The Power of Salesforce APIs

Codemotion Berlin 2017

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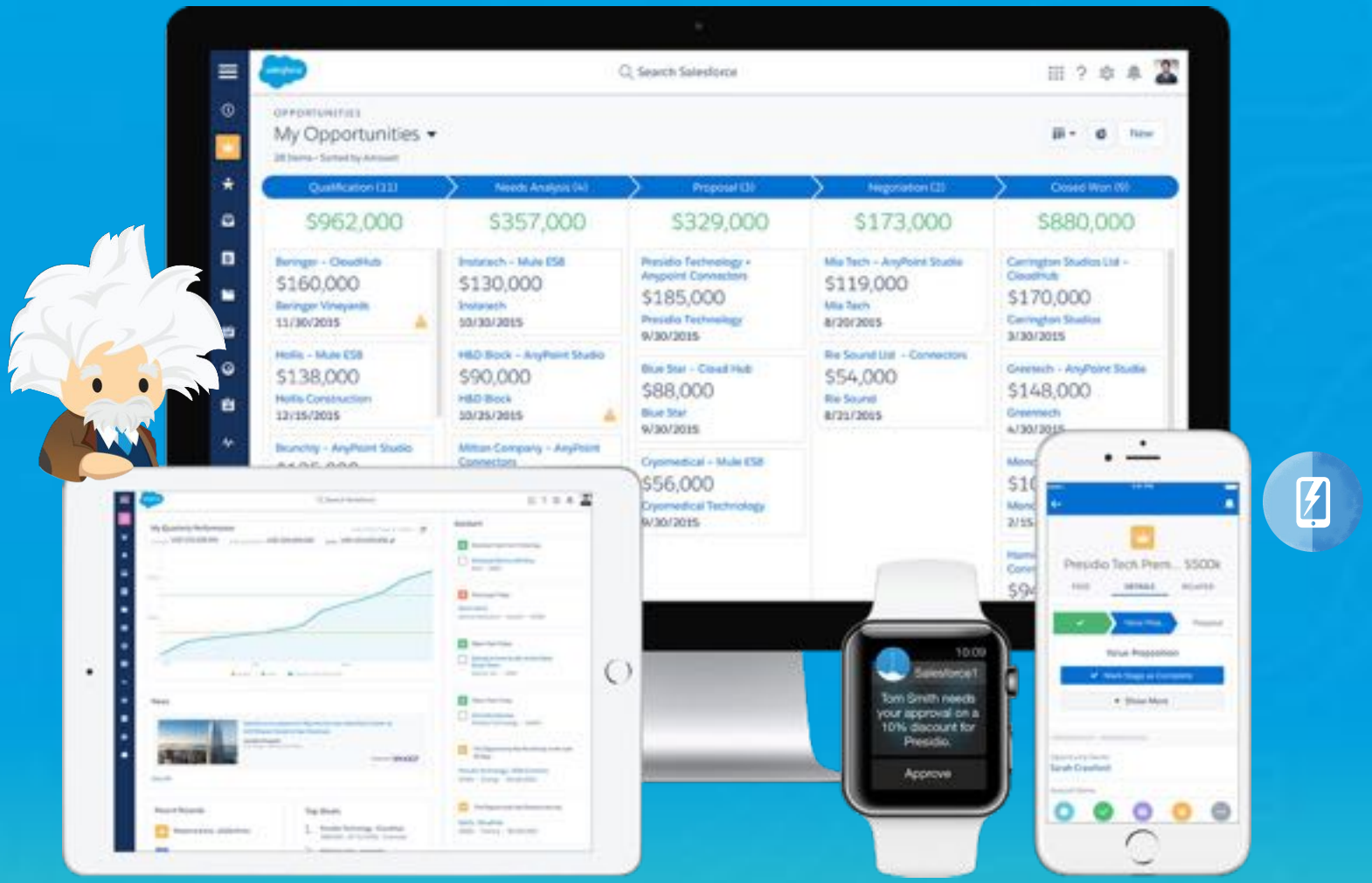
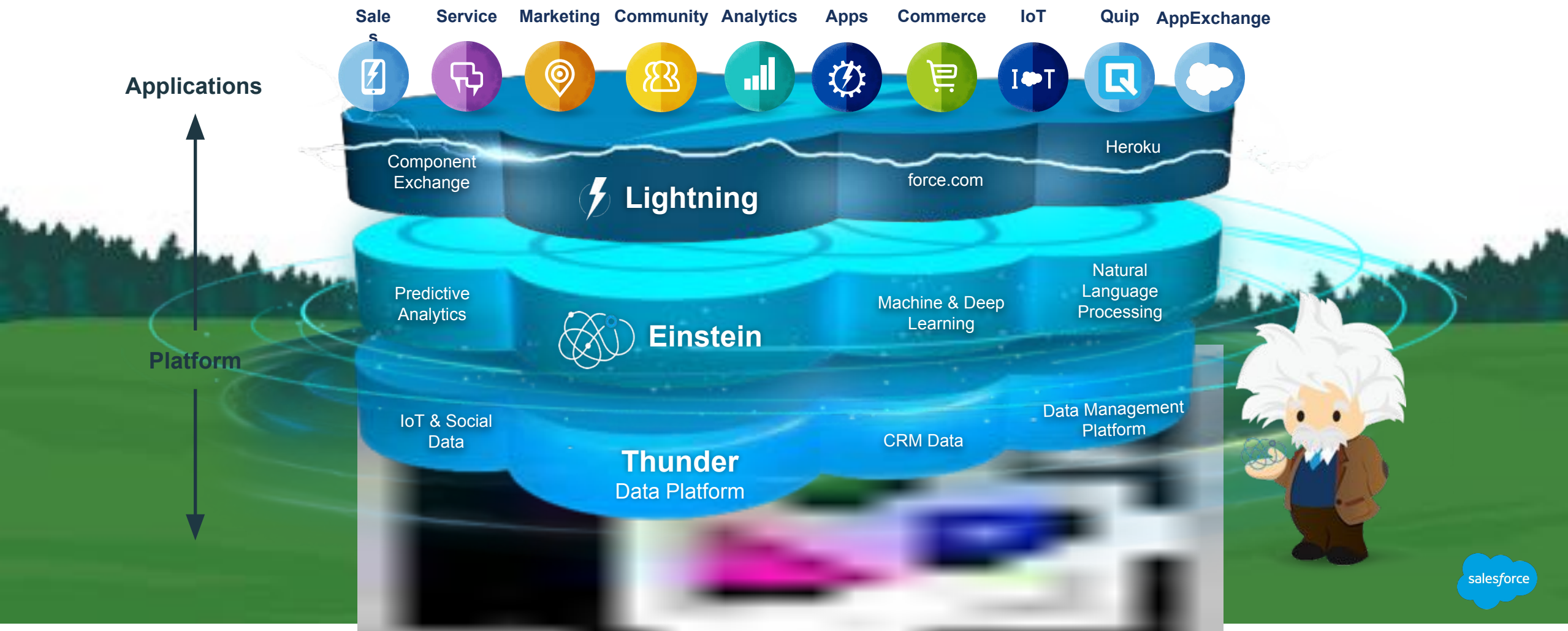
Agenda

Intro and Overview
Integration Dependencies
Data and CRUD APIs
Salesforce Connect
Apex Integration Services
Roundup of Other Integration Topics
Streaming Apis
Demo
Questions

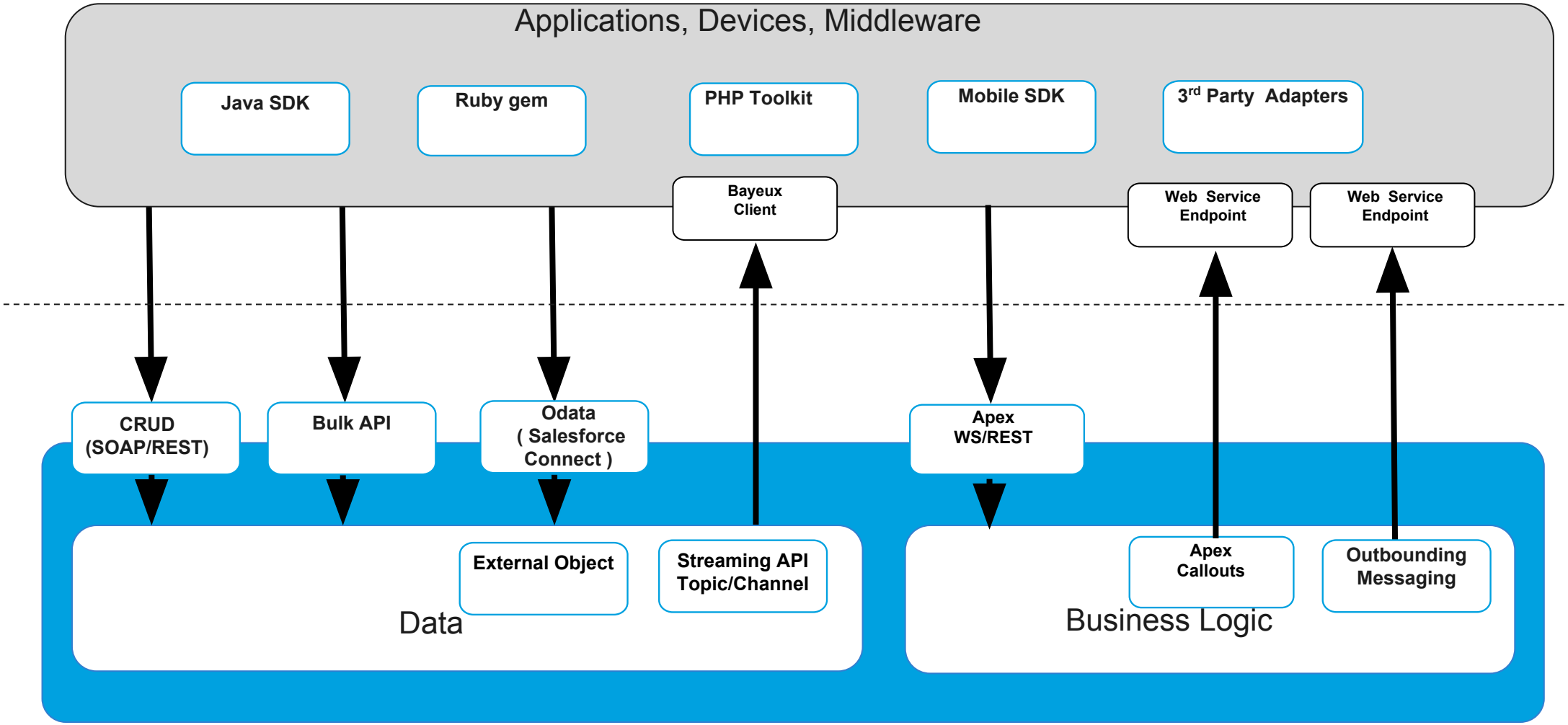
Work with the world's most trusted CRM platform



