

Practical IBM Cloud

IBM Cloud - First Deployments

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1. Platform Overview

IBM's innovative cloud computing platform combines platform as a service (PaaS) with infrastructure as a service (IaaS) and includes a rich catalog of cloud services that can be easily integrated with PaaS and IaaS to build business applications rapidly.

IBM Cloud (formerly Bluemix) has deployments that fit your needs whether you are a small business that plans to scale, or a large enterprise that requires additional isolation. You can develop in a cloud without borders, where you can connect your private services to the public IBM Cloud services available from IBM. You and your team can access the apps, services, and infrastructure in IBM Cloud and use existing data, systems, processes, PaaS tools, and IaaS tools. Developers can tap into the rapidly growing ecosystem of available services and runtime frameworks to build applications using polyglot programming approaches.

With IBM Cloud, you no longer have to make large investments in hardware to test out or run a new app. Instead, we manage it all for you and only charge for what you use. IBM Cloud provides public, dedicated, and local integrated deployment models.

You can take an idea from inception, to development sandbox, to a globally distributed production environment with compute and storage infrastructure, open source platform services and containers, and software services and tools from IBM, Watson, and more. Beyond the capabilities of the platform itself, IBM® Cloud also provides flexible deployment. Provision IBM® Cloud resources on-premises, in dedicated private cloud environments, or in the public cloud, and manage the resources from all three types of environments in a single dashboard.

All IBM cloud resources that are deployed in public and dedicated environments are hosted from your choice of IBM® Cloud Data Center locations around the world. IBM Cloud Data Centers provide regional redundancy, a global network backbone connecting all data centers and points of presence, and stringent security controls and reporting. Through IBM Cloud Data Centers, IBM can meet your most demanding expansion, security, compliance, and data residency needs.

IBM enables you to:

Deploy high performance compute and storage infrastructure in secure IBM Cloud Data Centers around the world. Test and adopt a broad range of cloud services and capabilities from IBM, open source communities, and third-party developers. Connect to all of your legacy systems and apps from a single, scalable, cloud platform through private network and API capabilities. Spin up and turn down resources in real time as your business needs or workload demands change. Apps

The dashboard provides everything you need to get your apps up and running, and to manage those apps while they run. IBM Cloud provides various boilerplates and runtimes:

A **boilerplate** is a template for an application and its associated runtime environment and predefined services for a specific domain. A runtime is the set of resources that is used to run an app, provided as containers for different types of apps. IBM Cloud provides various ways for you to run your apps, for example, Cloud Foundry and IBM® Cloud Container Service. Use IBM® Cloud Container Service to run Docker containers in a hosted cloud environment on IBM Cloud.

You can use IBM® Cloud Functions for distributed, event-driven computing. Cloud Functions runs application logic in response to events or direct invocations from web or mobile apps over HTTP.

You can use IBM Cloud Mobile services to incorporate pre-built, managed, and scalable cloud services into your mobile apps.

Services

The dashboard provides access to the IBM Cloud services available from IBM® and third-party providers. These include Watson, Internet of Things, Analytics, Mobile, and DevOps services:

Deliver innovative new applications faster and cheaper with just the right features using IBM DevOps services and the IBM Cloud Garage Method. When you adopt DevOps practices and create a culture of innovation and agility, you can use iterative practices and change direction in response to the market. Blockchain is a peer-to-peer distributed ledger technology for a new generation of transactional applications that establishes trust, accountability, and transparency while streamlining business processes. Watson gives your apps the power of cognitive computing with a full suite of speech, vision, and data APIs. Solve your most complex business problems by deploying a cognitive platform with Watson services. IBM enables you to do more with rich, integrated cloud databases and Data & Analytics services. The IBM Internet of Things service lets your apps communicate with, and consume data that is collected by, your connected devices, sensors, and gateways. Our recipes make it easy to get devices connected to our Internet of Things cloud. Your apps can then use our real-time and REST APIs to communicate with your devices and consume the data you've set them up to collect. IBM offers a mobile backend infrastructure where you can build multiplatform, native, or hybrid apps while also being able to monitor and test them. You can also enhance your app with analytics, security, user insight, and continuous delivery. IBM Cloud also provides experimental services that you can try out. To learn about service types and availability, see IBM Cloud services.

Infrastructure

The dashboard provides various services to fit your cloud infrastructure needs.

