THE COMPLETE GUIDE TO
App Cloud Mobile

salesforce app cloud
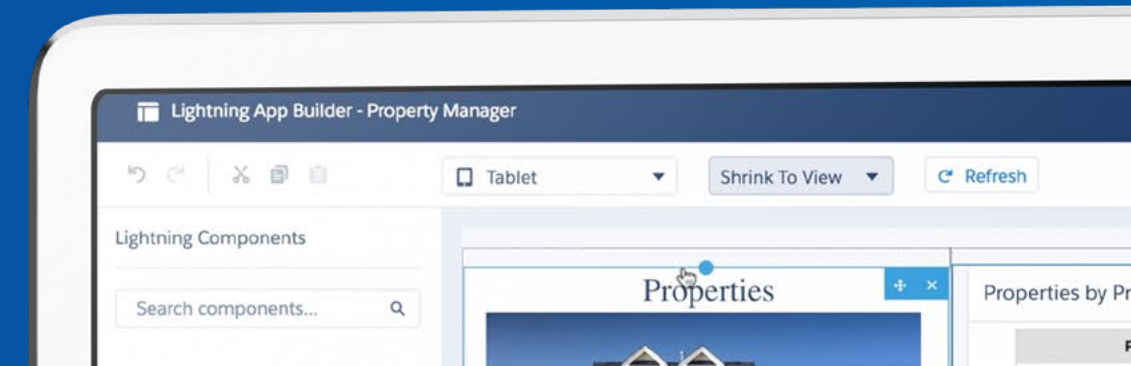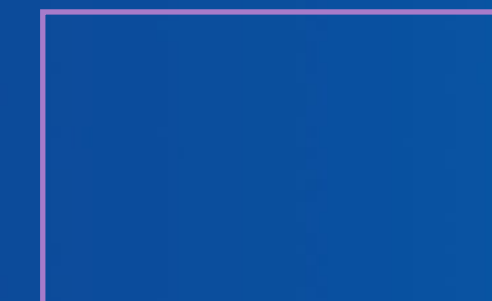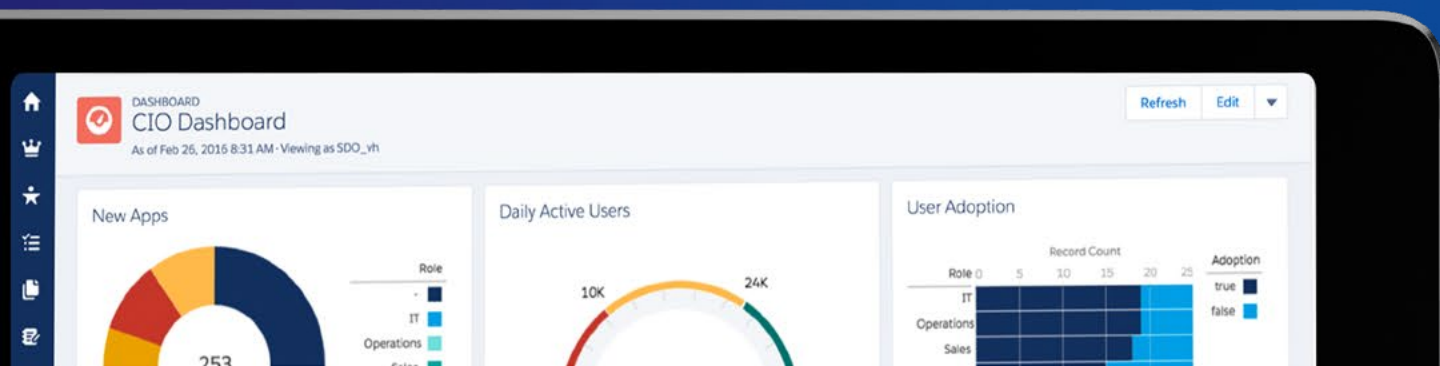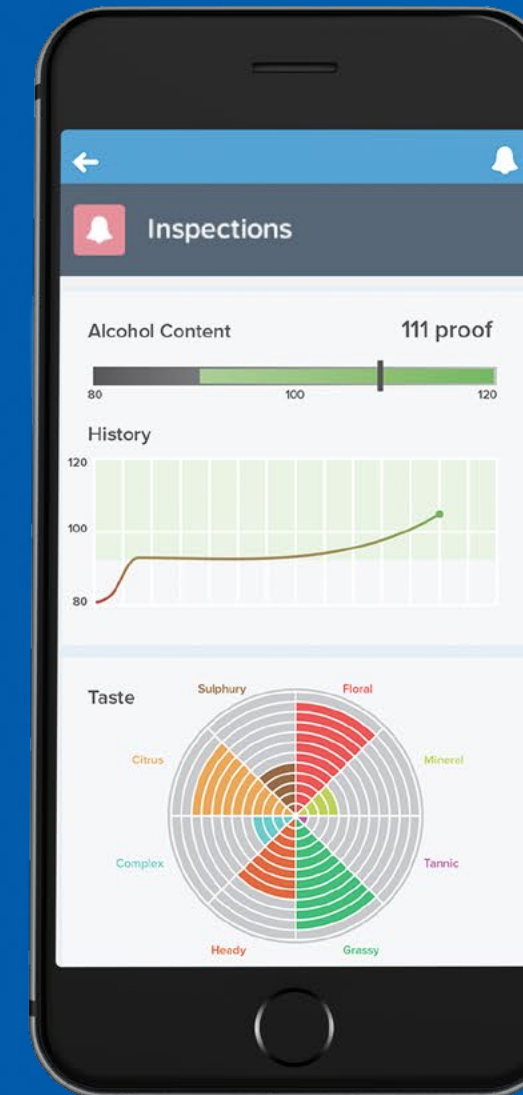
Table
of
Contents

Customer mobility is becoming key to transforming customer relationships and creating new revenue streams through "in the moment" customer experiences. Enterprise mobility is critical for business agility, and there is a big push to give employees the same digital tools that companies are giving to customers.

" *By **2020, 75%** of application purchases supporting digital business will be 'build,' not 'buy'."*[1]

– GARTNER

[1] Forecast Analysis: Enterprise Application Software, Worldwide, 1Q16 Update. Gartner, 10 May 2016

Where will these mobile apps come from? Increasingly, enterprises are under pressure to build a strong in-house mobile competency. According to Gartner, "By 2020, 75% of application purchases supporting digital business will be 'build,' not 'buy'." That's created a demand to make mobile development easier, faster, and more accessible to developers and nondevelopers within the enterprise.

However, the current approach to mobile app development is simply not scalable. Building apps for contextual mobile experiences that leverage data – both in network and offline – while addressing security and scalability requires a lot of time and resources.

Other hurdles include:

- A lack of skilled developers is slowing mobile transformation and forcing companies to prioritize and deliver only a few apps at a time.