Intelligent Customer Success Platform



Comprehensive APIs, Toolkits, and Support of Standards



Programmatic Integration

SOAP based APIs

- Data CRUD
- Metadata API

REST based APIs

- Data CRUD
- Chatter API
- Bulk API
- Tooling API
- Reports and Dashboards API

Bayeux/CometD based APIs

- Streaming API
- PushTechnology - Publish/Subscribe model

Declarative Integration

Salesforce Connect

- OData 2.0/4.0 Protocol based External Data Integration

Outbound Messaging

- XML messages sent out as Workflow actions

Custom Integration

Inbound

- Apex Web Services
- Apex REST resources

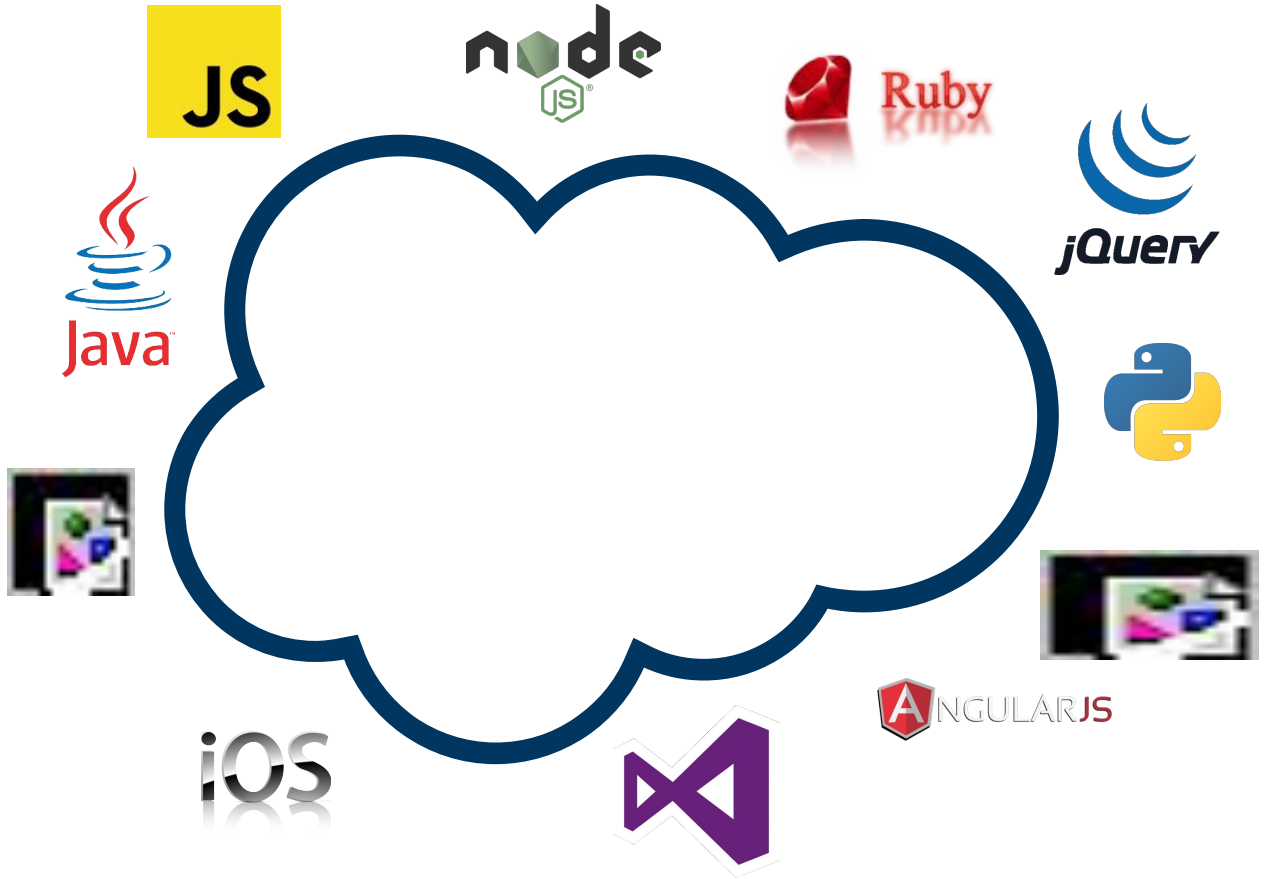
Outbound

- Apex Web Service Callouts
- Apex HTTP Callouts

Salesforce Connect

- Apex connector framework

Toolkits Libraries SDKs

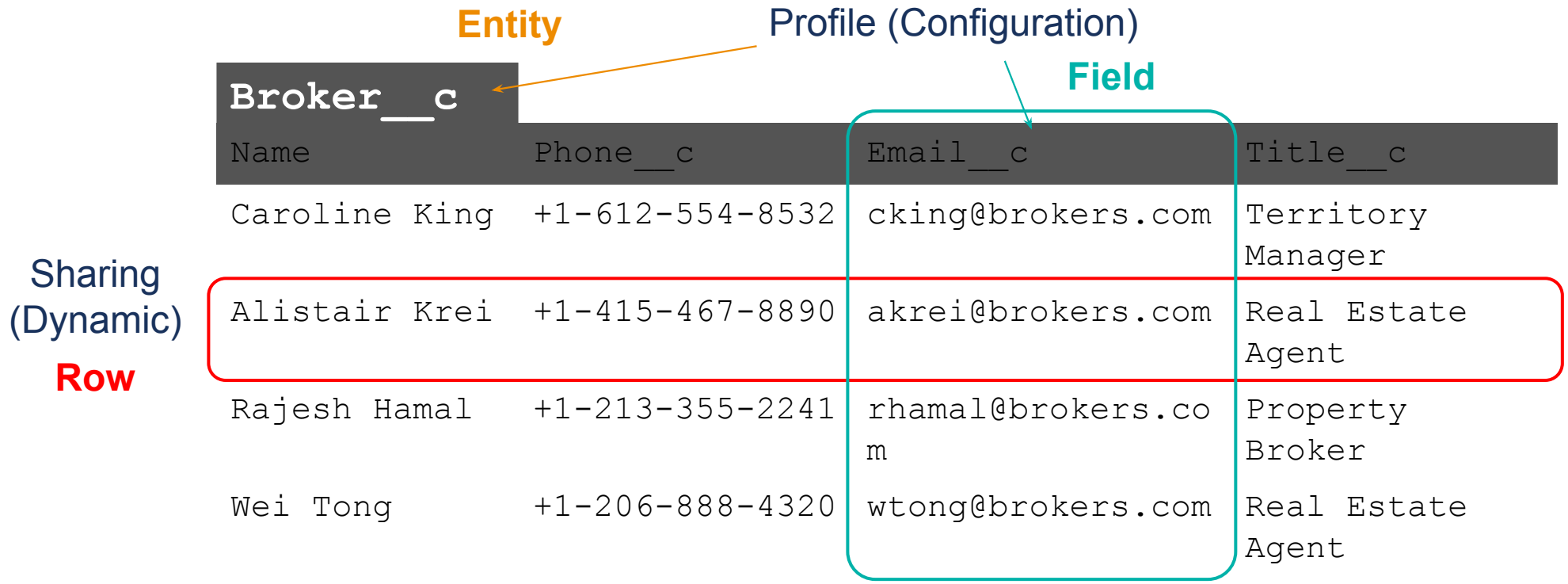


Identity:

User, Profile, License

Authorization:

Typically OAuth



User Profile Sharing Model

Security

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Identity

Comprehensive support for standards

SCIM

Single Sign-On

SAML 2.0 Identity Provider

SAML 1.1 / 2.0 Service Provider

OpenID Connect

API Access

OAuth 2

OAuth 2 SAML Bearer Tokens

OAuth 2 JWT Bearer Tokens

Cloud Directory & Provisioning

SCIM

SAML Provisioning

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More in details let's talk about...