IBM Cloud infrastructure provides the highest performing cloud infrastructure available. IBM Cloud infrastructure is one platform, which takes data centers around the world that are full of the widest range of cloud computing options, then integrates and automates everything. IBM Cloud Data Centers are filled with first class computing, storage, and networking gear. Each location is built, outfitted, and operated in the same way, so you get exactly the same capabilities and availability anywhere where we are present. Locations are connected by the industry's most advanced network-in-a-network, which integrates distinct public, private, and internal management networks to deliver lower total networking costs, better access, and higher speed. Also, the data centers and network share a single proprietary management system. One management tool lets you control everything--every bare metal server, virtual server, and storage device--all accessible by API, portal, and mobile applications.

IBM Cloud infrastructure offers powerful bare metal servers and flexible virtual servers in a single seamless platform. All are provided on demand and billed on monthly or hourly terms. Bare metal servers provide the raw horsepower for your processor-intensive and disk I/O-intensive workloads and can be configured to your exact specifications. Virtual servers allow for high speed of deployment, flexible scalability, and pay-as-you-go billing. For high performance computing, give your cloud a boost with graphics processing unit (GPU) servers, available by the hour or monthly.

IBM Cloud infrastructure offerings are connected to a three-tiered network, segmenting public, private, and management traffic. Infrastructure on a customer's IBM Cloud account might transfer data between such infrastructure across the private network at no cost. Infrastructure offerings, such as bare metal servers, virtual servers, and cloud storage, connect to other applications and services in the IBM Cloud catalog, such as Watson services, containers, or runtimes, across the public network. Data transfer between those two types of offerings is metered and charged at standard public network bandwidth rates.

2. Objectives

In this workshop, you will use **Cloud Foundry** to :

- Deploy a simple application from the IBM Cloud web interface.
- Use the `bx cf` command-line to deploy the application.

3. Deploy with the console

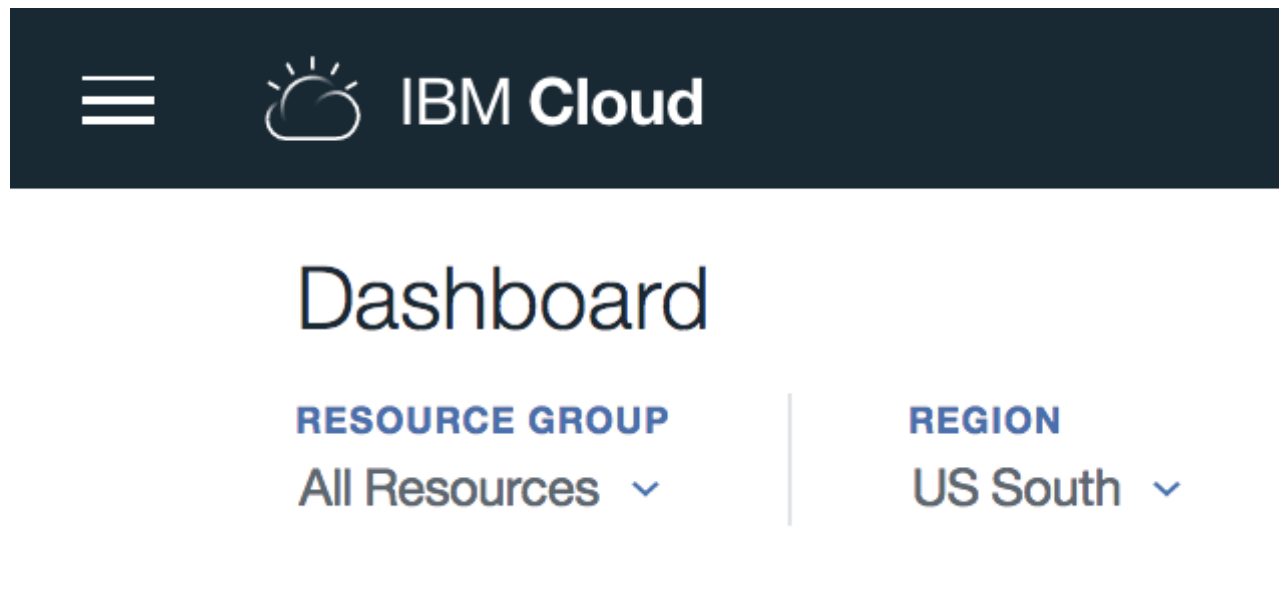
This exercise will show you how to deploy a simple application from the IBM Bluemix web interface.