- Conventional monolithic back-end platforms can't keep up with the rapid deployments mandated by agile-centric mobile development.

- The explosion in mobile tools, frameworks, and approaches has further increased the governance burden for IT leaders on their way to accelerating mobile innovation.

This document is designed to help you quickly understand the technical mobile landscape, to learn how App Cloud Mobile provides enterprise-class mobile app development capabilities for balancing speed and control, and to provide you with development guidance for your mobile journey.

The Mobile Opportunity

We see three major opportunities in the rapidly changing world of mobile:

1 **Harness systems of record** (including functional areas like sales, service and ERP, as well as custom business apps) and make that data actionable in mobile apps on any platform or device.

2 **Finally get ahead of the IT mobile backlog** by decreasing both delivery time and your portfolio's risk profile and governance burden.

3 **Activate all developer types**, from business analysts to professional developers, who want to use emerging frameworks, open source tools, and new programming models (including microservices) to deliver more apps, faster.

Today's IT leaders and mobile developers have a huge number of choices (and decisions) when selecting their go-forward strategy and tool set. No single-enterprise software provider addresses all possible use cases.

App Cloud Mobile focuses on four main areas:

1 Strong low-code capabilities for rapid apps

2 Direct support for current and emerging JavaScript mobile frameworks and a complete SDK

3 The industry's leading elastic compute environment, Heroku, as the foundation for massive-scale consumer apps

4 Streamlined integration, through data-by-reference, APIs, and third-party ecosystems

These areas can be thought of as a mobile continuum of capabilities for this type of app development. App Cloud Mobile gives every company the ability to leverage these tools to quickly and easily build, deploy, and manage any type of responsive mobile app and exploit mobile opportunities.
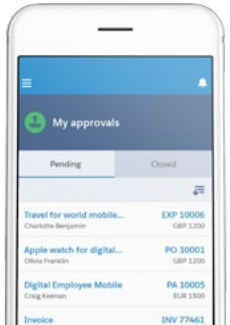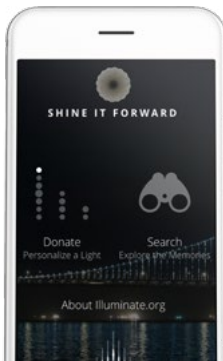
Modern App Development Using App Cloud Mobile

Mobile app components are composed of a user experience (UX) and a series of mobile back-end capabilities. In this section, we will lay out the components that make up each, and then explore how App Cloud Mobile effectively supports and connects these components into working apps.

Breaking It Down: Mobile UX

While there are many types of mobile apps, Salesforce has found they can be summarized in the following table. These are the commonly used ways to approach building the user-facing portion of mobile apps, along with their important trade-offs.

APP TYPE	TARGET AUDIENCE	MOBILE UX	FEATURES	DEVELOPER SKILL SETS NEEDED	UX CUSTOMIZATION CAPABILITIES	DEPLOYMENT METHOD
Simple Productivity Apps	Employees and Customers	Salesforce1 Mobile App (S1)	• Drag-and-drop app creation • Near-instant app distribution • Single container for all S1 apps • Self-contained, reusable application components (Lightning components) • No-code access to device camera and microphone • Apps are responsive OOTB • Offline support for recently used records and draft record creation	Business Analysis and Configuration (No Coding Skills Required)	Standard: Based on Lightning components, branding through page logos and colors	Admins deploy; apps automatically appear for all authorized users in the S1 container
High-Control Custom Apps	Employees and Customers	Hybrid / Native + with Salesforce Mobile SDK	• Multiple choices of HTML5/ JavaScript frameworks[2] • Advanced features including touch optimization, components, sample apps, choice of IDE • Salesforce Mobile SDK[3] provides full support for offline and secure/ encrypted local storage • Increased branding flexibility • Support for component-based Lightning Design System (LDS)[4]	Hybrid: Web Development + Tool-Specific + JavaScript Native: Device-Specific Languages, JavaScript	Hybrid: Custom UX with advanced graphical and device-specific capabilities Native: Advanced UX with unlimited interactivity and use of device-specific features	Via internal / external app stores or websites
Highly Scalable Apps	Customers and Consumers	Hybrid / Native	• Multiple choices of HTML5/ JavaScript frameworks • Advanced features including touch optimization, components, sample apps, choice of IDE • Increased graphical capability • Device-dependent language/ framework support • Support for component-based Lightning Design System (LDS)	Hybrid: Web Development + Tool-Specific + JavaScript Native: Device-Specific Languages, JavaScript	Hybrid: Custom UX with advanced graphical and device-specific capabilities Native: Advanced UX with unlimited interactivity and use of device-specific features	Via internal / external app stores or websites

[2] See https://developer.salesforce.com/mobile/services/mobile-packs
[3] See https://developer.salesforce.com/page/Mobile_SDK
[4] See http://www.lightningdesignsystem.com

Breaking It Down:
Back-End Services

The most valuable mobile apps are the ones that provide business or user context – that is, the ones that include functionality that reads and updates relevant data, use data from disparate sources, and leverage services from other cloud and on-premises-based apps. Developers need to easily tap into an enterprise-grade set of mobile back-end services to ensure that their apps have this complete business or user context and, meet the requirements at hand. App Cloud Mobile provides a full set of capabilities that expose and extend business data.

MOBILE BACK-END FEATURE	APP CLOUD MOBILE DESCRIPTION
Secure, Trusted Platform	App Cloud's S1 approach directly leverages Salesforce's global, secure, multitenant services, and supports a rich sharing model and user management. When using App Cloud's Heroku service, developers can leverage Private Spaces[5], a Virtual Private Cloud (VPC) with the capability to meet additional security needs and enable microservices-based programming models for independent development teams. Both S1-and SDK-based approaches can take advantage of encrypted offline data protects any in-flight data and prevents unauthorized access if the mobile device is lost or stolen.
Extensibility	App Cloud's metadata foundation and focus on component-based development means that developers can quickly develop and deploy apps, as well as add feature improvements and rapidly iterate to decrease time to market, all while reducing app backlogs.
Basic Mobile Back-End Services	• Push Notifications; full support through native OS vendors including Apple, Google, and Microsoft (for S1- and SDK-based apps) • Social Capabilities; access the Chatter REST API as well as Salesforce Community Cloud (for SDK-based apps) • Geolocation Services: through native device capability (for SDK-based apps) • File Access: asynchronous upload/download support (for S1- and SDK-based apps) • Mobile Identity: OAuth capability with optional PIN authentication (for S1- and SDK-based apps)
Integration: APIs and Connectors	• App Cloud supports complete REST, SOAP, and streaming APIs that mobile developers can use to create any type of composite app • Salesforce Connect provides data-by-reference via the industry-standard OData protocol • AppExchange ISV and SI partner communities bring additional capabilities via custom connectors
Mobile Device Management (MDM) Support	App Cloud Mobile provides OOTB support for all major MDM solutions, including policy support, custom login URLs for apps, and certificate-based authentication. This requires no changes to the application code (for SDK-based apps). S1 provides complete MDM support for Android and Windows.

