

Backend as a Service (BaaS)

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Tampere University of Technology

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<http://www.cs.tut.fi/~taivalasa/kurssit/BaaS2013/>

How to Get Credit Points (Opintopisteet)?

- **Number of credit points: 1-5 op**
- **Regular attendance: 1 op**
- **Seminar presentation on selected BaaS technology: 2 op**
- **Successfully written, new demo application using selected BaaS technology: 2 op**

Backend as a Service

Overview

Backend as a Service (BaaS)

- **Backend as a Service:** *a model for providing web and mobile app developers with a way to link their applications to hosted backend cloud storage while also providing features such as user management, push notifications, and integration with social networking services, all as an integrated offering.*
- Key goal is to **abstract away all the complexity related to cloud and cloud management**, and provide simple APIs that can be used across all popular mobile platforms.
 - “Don’t worry about the server side, we’ll take care of it for you.”
- This is a very popular area these days; 40+ startup companies in this area have sprung up recently.

Partial List of BaaS Systems / Companies

- <http://www.anypresence.com/>
- <http://www.apiomat.com/>
- <http://www.appcelerator.com/>
- <http://www.appery.io/>
- <http://www.applicasa.com/>
- <http://www.applicationcraft.com/>
- <http://www.apstrata.com/>
- <http://www.baasbox.com/>
- <http://www.backendless.com/>
- <http://www.catavolt.com/>
- <http://www.cloudmine.me/>
- <http://www.convertigo.com/>
- <http://www.deployd.com/>
- <http://www.dreamfactory.com/>
- <http://www.fatfractal.com/>
- <http://www.feedhenry.com/>
- <http://www.icenium.com/>
- <http://www.innoquant.com/>
- <http://www.instanext.com/>
- <http://www.jaystack.com/>
- <http://www.kii.com/>
- <http://www.kinvey.com/>
- <http://www.kumulos.com/>
- <http://www.mobdb.net/>
- <http://www.netmera.com/>
- <http://www.openmobster.com/>
- <http://www.parse.com/>
- <http://www.proxomo.com/>
- <http://www.quickblox.com/>
- <http://www.shephertz.com/>
- <http://www.sencha.com/products/space/>
- <http://www.stackmob.com/>

Key Selling Points for BaaS Systems

- **Writing and hosting a full-fledged cloud backend can be very tedious and expensive.**
- **Small developers do not have the resources or skills to write or host their own backends anyway.**
- **Backend offerings from major providers such as Amazon can be unnecessarily complex for small developers.**
- **Many BaaS systems are very easy to take into use.**
 - **To get started, often just a line or two of code in your web app is needed; excellent online documentation provided by most systems.**
- **Part of the value proposition is pricing. Most systems use the freemium model; small-scale use is usually free.**

BaaS – Commonly Provided Features

Data Storage



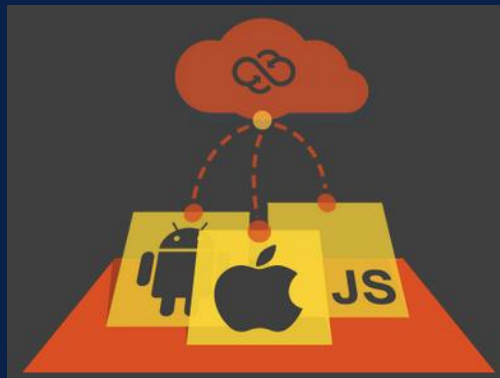
Push Notifications



3rd Party Data Integration



Cross-Platform Support



User Management



Versioning, analytics, etc.



Data Storage

Data Storage



- Most of the BaaS systems offer a *Data API* for storing application data in the cloud.
- File storage is usually provided as well (for large images, file attachments, etc.)
- Commonly, these APIs are offered in a number of different forms.
 - JavaScript API
 - REST API
 - native APIs for iOS, Android, (sometimes) WP
- The actual APIs / databases are still rather different (JSON or key-value stores, table-oriented DBs, SQL support, etc.).