Task 1 : Login to IBM Cloud

Open a browser window and type <http://blumix.net>

Task 2 : Access the Dashboard

Click LOG IN and then enter your login information on the IBM id page and click Sign in. You should see your dashboard view.



Task 3 : Catalog

Click on **Catalog** on the top right side of the screen.



Task 4 : Boilerplates

Click on the **Boilerplates** section on the left side, then find/click on the **Node.js Cloudant DB Web Starter**



Node.js Cloudant DB Web Starter

Use the Cloudant NoSQL DB service with the 'SDK for Node.js™' runtime.

Lite

IBM

Task 5 : Create a sample app

Type a unique App name like **myappXXX** where XXX matches with your initials or some numbers.

The host name must be **unique**. This is why you should specify this 3 or more alphanumeric characters.

Create a Cloud Foundry App

Node.js Cloudant DB Web Starter

Use the Cloudant NoSQL DB service with the 'SDK for Node.js™' runtime.

App name:

myapp123

Host name:

myapp123

Task 6 : Review and create

Scroll down to the bottom and look around the different services and the pricing plans. You will also notice that the application is based on a node.js runtime and uses a Cloudant Database (NoSQL).



Cloudant NoSQL
DB

Develop, deploy, and scale server-side JavaScript® apps with ease. The IBM SDK for Node.js™ provides enhanced performance, security, and serviceability.

Pricing Plans

Monthly prices shown are for country or region: [France](#)

PLAN	FEATURES	PRICING
✓ Default	Run one or more apps free for 30 days (375 GB-hours free).	€0.0526 EUR/GB-Hour
This is a service plan for the IBM Bluemix Platform runtime.		

[View Docs](#)

[Terms](#)

If a message appears saying that the name is already taken then change the name.

Click **Create** at the bottom.

Task 7 : The app is running

After a few minutes the following screen should appear.

Cloud Foundry apps /



myapp1230



Running

[Visit App URL](#)

Org: thomas1@fr.ibm.com

Location: United Kingdom

Space: dev

The application should be running (green light). You also find the ORG the location (region) and the space. In less than one minute, you have started a boilerplate (example) application and the needed resources have been added and configured automatically for you by the IBM Cloud.

Task 8 : Get access to the app

Click on **Visit App URL** near Running.

A window will open and shows your application.



Favorites Organizer powered by Cloudant

ment

Choose file

No file chosen

Upload

ADD

Help

Task 9 : Using the new app

Test the application by uploading a file in the the Cloudant Database. To do so, click on **choose file**, then find a text file or a csv file on your computer and click **Upload** to upload this file in the Cloudand DB.

Choose file

Branch.csv

Upload

ADD

Help

The uploaded file should appear on the left side of the screen. You can repeat this operation to load few files in the Cloudant DB.

A sample Document

[CorpFigures.csv](#)

[Branch.csv](#)

Choose file

No file chosen

ADD

Help

Results

Successful exercise ! You finally did the following points:

- ✓ You login on the IBM Cloud
- ✓ You browsed the catalog
- ✓ You created an application based on a boilerplate
- ✓ You started this application
- ✓ You were able to manipulate the created application

4. Modify and re-deploy with the CLI

In this exercise, you will use the bx command-line interface (CLI) to work with Bluemix. You use this tool in a terminal or command window on your workstation. We also use the same sample application that was used in the first exercise.

Prerequisites : you should have installed the command-line interface for the IBM Cloud : [bx CLI](#) and follow the instructions for your operating system.

Task 1 : Download the code

Open an internet browser and type: <https://github.com/IBM-Bluemix/nodejs-cloudant>
On the page, select “**clone or download**” green button and click on “**Download zip**”.

Sample Node.js application which uses Bluemix Cloudant NoSQL service

24 commits

1 branch

0 releases

5 contributors


Apache-2.0

Branch: master


New pull request

Find file

Clone or download


timroster committed with opiethetehokie updates to reduce memory footprint (#9) ...

Latest commit cd3d615 on 16 May

 .settings


first commit

2 years ago

 public


encode attachment urls (#8)

10 months ago

 routes

first commit

2 years ago

 views

light and responsive design


a year ago

After the starter package was downloaded, move your zip file to a **sample directory**.
Extract the package by double-clicking or right-clicking and click Extract or Unarchive.

Task 2 : Delete the app in the IBM Cloud

Delete the deployed application so that you can deploy it again from the command line. Click the Getting Started page of your myapp application. Then click the three dots button in the application, and then click **Delete**.