[5] See https://www.heroku.com/private-spaces for further details.

Putting It All Together with App Cloud Mobile

As IT leaders, you need to weigh the pros and cons of mobile development approaches against your specific use cases. Additionally, you need to address the needs of stakeholders and customer segments. In the following table, we combine the mobile UX and mobile back-end components introduced earlier to present three key mobile solution approaches.

As discussed earlier, while these suggested application types are the most common, Salesforce has also seen customers create a number of variations to meet their particular requirements, budgets, and skill sets.

| SOLUTION APPROACH	WHAT KINDS OF APPS CAN I BUILD?	HOW DO I DEVELOP?	WHAT ADDITIONAL APP CLOUD FEATURES SHOULD I CONSIDER?
Salesforce1 Mobile App: Integrated, Instant Deployment	**Business Apps for Automating Processes** Approvals Case Resolution Order Tracking Streamlining Sales Management Inventory Management Simple Site Surveys Time and Expense Tracking Internal Event Mgmt. Contract Management Concierge Apps	**Mobile Client:** Salesforce1 Mobile App Container **Development Tools:** Lightning App Builder, Lightning Process Builder, Lightning Components **Back-End:** Salesforce Core OOTB	AppExchange Lightning Components Salesforce Community Cloud Salesforce Connect Salesforce Shield
Mobile SDK: Branded, Stand-Alone Apps	**Enterprise Apps for Mobilizing Complex Processes** Specialized Field Service E-detailing High-Touch Financial Management Field Asset Management Complex Site Surveys Branded Event Management Realty Management Insurance Claim Submission	**Mobile Client:** Web, Cross-Platform Hybrid, or Native **Development Tools:** Lightning Components or JavaScript Framework, Salesforce Mobile SDK **Back-End:** Salesforce Core via API and Mobile Back-End Services	AppExchange Lightning Components Salesforce Community Cloud Salesforce Connect Salesforce Shield
Mobile Apps with Heroku: Custom, Multi-Language, Elastic	**Customer and Consumer Apps for Creating 1-to-1 Experiences** Specialized Field Service B2C Loyalty Apps E-commerce Property Management IoT Field Service Social Media/Community Sharing Economy Apps B2C Wellness/Fitness Recommendation Apps	**Mobile Client:** Web, Cross-Platform Container, or Native **Development Tools:** Lightning Components or JavaScript Framework **Back-End:** Heroku PaaS via API and Mobile Back-End Services	AppExchange Lightning Components Salesforce Community Cloud Salesforce Connect Salesforce Shield

Each of the approaches is further described in the following sections. Please also see "Reference Diagrams" at the end of this document for visual representations of each solution approach.

SALESFORCE1 MOBILE APP: INTEGRATED, INSTANT DEPLOYMENT

Salesforce1 Mobile App-based apps are focused on increasing the day-to-day productivity of employees. In this approach, the Salesforce1 Mobile App container is used to host custom low-code mobile apps built by admins or business analysts.

The S1 mobile container offers these key features:

- Ability to quickly build apps with no code and no deployment effort (activated apps are visible instantly on Salesforce1 Mobile App)
- Direct camera access (for posting photos back to apps)
- Voice-to-text input (for text form fills)
- Offline access (when offline, locally stores updates and synchronizes when device is connected)
- Connects to Salesforce data through REST APIs
- Salesforce Connect for real-time access to external data sources
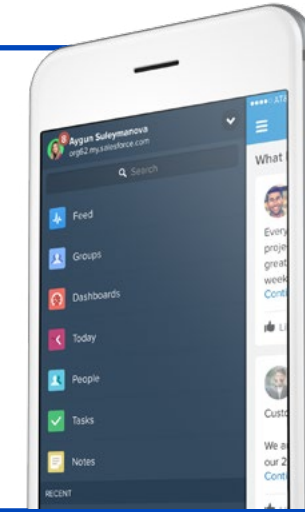
Developers often use this approach to extend Sales Cloud and Service Cloud functionality, and build analytics reports and dashboards for mobile users. In addition, other features of App Cloud can be used by the Salesforce1 Mobile App, including:

- Workflow
- Alerts
- Chatter
- Third-party AppExchange Lightning Components
- Integration to back-end systems through Salesforce Connect or Apex
- Authorized access to data encrypted through Salesforce Shield
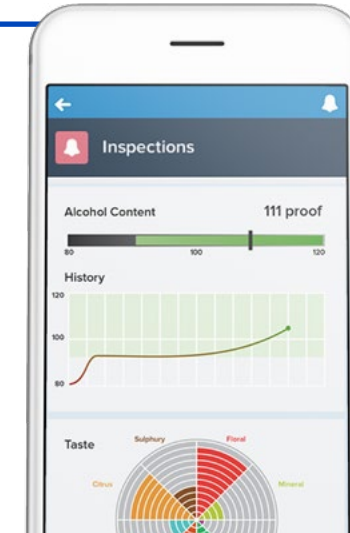
Common use cases for this approach include:

- Approval requests
- Case resolution
- Trouble tickets management
- Order fulfillment (including accessing data from ERP and other systems)
- CRM tasks
- Inventory management
- Simple site surveys

- HR apps:
  - Company calendar/holidays
  - Events
  - Fitness schedule
  - Building/parking info
  - Cafeteria menus
- Sales-based streamlined customer data capture; any geolocation apps
- Customer service: customized site surveys and digital signature apps