REST API and its composite resources

Salesforce Integration with Slack

Streaming API

Salesforce Connect

Demos

Data and CRUD APIs

Query and Search

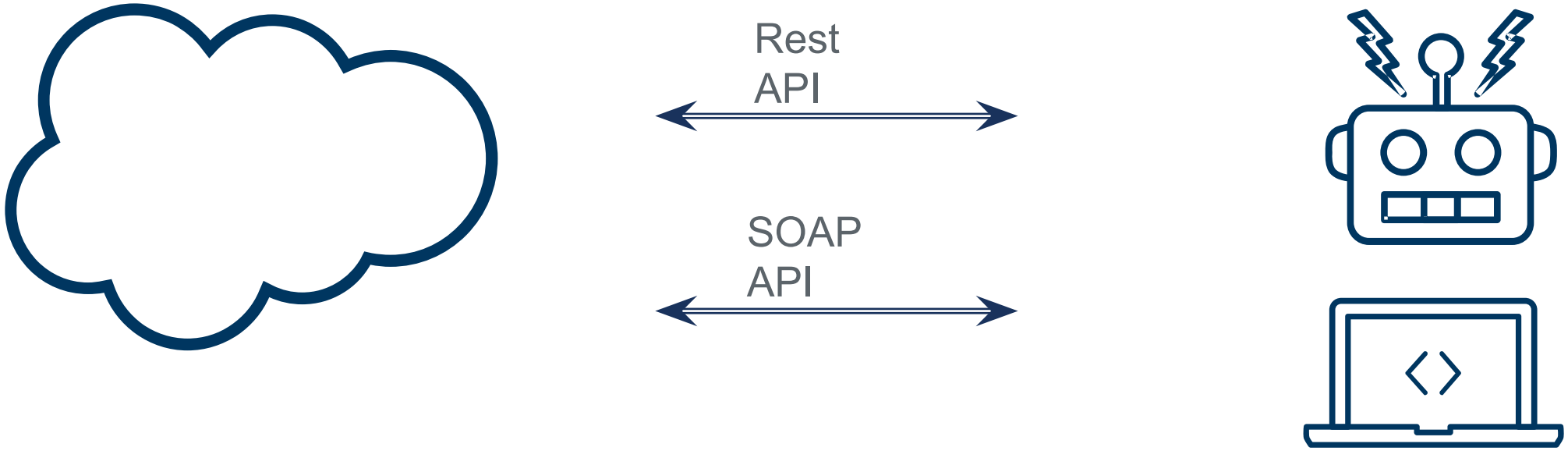
```
//SOQL – Salesforce Object Query Language
SELECT Id, Name, Title__c, Beds__c Broker__r.Name
  FROM Property__c
  WHERE Beds__c >= 3

//SOSL - Salesforce Object Search Language
FIND {GU19*} RETURNING Account, Property__c

//Parameterized Search API
/parameterizedSearch?q=bungalow&in=ALL&sobject=Property__c
```

Clients

Applications and Services

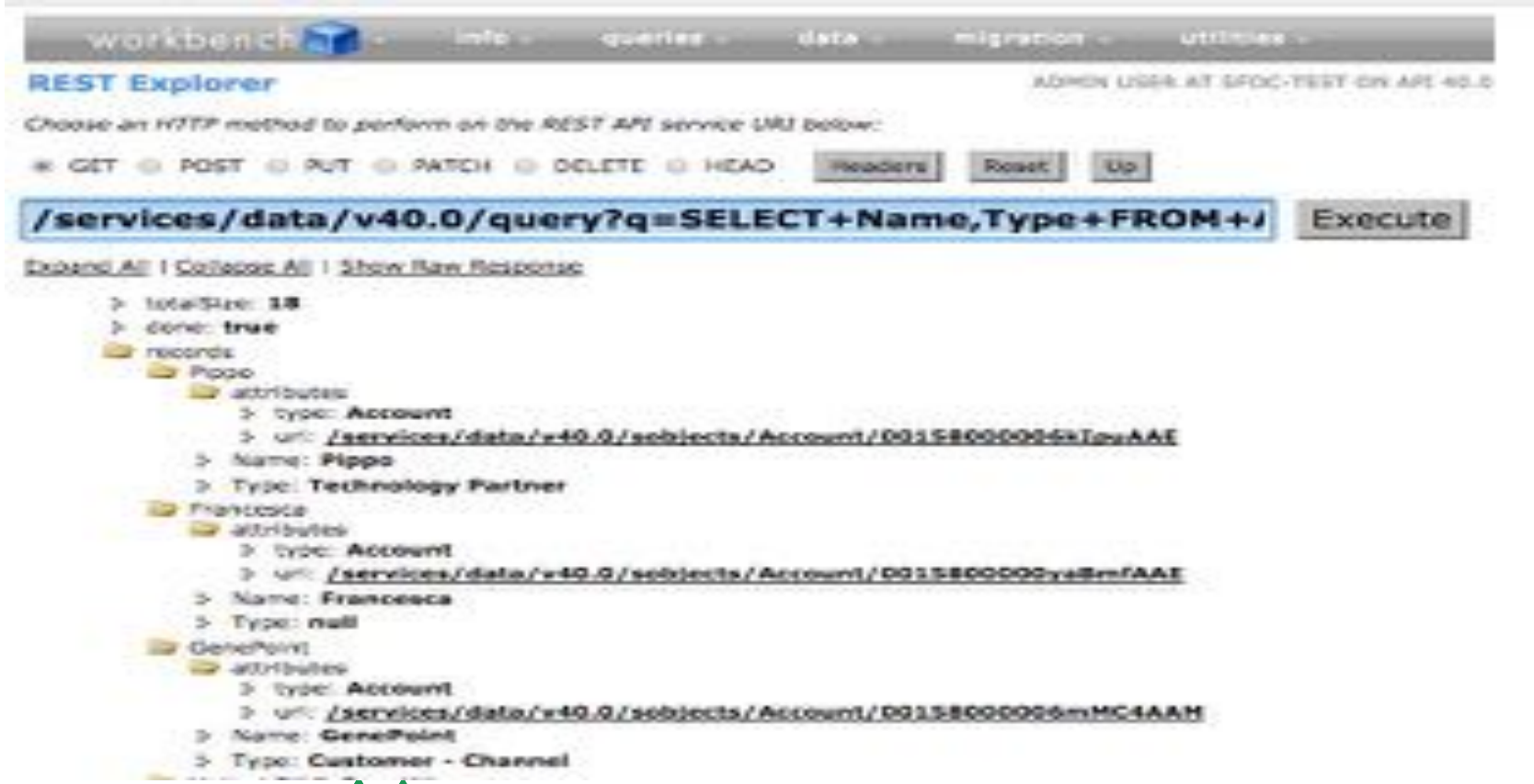


Workbench for Salesforce Developers – CRUD

- Launch Workbench.developerforce.com
- Free UI-based online API tool
- SOQL queries example “Select found_on_day__c, Id, Name FROM Cat__c”

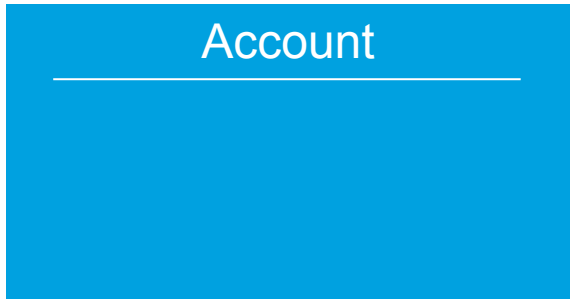
Workbench for Salesforce Developers – send a request

- Utilities > REST Explorer
- GET /services/data/v40.0/query?q=SELECT+Name,Type+FROM+Account



Workbench SOQL queries – Raw Response

Automatic API Endpoint Creation

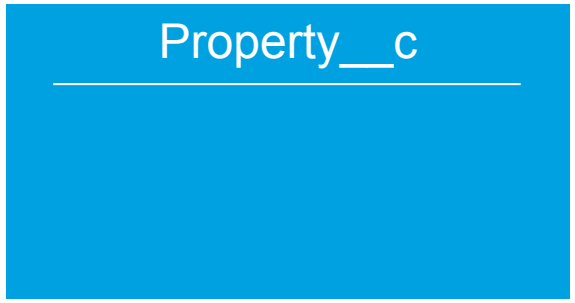



```
/SObjects/Account

/SObjects/Account/describe

/query?q=SELECT+Name,Type+FROM+Account

...
```




```
/SObjects/Property__c

/SObjects/Property__c/describe

/query?q=SELECT+Name,Type__c+FROM+Property__c

...
```

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What is Curl?

Curl is a tool to transfer data from or to a server, using one of the supported protocols (DICT, FILE, FTP, FTPS, GOPHER, HTTP, HTTPS, IMAP, IMAPS, LDAP, LDAPS, POP3, POP3S, RTMP, RTSP, SCP, SFTP, SMB, SMBS, SMTP, SMTPS, TELNET and TFTP). The command is designed to work without user interaction.

Use REST API with Curl connecting with Salesforce

- Create a Connected App
- Enable OAuth Settings in order to get Consumer Key, Consumer Secret
- Get authenticated and receive a token

```
curl -v https://eu6.salesforce.com/services/oauth2/token -H "Content-Type: application/x-www-form-urlencoded"  -d "grant_type=password" -d "client_id=<your-client-id>" -d "client_secret=<your-client-secret>" -d "username=<Your-username>" -d "password=<your-password>”
```

Send a Composite Batch using CURL

- Once you got the token you can send Requests
- Create the composite within a batch.json file
- Call the composite batch endpoint for the REST API: /services/data/v40.0/composite/batch/
- Use the TOKEN and pass the batch.json as input
- We can print the output in a file html

```
curl -v https://eu6.salesforce.com/services/data/v40.0/composite/batch/ -H
'Authorization: Bearer
00D58000000bJaG!AQUAQOUGqAUnmB01z7b6dYo9GS7zae23JnYp3YtgOlH8FMFS
M_b1oa_dGjawYrP37lLn86piz4NU0anSKpgMy_EhooF7p.Pe' -H "Content-Type:
application/json" -d "@batch.json” -o compositeBatch_OUT.html
```

