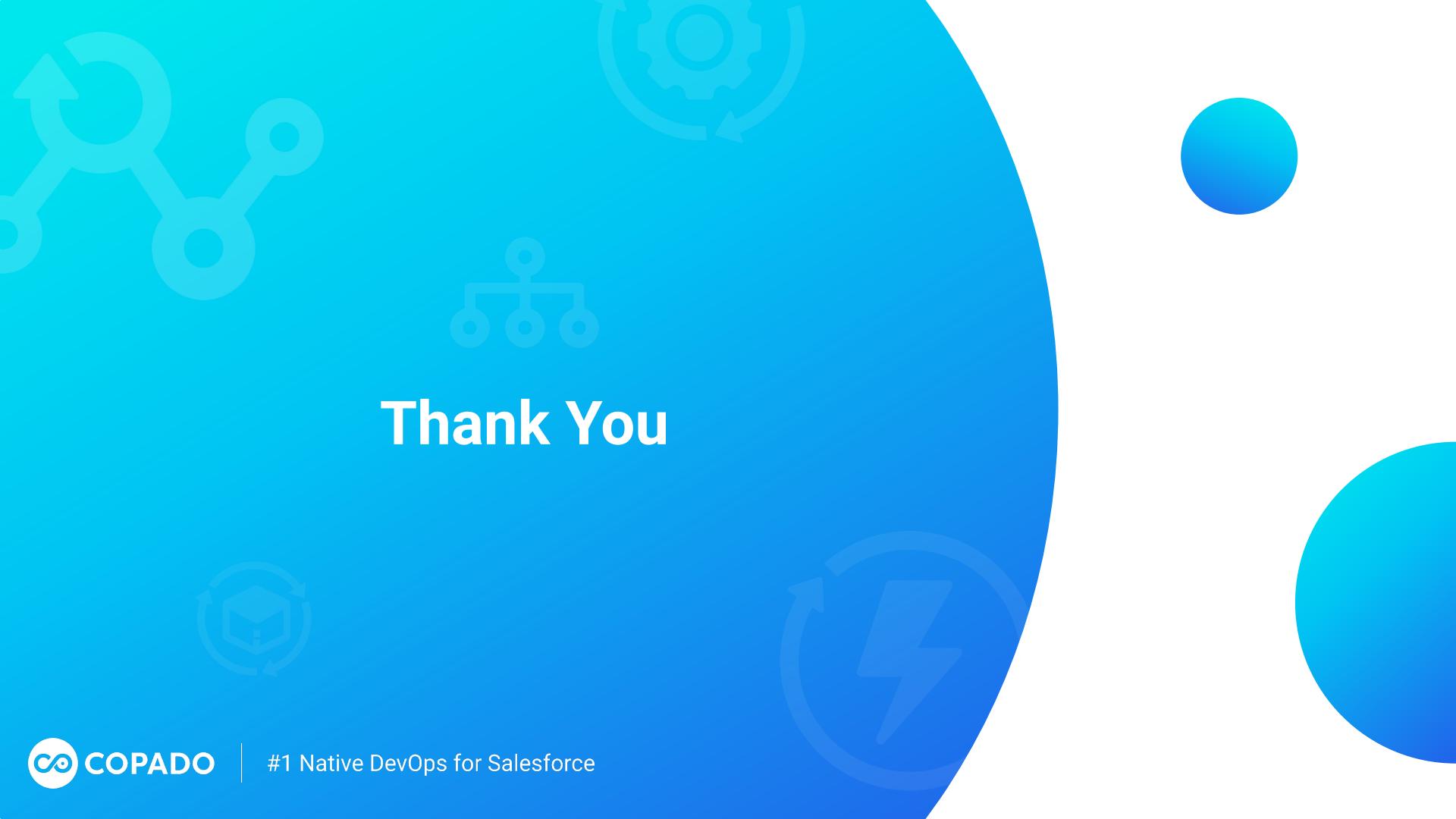
Search for “DevOps” on Salesforce’s [trailhead.com](#)

The screenshot shows the Trailhead website interface. At the top, there's a search bar with placeholder text "Search for modules, trails, and more...". To the right of the search bar is a user profile for "Andrew Davis" with 56 badges and 33,375 points. The main navigation menu includes Home, Learn (with a dropdown), Credentials (with a dropdown), Community (with a dropdown), For Companies (with a dropdown), and COVID-19 (with a dropdown). Below the menu, a banner for the "Salesforce DevOps and Continuous Innovation with Copado" trail is displayed. The banner text reads: "Sponsored content: Discover the big ideas in DevOps and make your Salesforce development process faster and more reliable." It shows a progress bar indicating "+1,000 Points" and "-1 hr 45 mins left - 0%". Two completed modules are listed below the banner:

- Module**: **Salesforce DevOps with Copado** (). **+500 POINTS**. Sponsored content: Learn Copado's take on how DevOps helps you deliver innovation faster with less risk. Status: Completed 8/12/20. Interaction buttons: heart, plus, share.
- Module**: **Continuous Innovation with Copado** (). **+500 POINTS**. Sponsored content: Gather feedback, build a generative culture, and optimize your development process. Status: Completed 8/12/20. Interaction buttons: heart, plus, share.

The Help I Need

- Let me know your experience working on Salesforce
- Are you working on solutions for delivering changes on other low-code platforms? If so, what are the challenges there?



Thank You



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