SALESFORCE1 MOBILE APP: CUSTOMER STORY
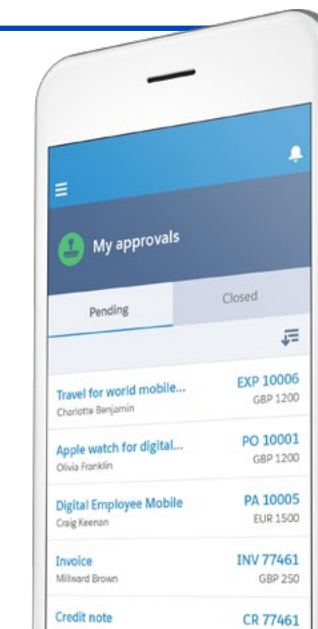
Unilever delivers six apps in six months to thousands of employees with App Cloud Mobile.
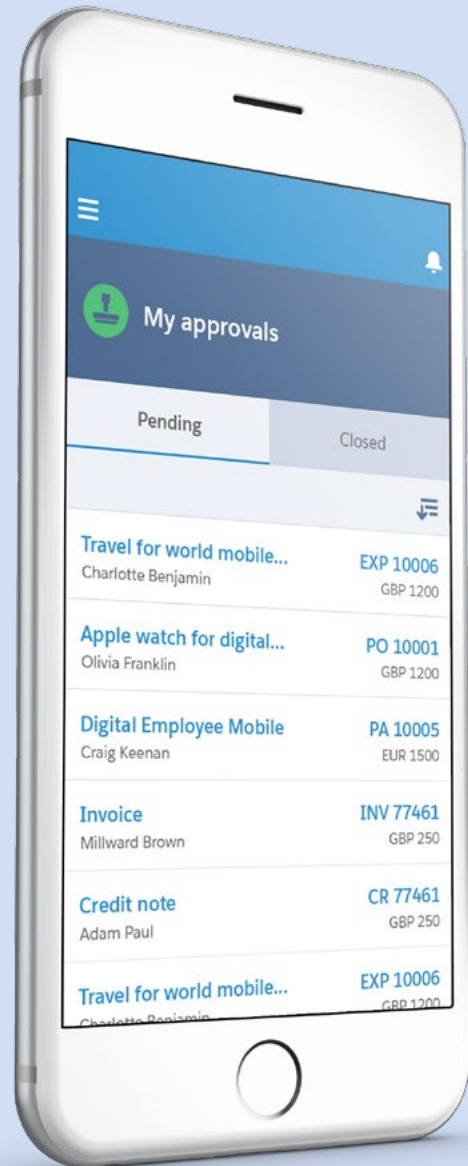
"App Cloud Mobile is a key part of our vision for a digital employee. It is our strategic platform for delivering mobile apps to a staff of 100,000 globally."

TOM MADDEN | APPS LEAD

Unilever

MyApprovals app streamlines submissions of millions of approvals and gives time back to thousands of employees each day.

FEATURED APP
MyApprovals (mobile approvals)

WHAT THE APP DOES
MyApprovals brings together approval workflows from a number of ERP systems to reduce the effort in approving purchase orders, expenses, invoices, and more. By reducing approval submission from 2 minutes to 10 seconds across 2 million approvals processed annually, the app has the potential to save thousands of employee hours per year.

HOW THE APP WORKS
Once the approval notification pops on the employee's mobile device, the employee uses single sign-on to log in to the app and clicks to approve or return the request. The app syncs with multiple business systems and sorts different approvals in one list view for a one-stop approval experience.

WHO BUILT THE APP
A tech lead with a co-located DevOps team, partnering with Mindtree, built the front end of the app in under 8 weeks.

UNDERLYING ARCHITECTURE
UX: Cross-platform Salesforce1 Mobile App with custom Visualforce page; S1 offline capability; MuleSoft as an integration layer; platform services for identity and single sign-on. The app works in 33 languages. The Unilever team is in the process of rebuilding it on Lightning.

OTHER APPS BUILT WITH APP CLOUD MOBILE
Agent App, Ideas App, Workplace App, Everyday Action App, News App

MOBILE SDK: BRANDED, STAND-ALONE APPS

Apps built using the Mobile SDK are focused on providing a highly customized and branded user experience. Typically, such apps focus on enabling increased customer engagement and retention, managing complex supply chains and partner ecosystems for increased service, and the seamless execution of transactions. In this approach, developers create stand-alone mobile apps using a number of widely used JavaScript and component frameworks,[6] and leverage the Salesforce Lightning Design System[7] in conjunction with their chosen tool set. They also use the Salesforce Mobile SDK and RESTful services to access Salesforce as mobile back-end as a service.

Key benefits include:

- Developer choice of component framework, including Angular, Polymer, React, Xamarin, and others

- High control over branding and user experience

- OOTB access to the Salesforce sharing, security, and federated identity models via standard REST and OAuth mechanisms

- Support for all major MDM products

- Enterprises can choose to expose Partner Communities via the REST API

Common use cases for the SDK approach include:

- Large-scale supplier communities: knowledge sharing, RMA management

- Supply chain management

- Distributor networks: supply chain management, lead pass, deal management, and more.

- Healthcare and life sciences: e-detailing

- Specialized CRM

- Specialized field of service

- Branded event management

[6] See https://developer.salesforce.com/mobile/services/mobile-packs
[7] See http://www.lightningdesignsystem.com/
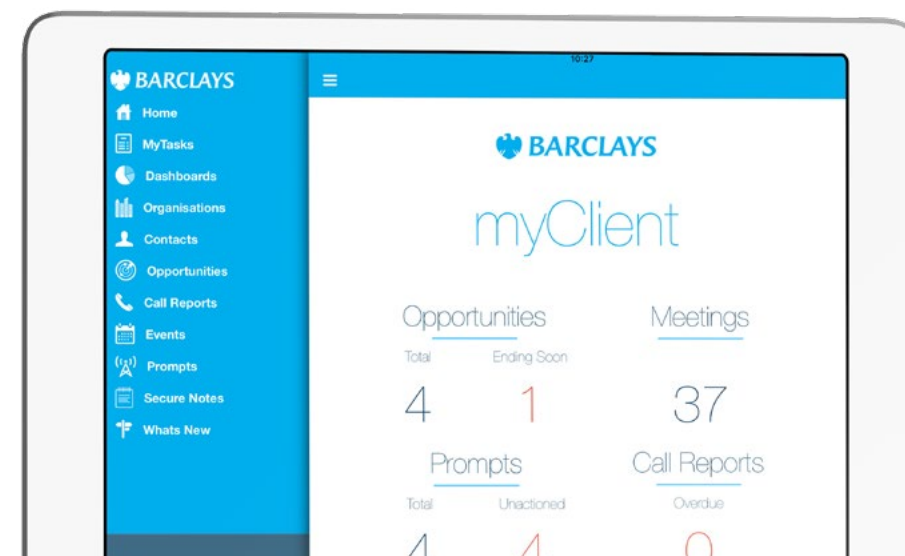
1,000+ Barclays Relationship Directors now run their business from their iPad.

> " App Cloud Mobile gives us the power to deliver custom mobile apps in just a couple of months, so we can focus on making the entire business more productive"

CARL CARTER | VP, CRM

BARCLAYS

Barclays uses App Cloud Mobile SDK to enable 1,000+ Relationship Directors to productively run their business from their tablet with a native iOS app.