Composite resources to reduce round trips

```
{
"records" :[{
   "attributes" : {"type" : "Account", "referenceId" : "ref1"},
   "name" : "SampleAccount",
   "phone" : "1234567890",
   "website" : "www.salesforce.com",
   "numberOfEmployees" : "100",
   "industry" : "Banking",
   "Contacts" : {
    "records" : [{
      "attributes" : {"type" : "Contact", "referenceId" : "ref2"},
      "lastname" : "Smith",
      "title" : "President",
      "email" : sample@salesforce.com },{
      "attributes" : {"type" : "Contact", "referenceId" : "ref3"},
      "lastname" : "Evans",
      "title" : "Vice President",
      "email" : "sample@salesforce.com"
      }]
    }
   },{
   "attributes" : {"type" : "Account", "referenceId" : "ref4"},
   "name" : "SampleAccount2",
   "phone" : "1234567890",
   "website" : "www.salesforce2.com",
   "numberOfEmployees" : "100",
   "industry" : "Banking"
   }]}
```

Tree - /vXX.X/composite/tree/SObjectName

- Create sObject record and it's child sObject records upto 5 levels deep in one go
- Counted as a single API call, up to a total of 200 records across all trees per call

Composite resources to reduce round trips

Batch - /vXX.X/composite/batch

- Executes up to 25 sub requests in a single request.
- The response bodies and HTTP statuses of the subrequests in the batch are returned in a single response body.
- Each subrequest counts against rate limits and is treated as a separate request.
- Executed in order

```
{
"batchRequests" : [
   {
   "method" : "PATCH",
   "url" : ”v40.0/sobjects/account/001D000000K0fXOIAZ",
   "richInput" : {"Name" : "NewName"}
   },{
   "method" : "GET",
   "url" : ”v40.0/sobjects/account/001D000000K0fXOIAZ?fields=Name,BillingPostalCode"
   }]
}
```

Send a Composite Batch using CURL

- We can simplify the commands by using env. variables to store the token
- Create a file (e.g. Login.sh) to store the TOKEN which can then be used elsewhere

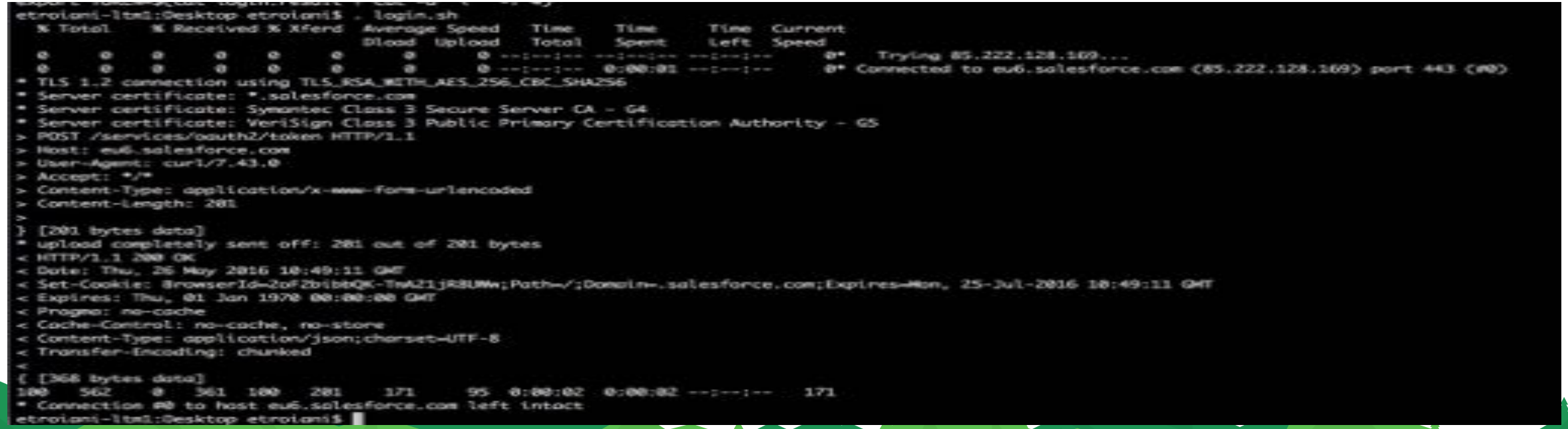
```
OUTPUT=$(curl -v https://eu6.salesforce.com/services/oauth2/token -H
"Content-Type: application/x-www-form-urlencoded"  -d "grant_type=password" -d
"client_id=<your-client-id>" -d "client_secret=<your-client-secret>" -d
"username=<your-username>" -d "password=<your-password>")

echo $OUTPUT > login.result
export TOKEN=$(cat login.result | cut -d "\"" -f 4)
```

```
curl -v https://eu6.salesforce.com/services/data/v40.0/composite/batch/ -H "Authorization: Bearer $TOKEN" -H
"Content-Type: application/json" -d "@batch.json" -o compositeBatch_OUT.html
```

Checking the Response

- Login.result

{"access_token":"00D58000000bJaG!AQUAQJWP4DYKCi6uYRu3oW.D_BkG1T0jtT0ifJ_A_e7SGvJlfqqa9z9RsR7LBHx5Ho0DEhHGa_6b41ao07h4FWDApYxTYQ2x","instance_url":"https://eu6.salesforce.com","id":"https://login.salesforce.com/id/00D58000000bJaGEAU/00558000000gJiwAAE","token_type":"Bearer","issued_at":"1464259752048","signature":"pn/h8E1MvbP1n36cGt9SpYQADwfZOONMAEJrEltdcU4="}



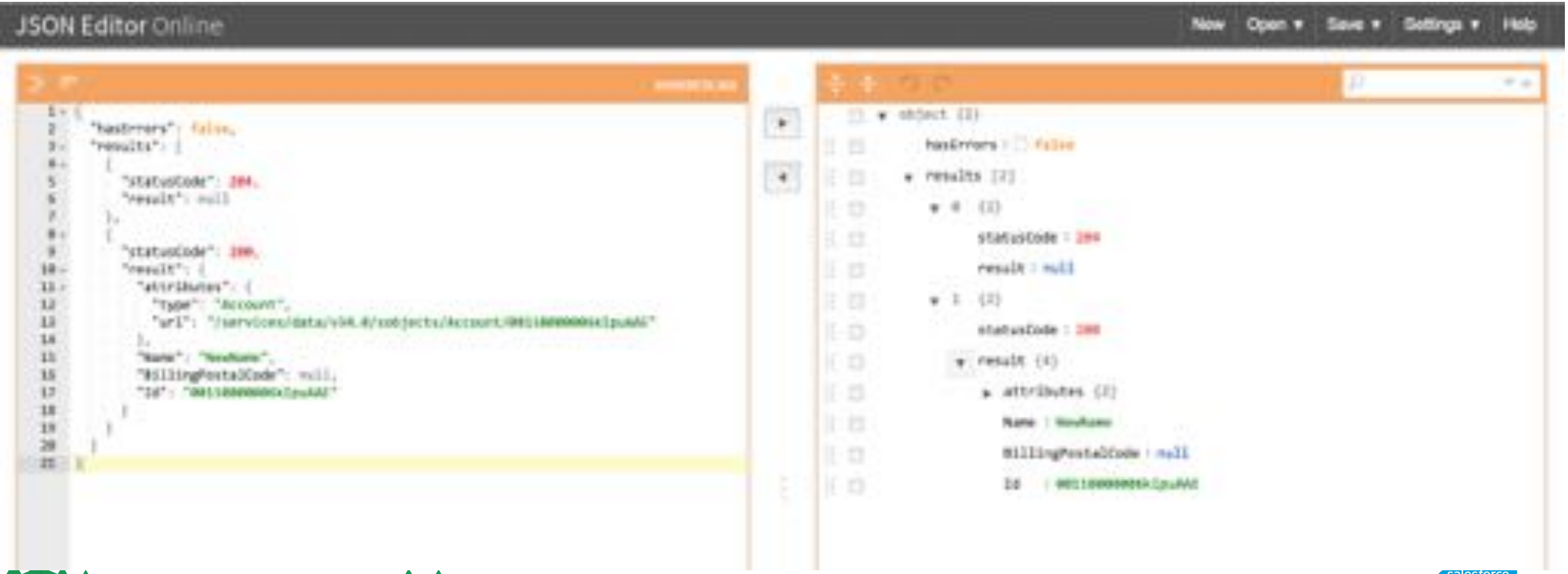
Response from Composite execution - step1

```
etroiani-ltm1:Desktop etroiani$ . composite.sh
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
  0     0    0     0    0     0      0      0 --:--:-- --:--:-- --:--:--     0*   Trying 85.222.128.41...
  0     0    0     0    0     0      0      0 --:--:--  0:00:01 --:--:--     0* Connected to eu6.salesforce.com (85.222.128.41) port 443 (#0)
  0     0    0     0    0     0      0      0 --:--:--  0:00:01 --:--:--     0* TLS 1.2 connection using TLS_RSA_WITH_AES_256_CBC_SHA256
* Server certificate: *.salesforce.com
* Server certificate: Symantec Class 3 Secure Server CA - G4
* Server certificate: VeriSign Class 3 Public Primary Certification Authority - G5
> POST /services/data/v34.0/composite/batch/ HTTP/1.1
> Host: eu6.salesforce.com
> User-Agent: curl/7.43.0
> Accept: */*
> Authorization: Bearer 00DS80000000bJoG!AQUAQJWP4DYKCi6uYRu3oW.D_BkG1T0jtT0lfJ_A_e7SGvJIfqqo9z9RsR7LBHxSHo0DEhHGo_6b41oo07h4FWDApYxTYQ2x
> Content-Type: application/json
> Content-Length: 256
>
} [256 bytes data]
* upload completely sent off: 256 out of 256 bytes
100   256    0     0  100   256      0     90  0:00:02  0:00:02 --:--:--    90< HTTP/1.1 200 OK
< Date: Thu, 26 May 2016 10:50:33 GMT
< Set-Cookie: BrowserId=gpycwkbJQOi50y882-Zf2g;Path=/;Domain=.salesforce.com;Expires=Mon, 25-Jul-2016 10:50:33 GMT
< Expires: Thu, 01 Jan 1970 00:00:00 GMT
< Sforce-Limit-Info: api-usage=84/15000
< Content-Type: application/json;charset=UTF-8
< Transfer-Encoding: chunked
<
{ [97 bytes data]
100   516    0   260  100   256     89     87  0:00:02  0:00:02 --:--:--    89
* Connection #0 to host eu6.salesforce.com left intact
etroiani-ltm1:Desktop etroiani$
```