Data Storage

FireBase	Hosted service; Key-value data and real-time synchronization
Deployd	Host your self; store data as JSON objects; easy real-time sync
BaaSBox	Self hosted (now); JSON based REST API or iOS and Android SDKs
Parse	Hosted service, JSON-based, auto-generated schema, semi-relational; not auto-syncing
Kinvey	Hosted?; Data is stored in collections -> entities -> key-values; sync?
Dropbox DS API	Hosted; DataStores->Tables->records

Push Notifications

Push Notifications



- **A push notification API allows users to be instantly notified of data changes in 3rd party services as well as changes across the user's own devices.**
 - **No battery consuming polling required.**
- **On device side, push support is often limited to iOS and Android devices**
 - **Google Cloud Messaging (GCM)**
 - **Apple Push Notification (APN)**
 - **Some systems (e.g., QuickBlox) support Microsoft Push Notifications as well**

Push notifications

FireBase	YES?, (uses web sockets or long polling)
Deployd	YES
BaaSBox	YES
Parse	YES
Kinvey	for Android (Google Cloud Messaging) and iOS (iOS Push Notifications); User has to register a device to receive push notifications
Dropbox DS API	NO

Third Party Data Integration

3rd Party Data Integration



- Most of the BaaS systems offer APIs for third-party data integration.
- Depending on platform focus, 3rd party support is either *consumer-oriented* or *enterprise-oriented*.
- **Consumer-oriented:**
 - Integration with social networking (Facebook, Twitter, Flickr) and location services (Foursquare, Google Places, etc.)
- **Enterprise-oriented:**
 - Integration with LDAP, Oracle, PeopleSoft, Salesforce.com, SAP, Siebel, etc.

3rd party data integration

FireBase	NO?
Deployd	NO?
BaaSBox	NO
Parse	NO (FB coming?)
Kinvey	Oracle, Salesforce, Facebook Open Graph,
Dropbox DS API	DropBox 😊

Cross-platform support

FireBase	javascript, iOS/OSX, Java/Android; node.js; REST API
Deployd	One API for both server side and client side code.
BaaSBox	JSON based REST API or iOS and Android SDKs
Parse	Android, iOS, OS X, JavaScript, Windows 8, Windows Phone 8, Unity, REST
Kinvey	HTML5, Android, iOS, ... + REST API
Dropbox DS API	IOS, Android, JavaScript, Python

User Management

User Management



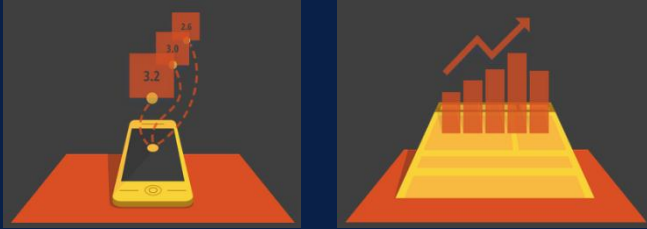
- **User management is needed for multi-device use as well as for third-party data integration.**
- **BaaS systems typically offer [a subset of] the following mechanisms:**
 - **OAuth and/or OAuth 2.0, OpenID**
 - **Google Account, Apple ID, Microsoft Live, Twitter, Facebook logins.**
 - **Enterprise integration with LDAP.**
- **For security, the systems rely on common technologies (HTTPS, SSL/TLS); server-side data is usually encrypted.**

User management

FireBase	NO?
Deployd	NO?
BaaSBox	YES, also with API
Parse	YES, with ACLs
Kinvey	YES, but If no need for an user concept, the user can be generated automatically
Dropbox DS API	NO

Additional Features

Versioning, analytics, etc.



Additional differentiating features available in some systems:

- 1. Data analytics / logging capabilities**
- 2. API / Data versioning support**
- 3. Server-side code execution support**
- 4. Application / plugin marketplace**
- 5. Multi-platform UI generation /
UI authoring tools / widget libraries**

Version, analytics etc

FireBase	NO?
Deployd	NO?
BaaSBox	Console for backups etc.
Parse	Analytics
Kinvey	Analytics, versioning
Dropbox DS API	NO

Summary of Most Prominent BaaS Systems

Most Popular Systems	Most Recommended Systems	Most Feature-Rich Systems
<ol style="list-style-type: none">1. Parse2. Sencha3. CloudMine4. Appcelerator ACS5. Buddy6. MobDB7. StackMob8. Flurry9. Applicasa10. QuickBlox	<ol style="list-style-type: none">1. Parse2. Sencha3. CloudMine4. Kinvey5. Buddy6. Appcelerator ACS7. Feedhenry8. QuickBlox9. MobDB10. Applicasa	<ol style="list-style-type: none">1. Parse2. Appcelerator ACS3. Sencha4. CloudMine5. MobDB6. Deployd7. Apigee8. StackMob9. Flurry10. QuickBlox

Status: firebase

Active blog (e.g example projects)

<http://firebase.github.io/active-users-globe/>

688 questions in StackOverflow

Status: Deployd

Blogs end Dec 2012

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20 questions in StackOverflow

Status: BaasBox

Living blog

Investor day Nov 06, 2013

0 questions in StackOverflow

Status: Parse

Active blog (e.g videos, developer days)