FEATURED APP

MyClient App (relationship management)

WHAT THE APP DOES

The myClient iOS app prepares Relationship Directors with real-time knowledge of the client account, past conversations, potential talking points, products they hold, account balances, as well as the kind of income generated by the client – before they walk into the meeting. Additionally, Relationship Directors can take meeting notes and submit in real time without needing to prepare lengthy reports days, and sometimes weeks after.
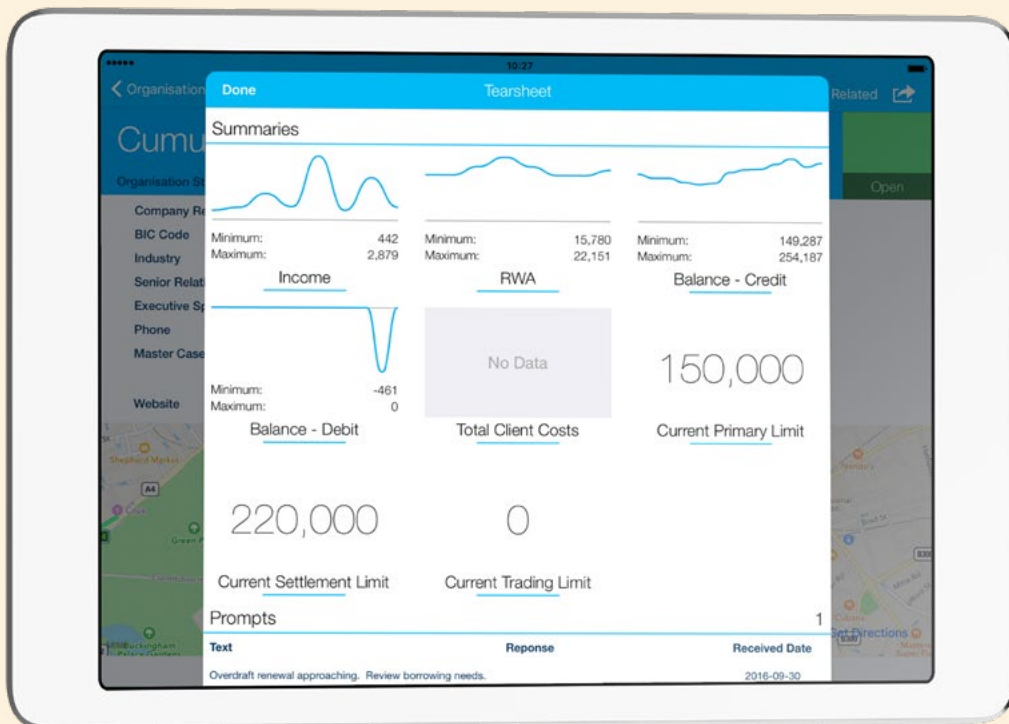
HOW THE APP WORKS

Relationship Directors download the app from the internal corporate app store and login using their credentials. The app calls a series of custom REST APIs and syncs all the relevant data in CRM to their iPads using offline caching functionality; relationship directors can view and edit client records in real time.

WHO BUILT THE APP

One native developer, one Salesforce developer and a couple of business analysts launched the initial version in under 3 months with focused bi-weekly releases; continual updates have been released on a monthly basis ever since.

UNDERLYING ARCHITECTURE

UX: Native iOS and Third-Party Graphing Libraries; Mobile SDK Services; Offline, REST APIs for connecting to data; Custom SSL Pinning and Complex Pin; Platform Services

OTHER APPS BUILT WITH APP CLOUD MOBILE

Mortgage Application App, Digital Marketing App

CUSTOM MOBILE APPS WITH HEROKU: CUSTOM, MULTI-LANGUAGE, ELASTIC

In many cases, mobile app developers need to provide a highly effective user experience and seamless extension of the enterprise's brand for very large audiences. Also, as more development teams adopt the microservices approach to app development, they need additional flexibility in back-end tooling and the ability to independently deploy apps across a heterogenous set of back-end services.

In the Mobile SDK and Heroku approach, developers can write either hybrid or native apps to meet their customers' requirements and use App Cloud's Heroku service as a scalable "elastic" compute capability that can easily scale to meet any demand. To construct their end-to-end apps, developers use a combination of APIs and their server-side language of choice to build responsive mobile apps coupled with Heroku computer power and flexible data stores.

Key benefits of this approach include:

- Developer choice of component framework, including Angular, Polymer, React, Xamarin, as well as server-side development languages (Ruby, Java, Scala, Node.js, and others)
- High control over branding and user experience
- Support for microservices-based development models, including Continuous Integration/Continuous Delivery via Heroku Flow
- Rich set of functional back-end add-ons (logging, messaging, data services, and more) available to development teams
- Out-of-the-box (OOTB) federated identity across Force.com and Heroku via standard REST and OAuth/SAML mechanisms
- Support for all major MDM frameworks
- Back-end compute scale and elasticity with none of the provisioning or complex configurations to manage

Depending on specific requirements for business data and integration, developers can leverage a number of additional App Cloud capabilities and tools, including:

- Seamless bidirectional sync between Heroku data stores and sales/service business data (via Heroku Connect)
- Ultra-secure Virtual Private Cloud (VPC) connectivity between on-premises enterprise apps and dedicated Heroku instance (Heroku Private Spaces)
- Full REST APIs to quickly provide mobile apps with the business data they need
- Vast ecosystem of connectors, ISV/SI partners, and marketplace to streamline integration and deployment

Common use cases for the Heroku approach include:

- Business-to-consumer loyalty programs
- Business-to-customer custom intranet
- Business-to-business complex business rule-based computations

CUSTOM MOBILE APPS WITH HEROKU: CUSTOMER STORY
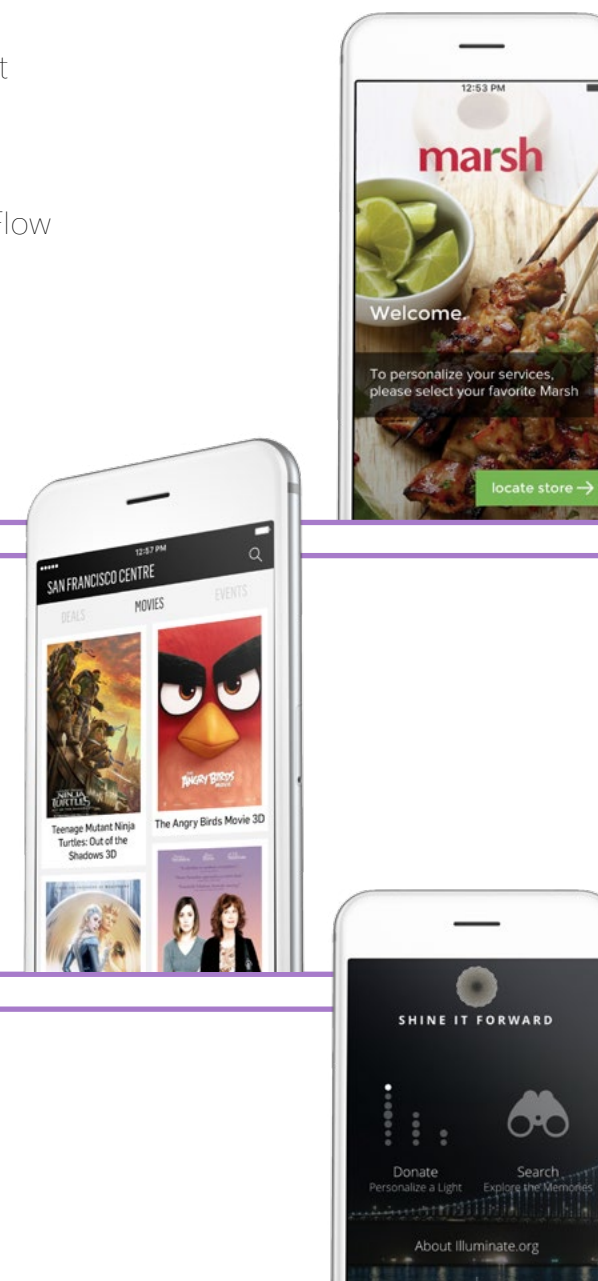
ILLUMINATE brightens the future of monumental Bay Area public art.