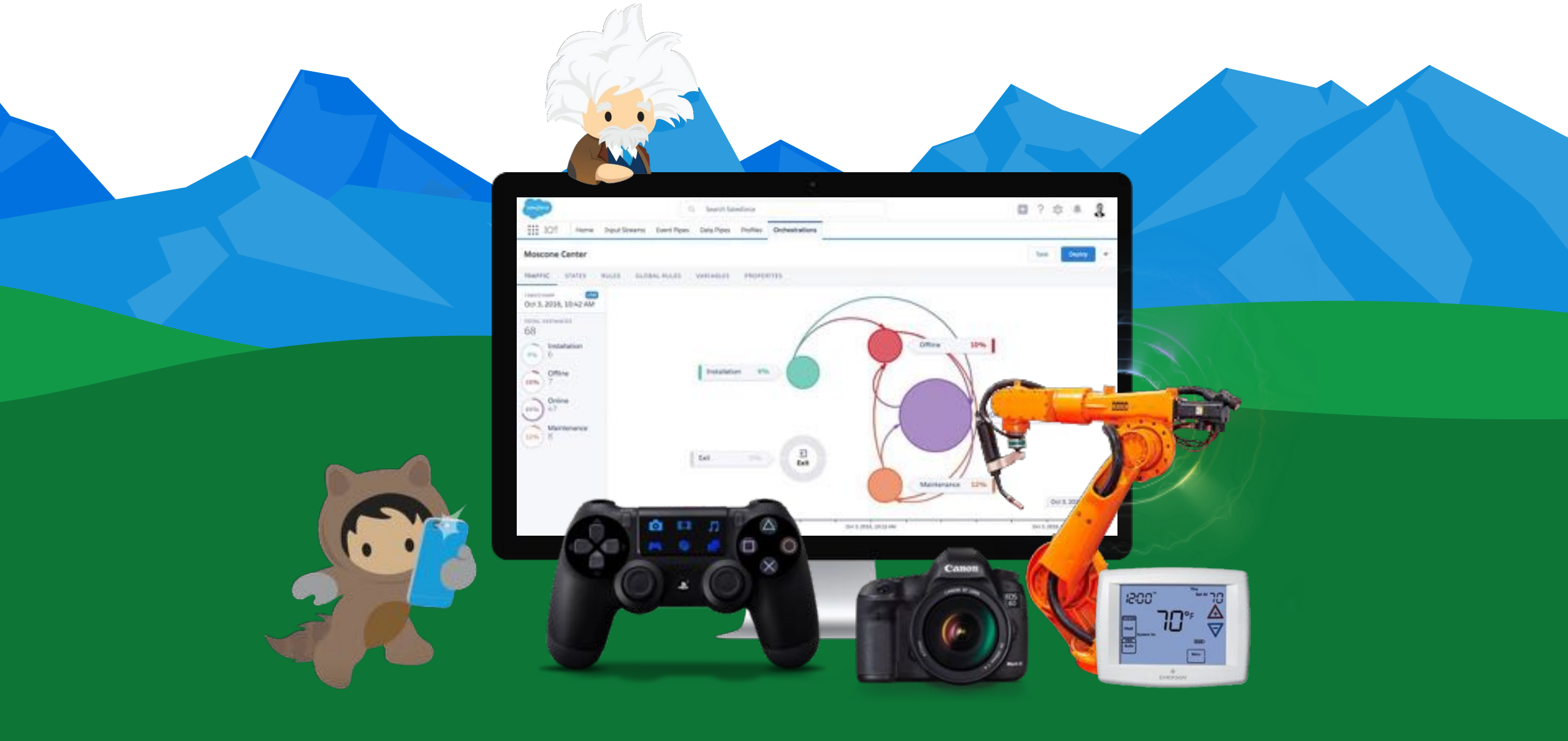
Response from Composite execution – step2

{"hasErrors":false,"results":[{"statusCode":204,"result":null},{"statusCode":200,"result":
{"attributes":{"type":"Account","url":"/services/data/v40.0/sobjects/Account/00158000006kIpuAAE"},"Name":"NewName","BillingPostalCode":null,
"Id":"00158000006kIpuAAE"}}]}

Response from Composite execution – step3



Apex Integration Services



Roundup of Other Integration Topics

Apex Callout

Salesforce request to external system

```
1   HttpRequest req = new HttpRequest();
2
3   req.setEndpoint(url);
4   req.setMethod(method);
5   req.setBody(body);
6
7   Http http = new Http();
8   HttpResponse resp = http.send(req);
```

Apex Rest Endpoint

Custom API in Salesforce

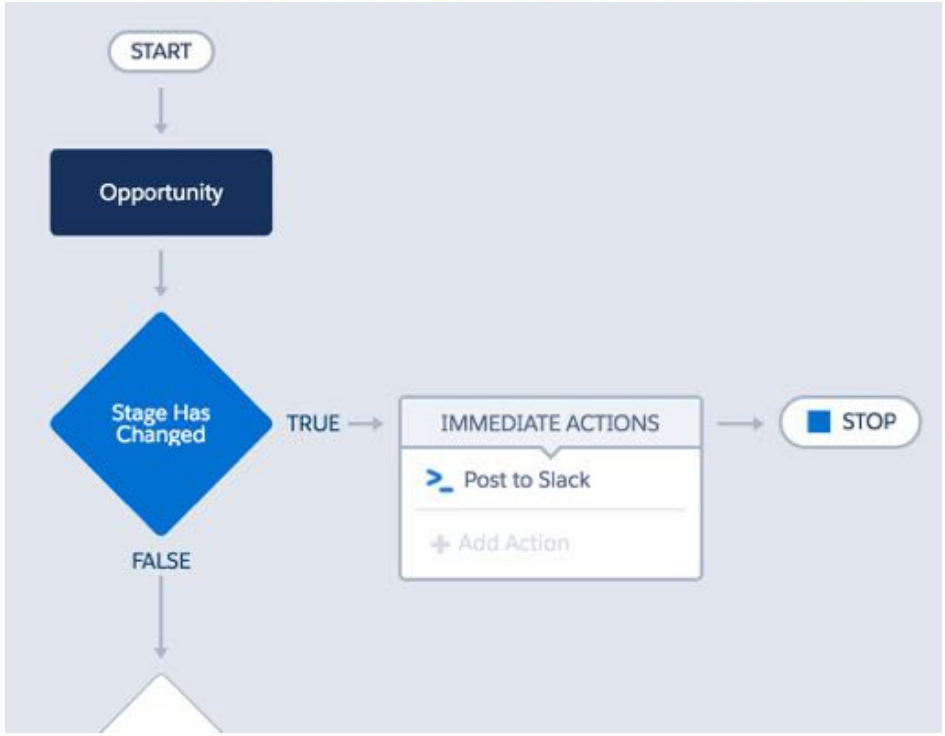
```
1   @RestResource(urlMapping='/propertyhub/*')
2   global class PropertiesService {
3
4       @HttpGet
5       global static List<Property__c> getNearbyProperties(){
6           List<Property__c> retProps = new List<Property__c>();
7           RestRequest req = RestContext.request;
8           RestResponse resp = RestContext.response;
9           ...
10
11          return retProps;
12      }
```