Web page underlines analytics

,

1010 questions in StackOverflow

Status: Kinvey

Active blog

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36 questions in StackOverflow

Status: dropbox datastore API

Living blog

,

68? questions in StackOverflow

Highlights of Most Popular BaaS Systems

- **Parse:** The most popular BaaS platform for consumer apps. Has a good set of features and a wide range of target platforms, but does not support conflict resolution or enterprise features. Recently acquired by Facebook.
- **Sencha.io:** Originally a HTML5 Touch UI toolkit, later an app framework, and more recently adding BaaS capabilities (“the first mobile HTML5 cloud”). BaaS features limited to push notifications and social networking (Facebook) integration. Own app marketplace supported.
- **CloudMine:** Enterprise-oriented system that provides an impressive set of data connectors for enterprise software, including Oracle, PeopleSoft, SAP and Siebel.

Highlights of Most Popular BaaS Systems

- **Appcelerator ACS:** Uses its own authoring tool (Titanium) and UI language, although app logic is written in JavaScript. Rich SDK with fairly limited core functionality; extendable with various third party plugins. Own app marketplace supported.
- **Kinvey:** Comprehensive platform offering both consumer and enterprise features. Integrates also with Google App Engine.
- **Google Mobile Backend Starter:** A new, minimalistic, generic storage and messaging backend that can be auto-deployed on Google App Engine. A sample Android app that includes a client library for the backend is provided. By extending the sample backend you can access all the Google Cloud APIs.

Highlights of Other BaaS Systems

With Consumer/UI/Gaming Orientation

- **Applicasa**: Mainly oriented towards games; tries to minimize coding , e.g., by providing a drag-and-drop interface for defining database tables. Supports Unity as a separate platform in addition to iOS and Android.
- **QuickBlox**: Similar to Applicasa; oriented towards "thick client, thin server" apps focusing on client-side features. Supports video chat, augmented reality, maps and Unity.
- **Deployd**: An easy-to-use open source Node.js module that makes it easy to write self-hosted web app backends running on MongoDB. There are plans to provide Deployd as a hosted service (currently in alpha).

Highlights of Other BaaS Systems

With Enterprise Orientation

- **Apigee**: Enterprise-oriented system that was recently positioned as a BaaS offering; main differentiator is the ability to write server-side API adapters.
- **FeedHenry**: Enterprise-oriented system with well thought-out core features, e.g., data sync can be adapted to other backends. Some features missing, e.g., no built-in social network integration is provided.
- **StackMob**: Comprehensive platform with offline support and synchronization capabilities with custom conflict resolution (iOS only for now), API versioning, and own marketplace for extending platform functionality with 3rd party add-ons.

Highlights of Other BaaS Systems

With Data Analytics Orientation

- **Buddy**: Simple platform with analytics as the main selling point.
- **Flurry**: Purely an advertisement and analytics platform.
- **MobDB**: Storage backend running on AWS that lets you easily define and access database tables. Supports push notifications and analytics. Provides a web interface for backend management.

Feature Comparison

System	Data API	Push notif	User mgmt	3rd party integr.	Analytics	Server code	Market place	WP support	Differentiators
Apigee	X	X	X	X	X	(X)	(X)		Enterprise focus
Appcelerator	X	X	X	X		(X)	X	(X)	Own UI authoring SDK
Applicasa	X	X	X	X	X				Gaming, analytics focus
Buddy	X	X	X		X			X	Analytics focus
CloudMine	X	X	X	X	X	X			Enterprise connectors
Deployd	X	(X)	X			X		(web)	Open source, self-host
FeedHenry		X	X	(X)	X	X		(X)	Enterp focus; device APIs
Flurry					X			X	Analytics focus
Google MBS	X	(X)	(X)		(X)	(X)			Android/App Eng focus
Kinvey	X	X	X	X	X	X			Excellent documentation
MobDB	X	X	X		X				Storage/analytics focus
Parse	X	X	X	X	X	X		X	Excellent documentation
QuickBlox	X	X	X	X			(X)	X	Chat/video focus
Sencha.io	X	X	X	(X)			X	(X)	Client-side focus
StackMob	X	X	X	X	X	X	X		API versioning, offline

Database as a Service (DBaaS)

- There are a number of companies that offer subsets of BaaS functionality, usually focusing on storage and push notifications:
 - <https://cloudant.com/>
 - <http://www.cloudbase.io/>
 - <https://cloud.google.com/products/cloud-storage>
 - <http://www.dropbox.com/>
 - <http://aws.amazon.com/simplifiedb/>
 - <http://www.firebase.com/>
- The basic value proposition is the same – build cloud-oriented applications fast without worrying about backend development or management.

Kiitos!
Thank You!