"
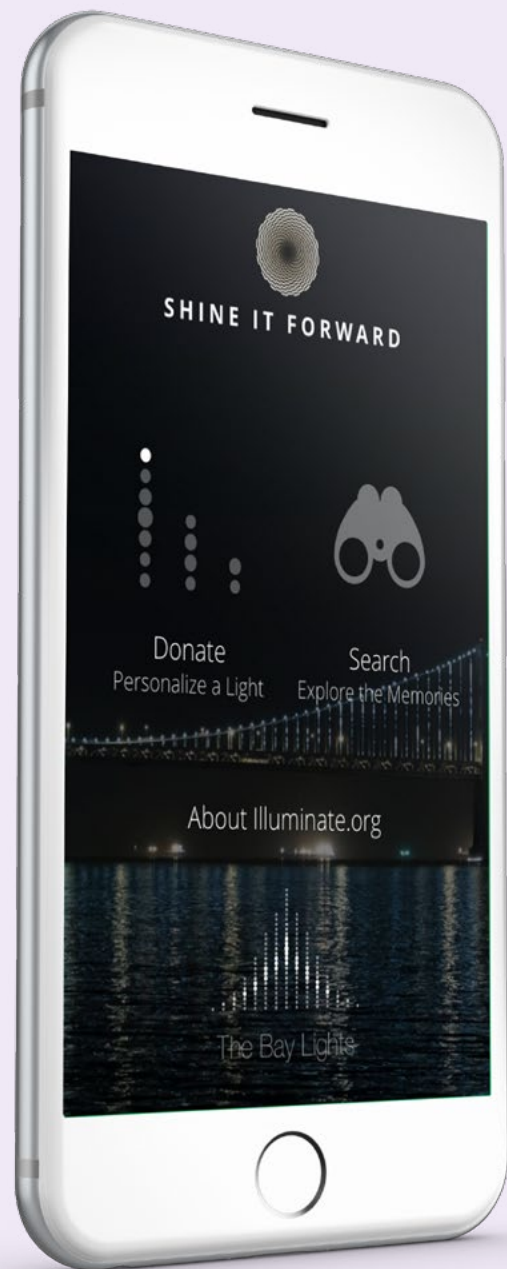
App Cloud Mobile from Salesforce has enabled us to build a robust donor engagement system that we can use to create ongoing relationships – an extremely valuable asset for an arts organization."

BEN DAVIS | FOUNDER AND CHIEF VISIONARY OFFICE

ILLUMINATE uses App Cloud to establish a donor system of record, as well as a donor engagement app running on Heroku to support its "Shine It Forward" program.

FEATURED APP

Shine It Forward

WHAT THE APP DOES

The Shine It Forward app is a mobile-first, responsive web app that performs gracefully across mobile, tablet, and desktop browsers. Donors can dedicate a light in The Bay Lights project to a loved one and memorialize the dedication by uploading a photo and text. The system randomly assigns a light from the available pool, and users can navigate to the light detail page and zoom in on their specific light. A permalink is generated for users to share their dedication on Facebook, Twitter, or other social media sites.

HOW THE APP WORKS

Shine It Forward is comprised of two apps – the donor-facing UI and the API – with a microservices architecture. The app's Node.js front-end web service renders a JavaScript application on the server side, which serves the UI to web browsers.

WHO BUILT THE APP

A small team of developers built the the app in a rapid 6-week timeframe. The use of Heroku Add-ons significantly accelerated development and reduced testing time.

UNDERLYING ARCHITECTURE

UX: React and Redux; Back-End Services: Node.js, Pliny, Filestack, Papertrail, Blitline; Platform Services; Integration with business data using Heroku Connect

Next Steps

As we've seen, App Cloud has everything you need to take full advantage of the mobile opportunities of unlocking business data, slashing your mobile backlog, and enabling all of your mobile developers to be productive and fast. So, where do you go from here?
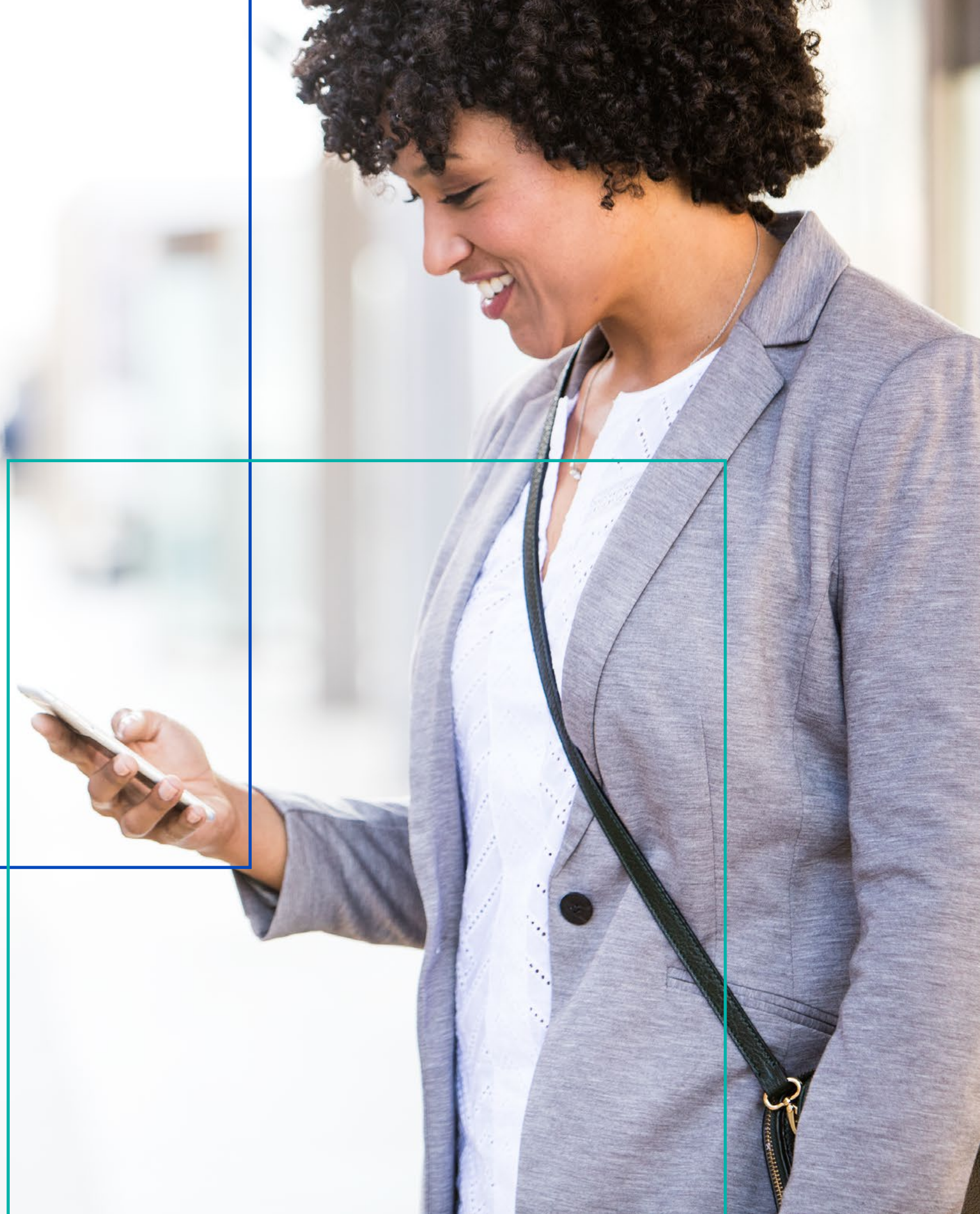
Here are three suggested steps as you begin your App Cloud Mobile journey:

1 Decide on the mobile app(s) you want to build using this document as a guide.

2 Depending on the approach you choose, dive in and start experimenting:
  Trailhead for Salesforce1 Mobile App
  Trailhead for Mobile SDK apps
  Information on developing Mobile Heroku apps

3 Deploy early and often – mobile app development is most effective by starting small and delivering incremental value, then continuing to deliver new features and apps over time.

And while changing business models, requirements, and new use cases will continue to bring change to your organization, App Cloud Mobile's range of tools allows you to meet today's needs with the flexibility to adopt new frameworks and approaches – all atop the industry's leading secure cloud platform.

Have It All with
App Cloud Mobile.

BUILD MOBILE APPS FASTER WITH THE LEADING CLOUD PLATFORM
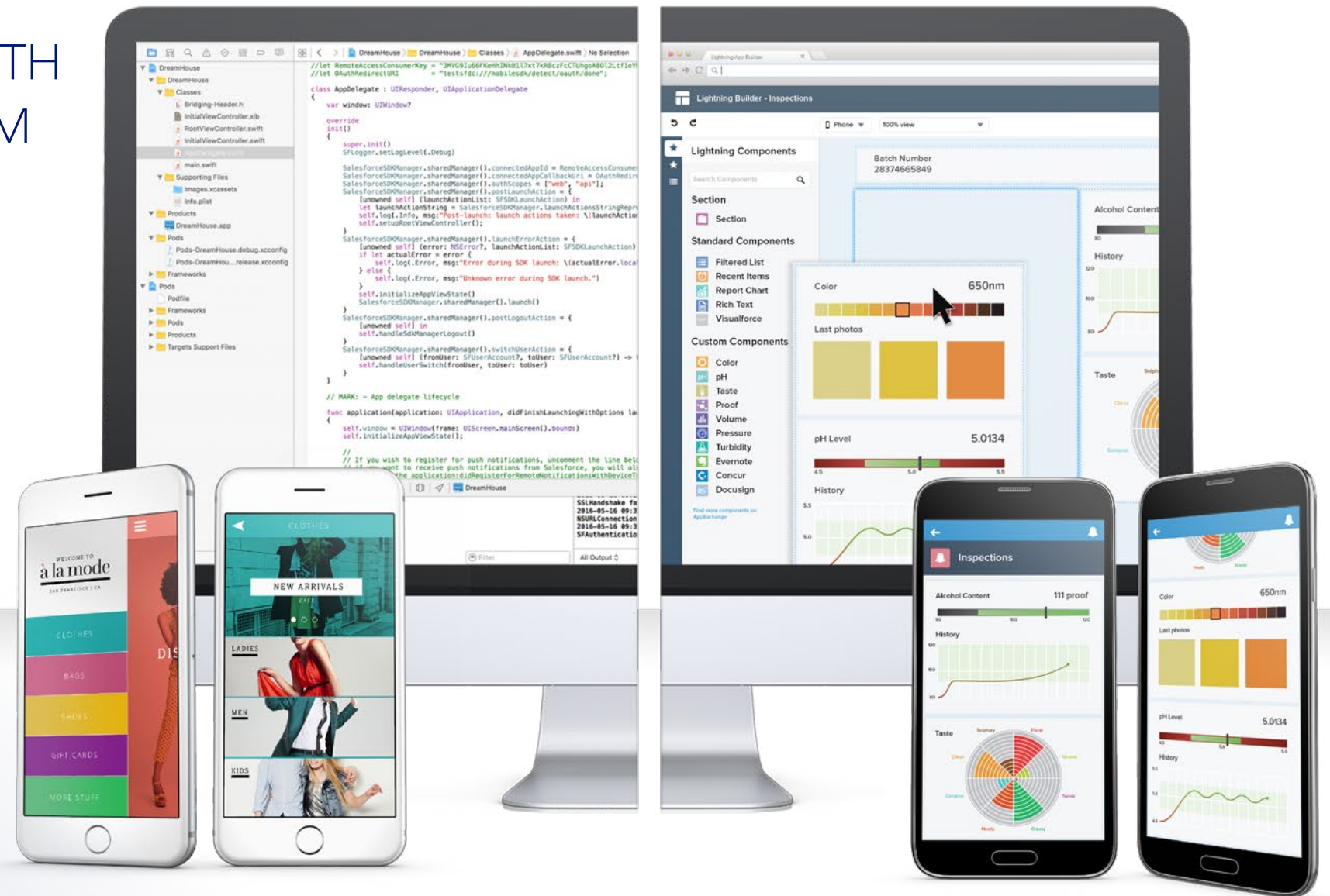
SALESFORCE1 MOBILE APP: REFERENCE DIAGRAM

Mobile UI Frameworks	Salesforce1 Mobile App/Lightning	Web/Hybrid Native

Mobile Development Services

Visual App and Process Builder	Push Notifications*	Offline Sync*	Encrypted Database*	Identity*	MDM Policies*