Slack Integration using Apex and BOT

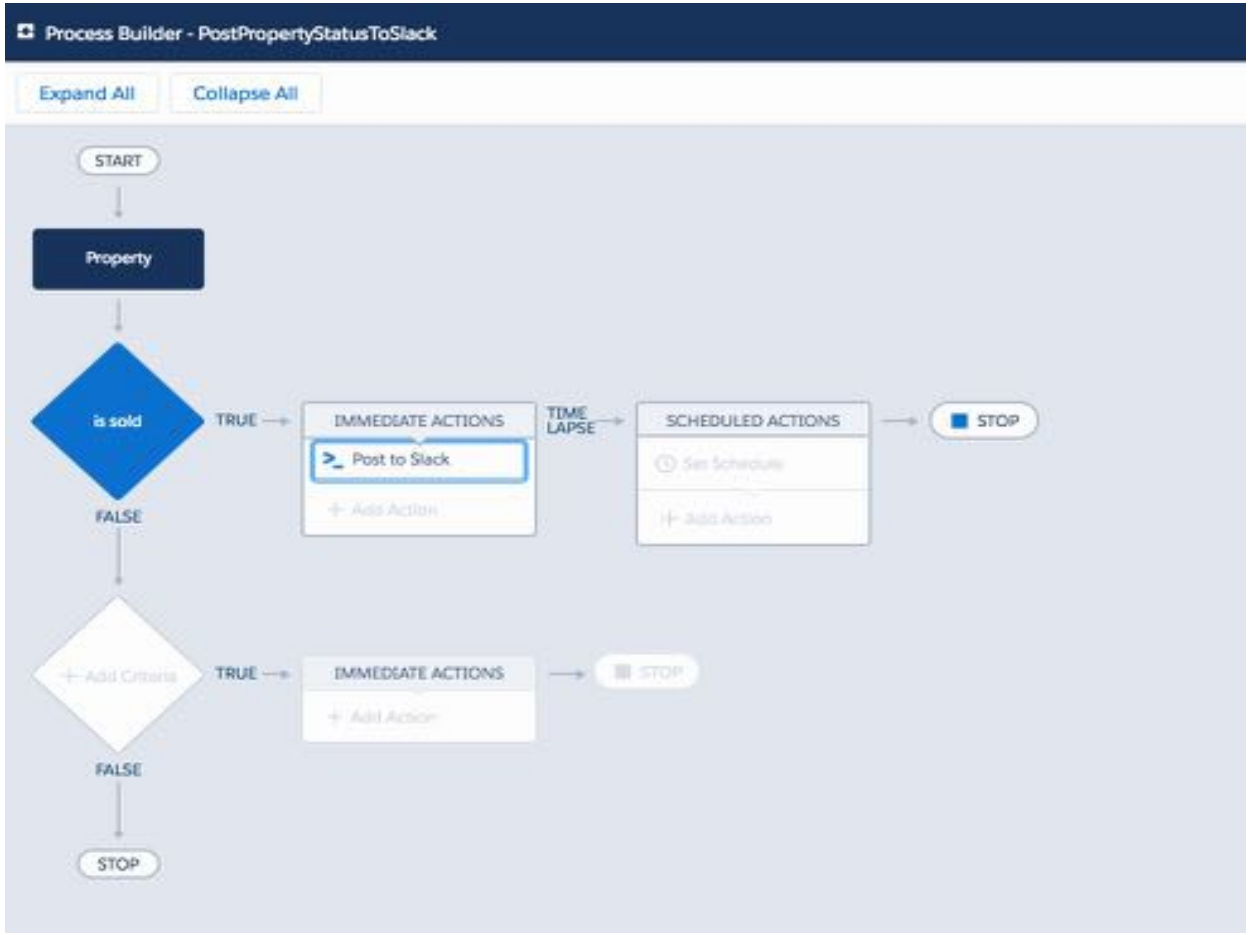
Apex Code - Declarative Logic

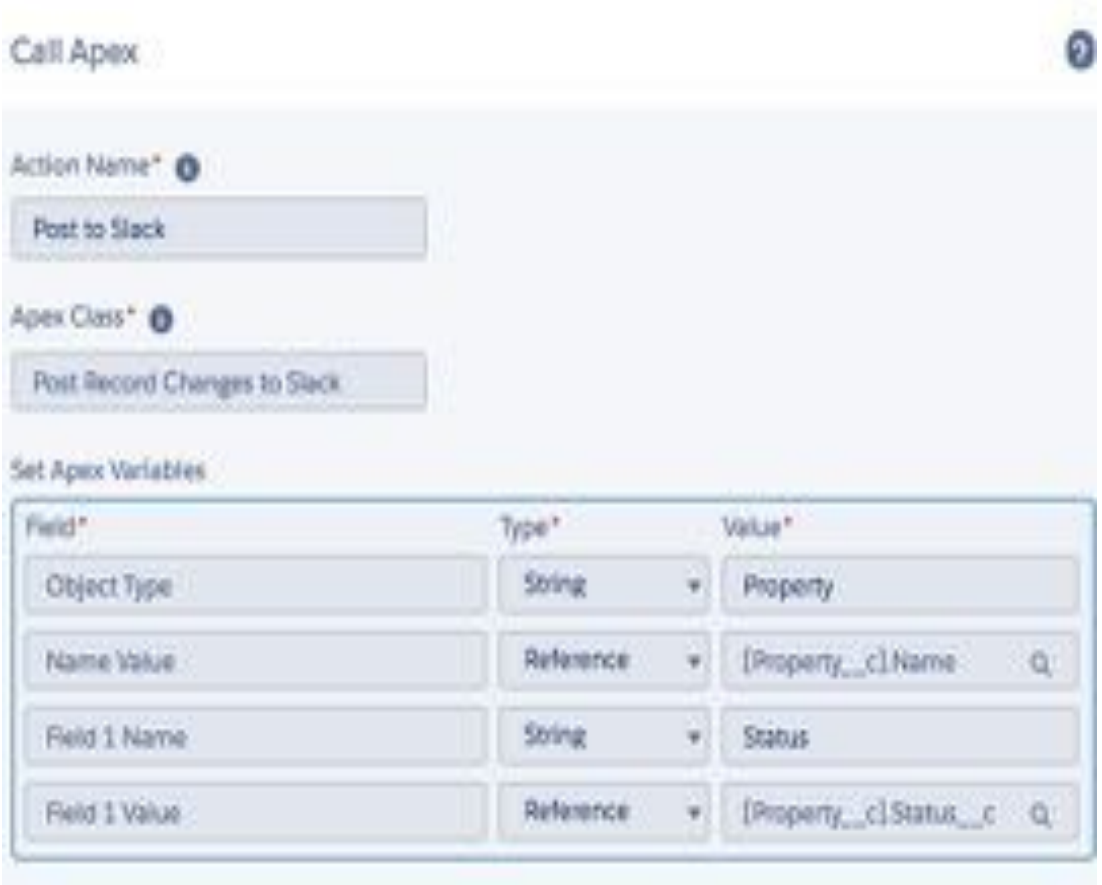
Customization

```
@InvocableMethod(label='Post to Slack')
public static void postToSlack(List<Oppty> oppties) {
    Oppty o = oppties[0];
    Map<String,Object> msg = new Map<String,Object>();
```



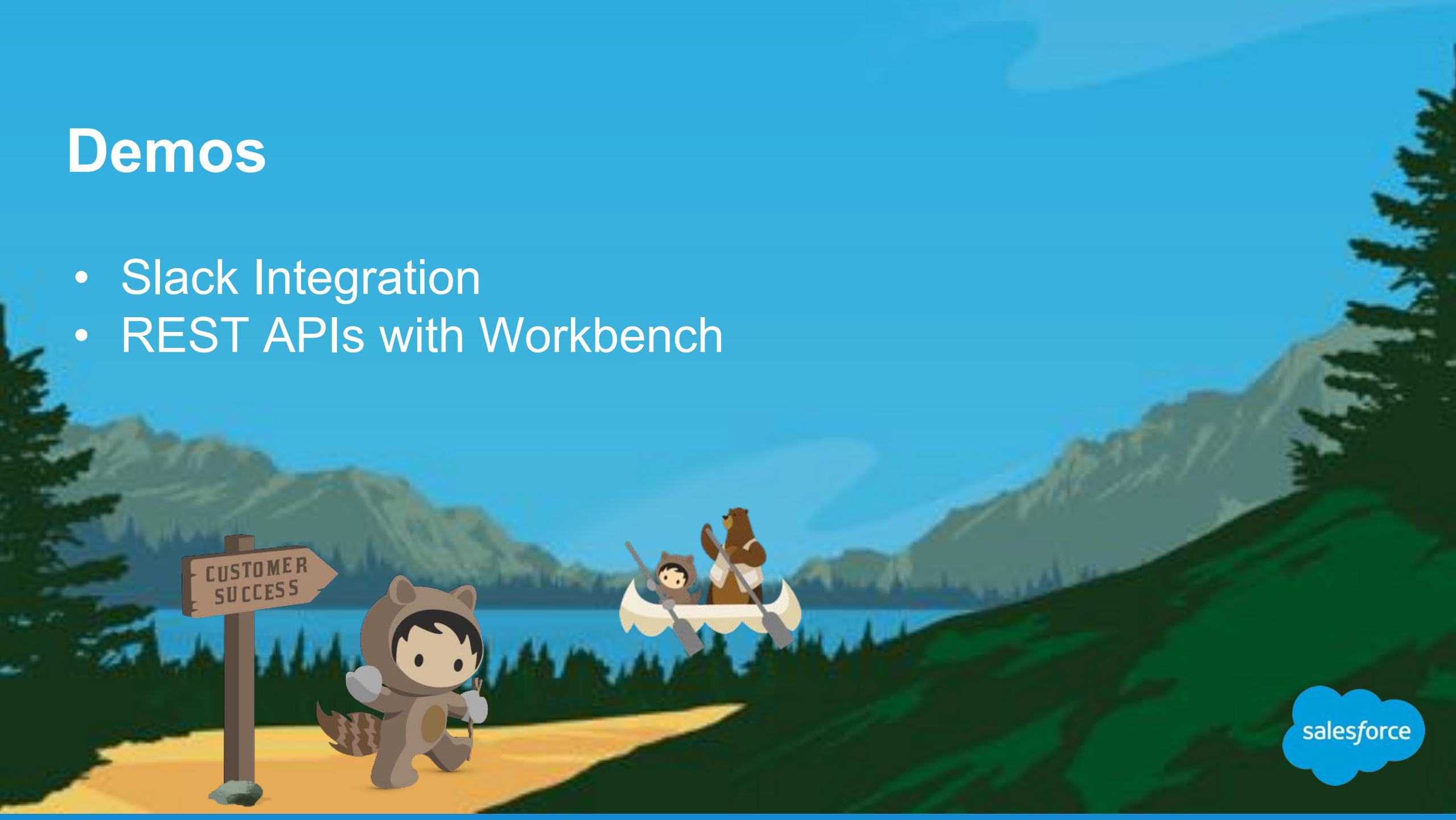
Apex Code - Declarative Logic





Demos

- Slack Integration
- REST APIs with Workbench



Salesforce Connect

Federating data using OData

Salesforce Connect

OData 2.0/4.0 or Custom Connector using Apex

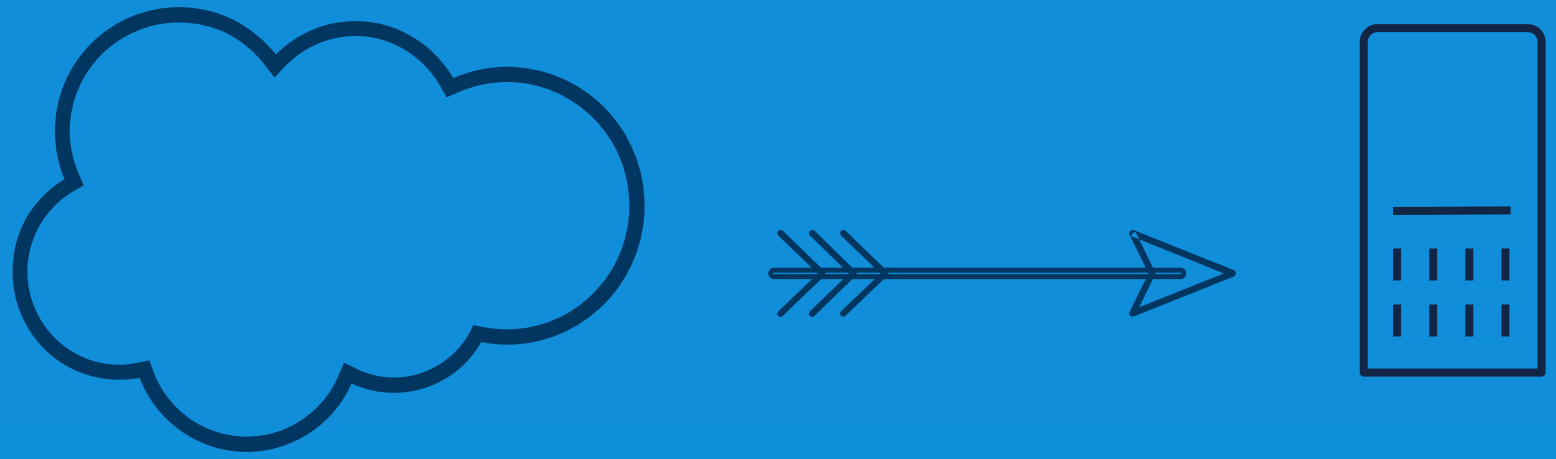
External data represented as Salesforce entity

Metadata from schema of system of record

Standard object features like Tabs, Views, SOQL, API

OData 2.0/4.0 or Custom Apex
External data as Salesforce entity
Sync schema from system of record
No data duplication
Data mastered at system of record

Salesforce Connect



Streaming API

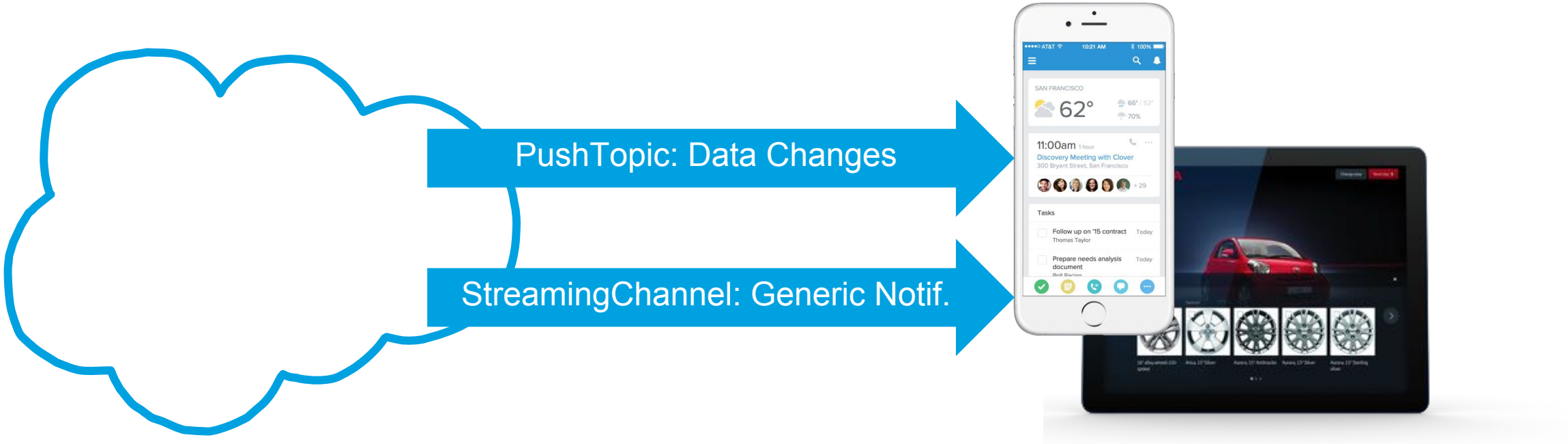
Pub/sub API to push events using long polling
Can be replayed for 24 hours

Streaming API

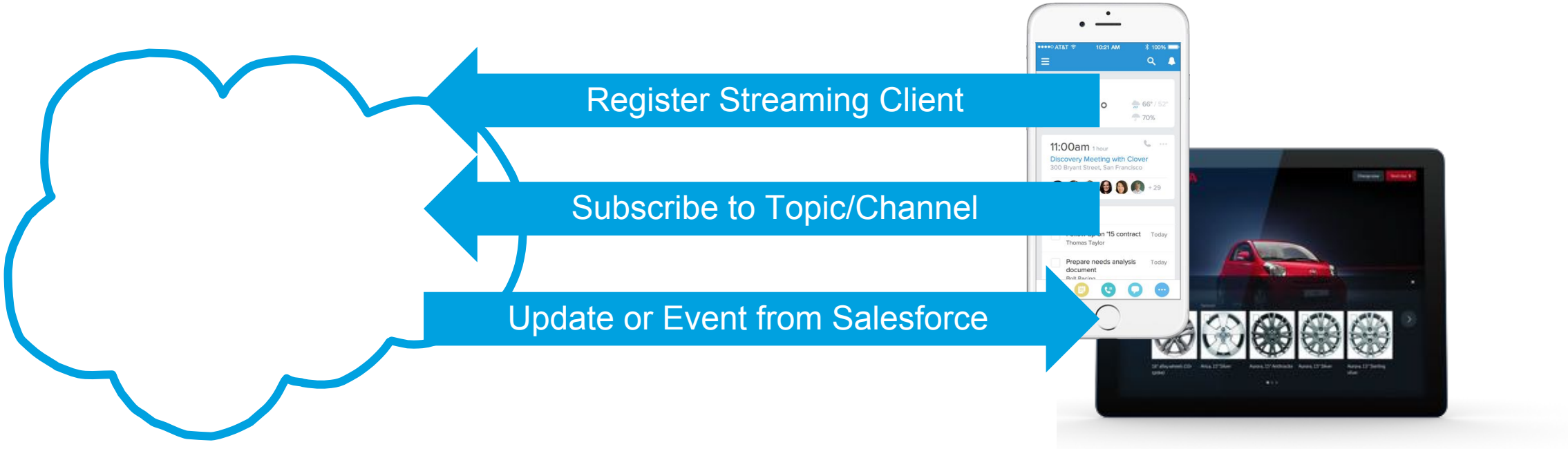
- What is Streaming Api - Introduction
- Streaming Api - Example of usage in Workbench
- Prerequisites
- How it is used
- Where it is used
- Example - Demo with Code Walking Trough
- Pro & Cons