Platform and MBaaS Capabilities

Model-Driven Service (Force.com)

Customer Data	Business Data	Process and Workflow	Communities

Identity (Users, Profiles, Roles, Permissions) | Analytics | Security

Auto Sync (Heroku Connect)

Elastic Compute Service (Heroku)

Custom Back-End	Postgres, Redis, Kafka	Large Scale Compute, Messaging, AI
Microservice Container	Data Services	Specialized Add-ons

Integration Approaches

0data (Salesforce Connect), SOAP/REST, Messaging, API
External Data Sources (including ERP)

REST, Third-Party IoT Gateway
Streaming Data Sources (including IoT)

Approach Summary: Salesforce1 Mobile App uses Lightning App Builder and Lightning Process Builder to rapidly create single-page mobile apps that leverage built-in workflow capabilities of Force.com. Additionally, these apps can securely access customer and business data as well as communities for rich interaction. Finally, the Salesforce1 Mobile App leverages the complete integration capability of App Cloud through Salesforce Connect, REST, SOAP and Streaming APIs, and IoT data sources through REST or IoT Gateways (via partners).

*Feature is included as a built-in part of the Salesforce1 Mobile App container.

CUSTOM APPS WITH MOBILE SDK: REFERENCE DIAGRAM

Mobile UI Frameworks	Salesforce1 Mobile App/Lightning	Web/Hybrid	Native

Mobile Development Services	Visual App and Process Builder	Push Notifications	Offline Sync	Encrypted Database	Identity	MDM Policies

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REST, Third-Party IoT Gateway
Streaming Data Sources (including IoT)

Approach Summary: Custom apps using the Salesforce Mobile SDK can be built using a number of popular JavaScript frameworks to provide complete control over the user experience, page flow, and branding of the app. They can then leverage the SDK's offline sync, encrypted database storage, push notifications, and other features. The SDK provides access to Force.com's built-in workflow, customer and business data, and communities for rich interaction. These apps can also leverage the complete integration capability of App Cloud through Salesforce Connect, REST, SOAP and Streaming APIs, and IoT data sources through REST or IoT Gateways (via partners).
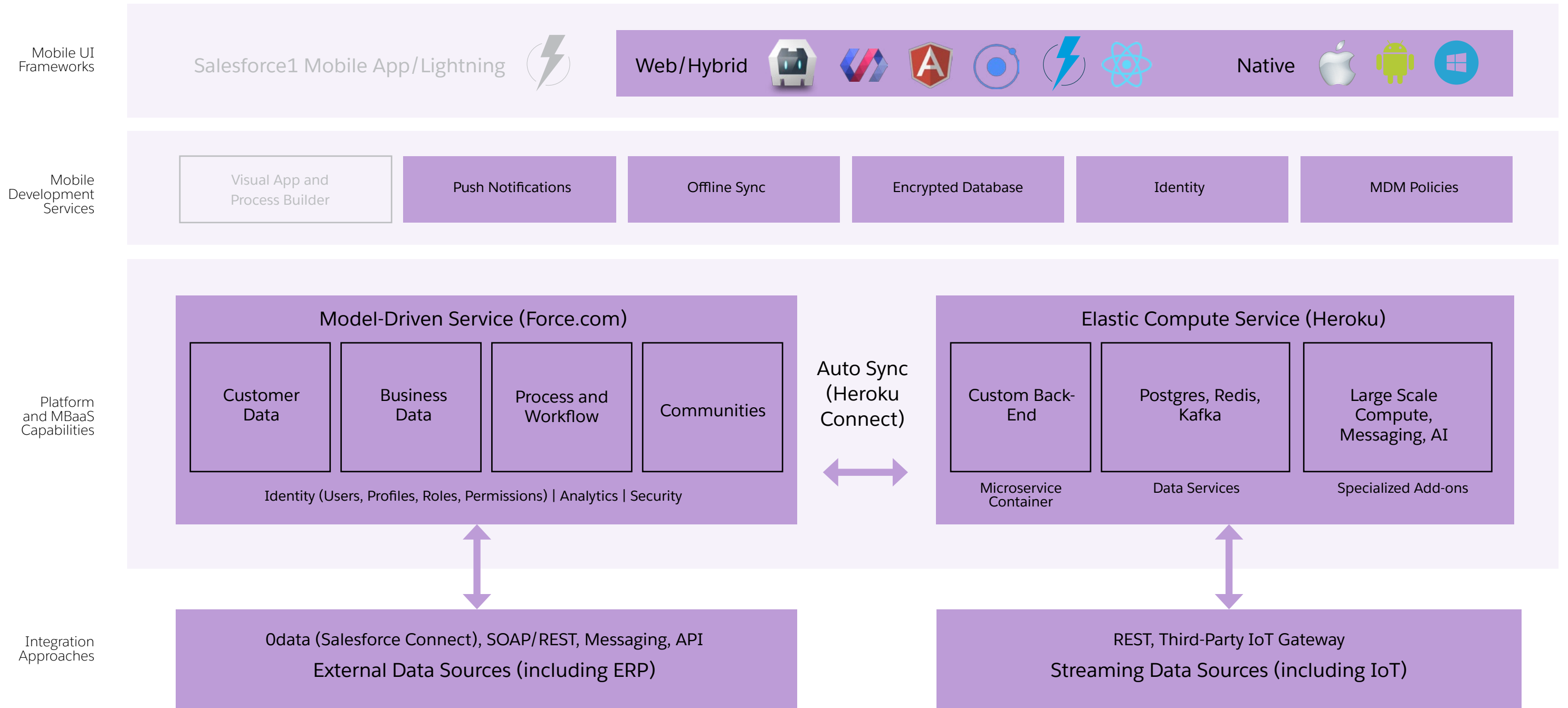
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Platform and MBaaS Capabilities

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Customer Data	Business Data	Process and Workflow	Communities

Identity (Users, Profiles, Roles, Permissions) | Analytics | Security

Auto Sync (Heroku Connect)

Elastic Compute Service (Heroku)

Custom Back-End	Postgres, Redis, Kafka	Large Scale Compute, Messaging, AI

Microservice Container | Data Services | Specialized Add-ons

Integration Approaches

0data (Salesforce Connect), SOAP/REST, Messaging, API
External Data Sources (including ERP)

REST, Third-Party IoT Gateway
Streaming Data Sources (including IoT)

Approach Summary: Custom mobile apps using Heroku can use a number of popular JavaScript frameworks or native approaches to provide complete control over the user experience, page flow, and branding of the app. They can then tap into Heroku's elastic compute capabilities to scale the custom back end, and pull data from IoT sources through REST or IoT Gateways (via partners). These custom mobile apps can also optionally use and synchronize Force.com data through Heroku Connect.

salesforce app cloud