Streaming API – Publish/Subscribe model

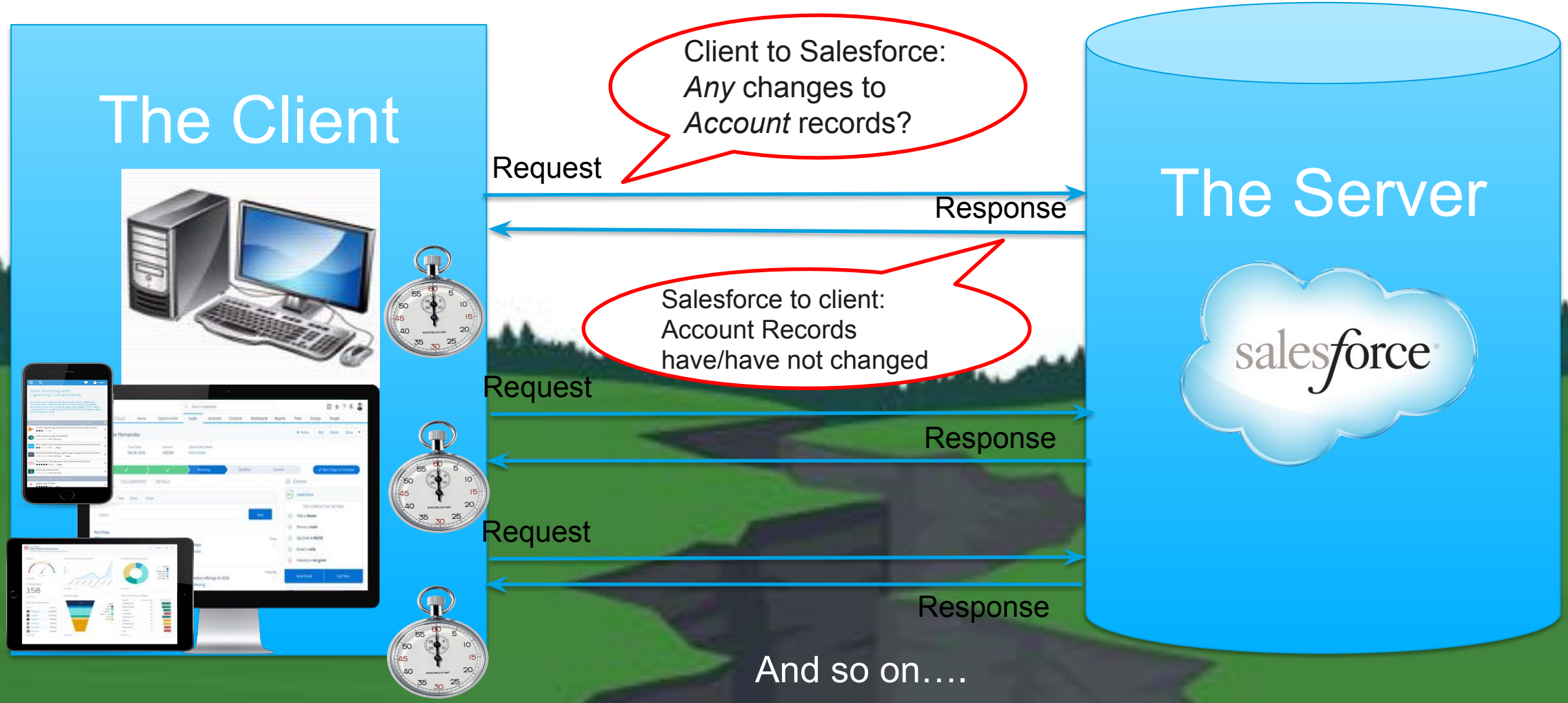
Push Topics and Generic Streaming



Streaming to client - PushTopic/StreamingChannel

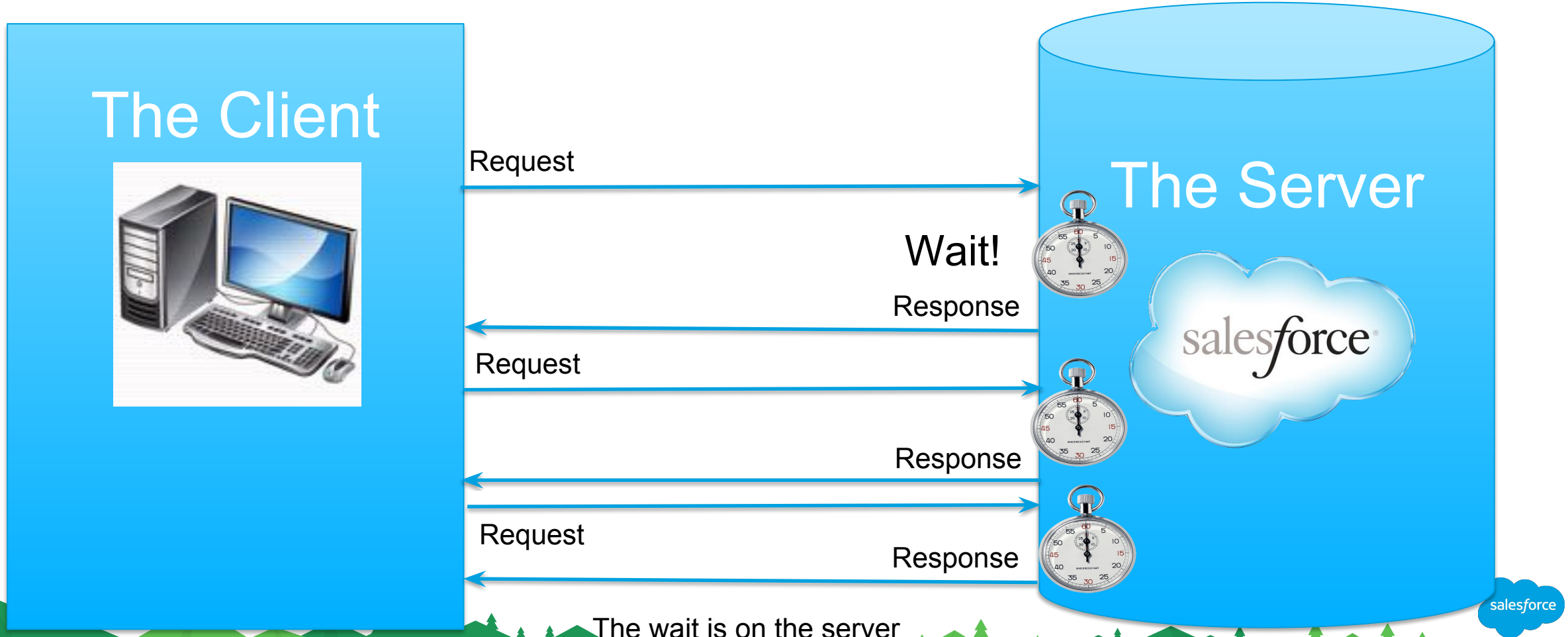


Pull Technology vs Push Technology



Long Polling

Long Polling emulates an information push from a server to a client to keep the connection active



Why Another API?

The Traditional Solution:

Client polls Salesforce at a regular interval using the REST or SOAP API

Issues:

- Your org may hit API limits
- Does not scale to multiple clients needing the same data
- The Action is happening on the server side but the client does not know when

The new solution:
Publish/Subscribe model with the Streaming API

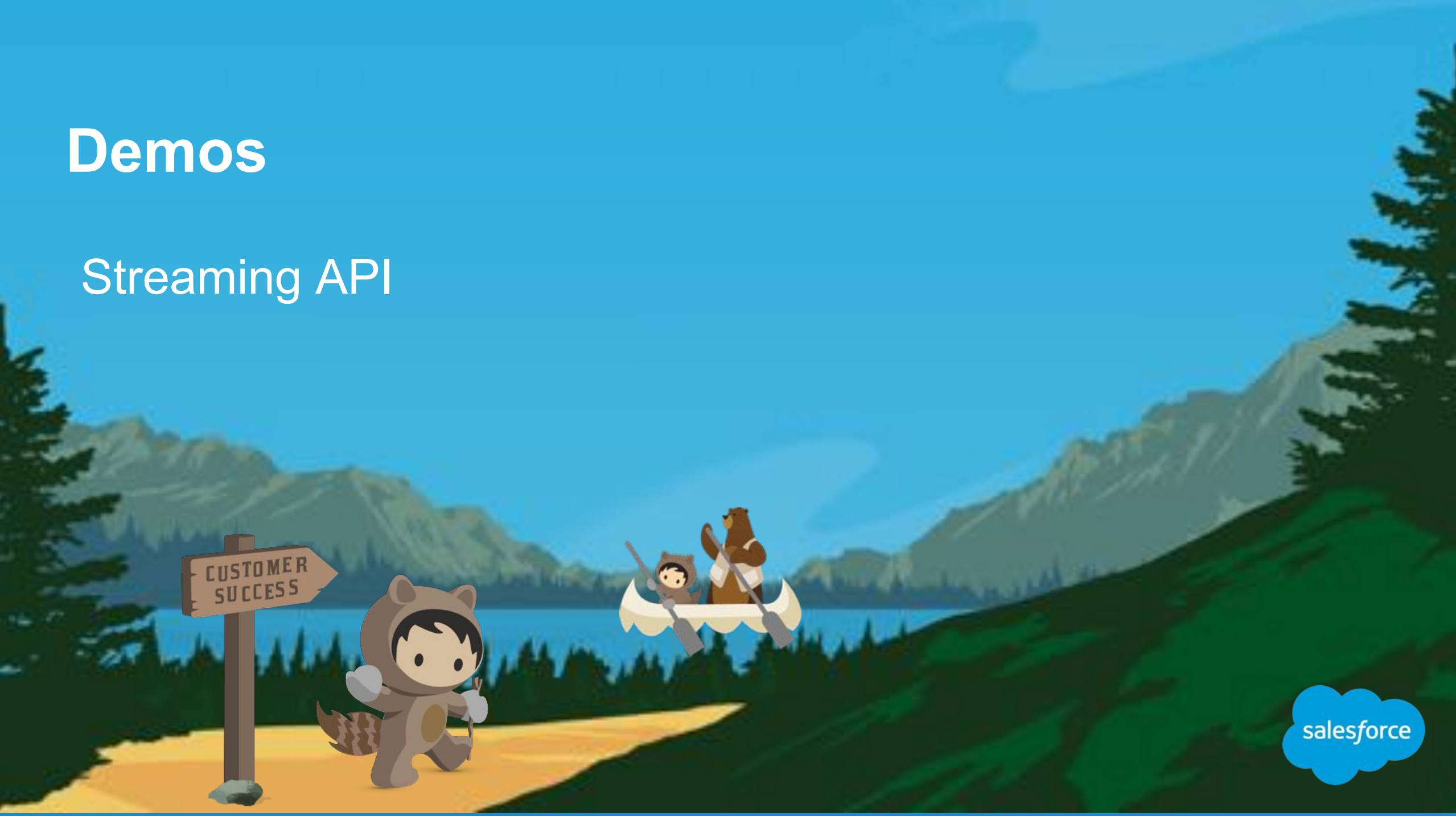
Data Changes: Create a PushTopic

Notify changes in salesforce data to an external client

```
PushTopic pushTopic = new PushTopic();

pushTopic.Name = 'InvoiceStatementUpdates';

pushTopic.Query = 'SELECT Id, Name, Status__c, Description__c FROM Invoice_Statement__c';

pushTopic.ApiVersion = 40.0;

pushTopic.NotifyForOperationUpdate = true;

pushTopic.NotifyForFields = 'Select';

insert pushTopic;
```

Demos

Streaming API



Resources - part 1

1. **Integration between Salesforce and Slack**
   http://www.dreamhouseapp.io/slack/
   http://coenraets.org/blog/2016/01/slack-salesforce-integration/
   http://coenraets.org/blog/2016/01/slack-salesforce-integration-part-2/
2. **Dreamhouse App**
   http://www.dreamhouseapp.io/installation/
3. **Webhooks**
   https://api.slack.com/incoming-webhooks
4. **SOAP based APIs**
   https://developer.salesforce.com/docs/atlas.en-us.api.meta/api/
5. **REST based APIs**
   https://developer.salesforce.com/page/REST_API
6. **Workbench**
   https://developer.salesforce.com/page/Workbench

Resources - part 2

1. **StreamingAPI Create a Push Topic https://developer.salesforce.com/docs/atlas.en-us.api_streaming.meta/api_streaming/create_a_pushtopic.htm**
2. **StreamingAPI Limitshttps://developer.salesforce.com/docs/atlas.en-us.api_streaming.meta/api_streaming/limits.htm**
3. **Bayeux/CometD based APIs**

CometD documentation: https://docs.cometd.org/

Bayeux protocol documentation: www.cometd.org/documentation/bayeux

Bayeux protocol specification: www.cometd.org/documentation/bayeux/spec

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Questions?

If you have more questions on what I presented today

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Find me on twitter: @Manus2416

Thank You
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