Cloud Foundry apps /

 myapp1230 Running [Visit App URL](#)

Org: thomas1@fr.ibm.com Location: United Kingdom Space: dev

Download, modify, and redeploy your Cloud Foundry app with the command line interface

Last Updated: 2017-06-31 | [Edit in GitHub](#)

Use IBM Cloud command line interface to download, modify, and redeploy your Cloud Foundry applications and service instances.

Routes

Rename

Delete

Don't forget to tick the boxes to also delete the associated **services** and the **routes**.

Are you sure you want to delete the 'myapp1230' app?

After 'myapp1230' app is deleted, some services and routes will not be associated with any app.

Services

Routes

Select the services to be deleted when the app is deleted.

Services that are not deleted can still be administered from the dashboard.

☒ myapp1230-cloudantNoSQLDB

Cancel

Delete

Then click **Delete** to remove the application, the associated services and the routes.

Task 3 : Go to the directory

Open a terminal or a command-line window and change the directory to the location where you extracted the downloaded sample application.

you should see the following files and directories. Also locate the **package.json** file.

```
(phil:[myapp]): ls -rtl
total 80
drwxr-xr-x@ 3 phil  staff   96 May 16  2017 views
drwxr-xr-x@ 4 phil  staff  128 May 16  2017 routes
drwxr-xr-x@ 6 phil  staff  192 May 16  2017 public
-rwxr-xr-x@ 1 phil  staff  432 May 16  2017 package.json
-rwxr-xr-x@ 1 phil  staff  246 May 16  2017 manifest.yml
-rwxr-xr-x@ 1 phil  staff 14187 May 16  2017 app.js
-rwxr-xr-x@ 1 phil  staff  791 May 16  2017 README.md
-rwxr-xr-x@ 1 phil  staff 11324 May 16  2017 LICENSE
phil:[myapp]:
```

Task 4 : login with the CLI

Log in to **IBM Cloud** by issuing one of the following commands. Use the same region that you used in the **IBM Cloud** web interface:

Region: US South

```
bx login -a https://api.ng.bluemix.net
```

Region: United Kingdom

```
bx login -a https://api.eu-gb.bluemix.net
```

Region: Sydney

```
bx login -a https://api.au-syd.bluemix.net
```

Enter the **email** and **password** that you used to log in to the IBM Cloud web interface. Then select the account. See below an example:

```
[phil:[myapp]: bx login -a https://api.ng.bluemix.net
API endpoint: https://api.ng.bluemix.net

Email> miketodo@mail.com

[Password>
Authenticating...
OK

Select an account (or press enter to skip):
1. todo corp (5eee44ccb92042c4bdcdbd5141f200ea2)
Enter a number> 1
Targeted account todo corp (5eee44ccb92042c4bdcdbd5141f200ea2)

Targeted resource group Default

API endpoint:      https://api.ng.bluemix.net (API version: 2.92.0)
Region:           us-south
User:             miketodo@mail.com
Account:          todo corp (5eee44ccb92042c4bdcdbd5141f200ea2)
Resource group:   Default
Org:
Space:

Tip: If you are managing Cloud Foundry applications and services
- Use 'bx target --cf' to target Cloud Foundry org/space interactively,
- Use 'bx cf' if you want to run the Cloud Foundry CLI with current Blue

[phil:[myapp]:
```

As you can see the ORG and the SPACE are empty. Use the following command `bx target -o your_organization -s your_space`

```
bx target -o your_organization -s your_space
```

```

phil:[myapp]: bx target -o miketodo@mail.com -s dev
Targeted org miketodo@mail.com

Targeted space dev

API endpoint:      https://api.ng.bluemix.net (API version: 2.92.0)
Region:           us-south
User:             miketodo@mail.com
Account:          todo corp (5eee44ccb92042c4bdcdbd5141f200ea2)
Resource group:   Default
Org:              miketodo@mail.com
Space:            dev
phil:[myapp]:

```

Task 5 : Create a DB

Before you deploy the application, deploy a Cloudant database. View the available services by running this command :

```
bx catalog service-marketplace
```

In the list of displayed services, find the **cloudantNoSQLDB** service. Then create a new service instance with the following command:

```
bx cf cs cloudantNoSQLDB Lite xxxCloudant
```

Where:

- **CloudantNoSQLDB** is the name of the service from the bx marketplace command.
- **Lite** is the name of the service plan that you want to use from the cf marketplace command.
- **xxxCloudant** is the name of the service *instance* that you want to use. Enter your own name rather than Cloudant. You will use this new name when connecting (binding) the service to the application. xxx should be your initials or some numbers to uniquely identify this instance.

```

phil:[myapp]: bx cf cs cloudantNoSQLDB Lite 123Cloudant
Invoking 'cf cs cloudantNoSQLDB Lite 123Cloudant'...

Creating service instance 123Cloudant in org miketodo@mail.com / space dev as miketodo@mail.com...
OK
phil:[myapp]:

```

```
bx cf service xxxCloudant
```

```

phil:[myapp]: bx cf service 123Cloudant
Invoking 'cf service 123Cloudant'...

Service instance: 123Cloudant
Service: cloudantNoSQLDB
Bound apps:
Tags:
Plan: Lite
Description: Cloudant NoSQL DB is a fully managed cloud
NoSQL schema. Cloudant is built upon and compatible with
application grows. Cloudant is ISO27001 and SOC2 Type
a cluster for HA/DR within a data center.
Documentation url: https://console.ng.bluemix.net/da
Dashboard: https://cloudantbroker.ng.bluemix.net/da

Last Operation
Status: create succeeded
Message:
Started: 2017-12-04T14:34:32Z
Updated: 2017-12-04T14:34:32Z
phil:[myapp]: 

```

Task 6 : Push the app

Push the application to Bluemix by entering the following command. Change the application name to your unique name:

```
bx cf push myappXXX -c "node app.js" -m 128M --no-manifest --no-start
```

Be sure that you are on the directory of the application.

```

phil:[myapp]: bx cf push myapp1230 -c "node app.js" -m 128M --no-manifest --no-start
Invoking 'cf push myapp1230 -c node app.js -m 128M --no-manifest --no-start'...

Creating app myapp1230 in org miketodo@mail.com / space dev as miketodo@mail.com...
OK

Creating route myapp1230.mybluemix.net...
OK

Binding myapp1230.mybluemix.net to myapp1230...
OK

Uploading myapp1230...
Uploading app files from: /Users/phil/sample/myapp
Uploading 109.9K, 24 files
Done uploading
OK

phil:[myapp]: 

```

Where:

- **myappXXX** is the application name and host name.
- **-c** specifies the command to start the application.

- **-m** specifies the amount of memory to allocate to each application instance. The default is 1 GB.
- **--no-manifest** instructs to CLI tool to ignore the supplied manifest, which will be explained later.
- **--no-start** instructs to CLI tool not to automatically start the application.

We don't want to allow the application to automatically start because it needs a database to run. You must link the Cloudant database instance to the application before you start the application.

Task 7 : Bind the App and the DB

Link the database and application together by using the following command. Substitute the application name and service instance names that you used previously:

```
bx cf bs myappXXX XXXCloudant
```

Start an application by running the following command. Substitute the name of your application:

```
bx cf start myappXXX
```

After a long list of messages, you should see something like this:

```

Uploading droplet, build artifacts cache...
Uploading build artifacts cache...
Exit status 0
Staging complete
Uploading droplet...
Uploaded build artifacts cache (2.5M)
Uploaded droplet (21.8M)
Uploading complete
Stopping instance 5ea561a0-7f47-4e1e-9834-cbc2f6afdb5b
Destroying container
Successfully destroyed container

Waiting for app to start...

name:          myapp1230
requested state: started
instances:     1/1
usage:         128M x 1 instances
routes:        myapp1230.mybluemix.net
last uploaded: Mon 04 Dec 16:16:46 CET 2017
stack:         cflinuxfs2
buildpack:     SDK for Node.js(TM) (ibm-node.js-6.11.4, buildpack-v3.15-20171024-1528)
start command: node app.js

   state   since                cpu    memory       disk          details
#0  running  2017-12-04T15:28:29Z   0.0%   24.7M of 128M  91.5M of 1G
phil:[myapp]: 
```


The last line is the most important one : it shows that your application is running.

Task 8 : Test the app

Go back to the IBM Cloud console (Web interface) and refresh the Dashboard. Click on your application (that should be running).

Dashboard

RESOURCE GROUP All Resources ▾ REGION US South ▾ CLOUD FOUNDRY ORG miketodo@mail.com ▾ CLOUD FOUNDRY SPACE dev ▾ Filter by resource name...

Cloud Foundry Apps 128 MB/2 GB Used

Name ▾	Route	Memory (MB)	State
myapp1230	myapp1230.mybluemix.net	128	● Running (1/1)

Cloud Foundry apps /



myapp1230 ● Running [Visit App URL](#)

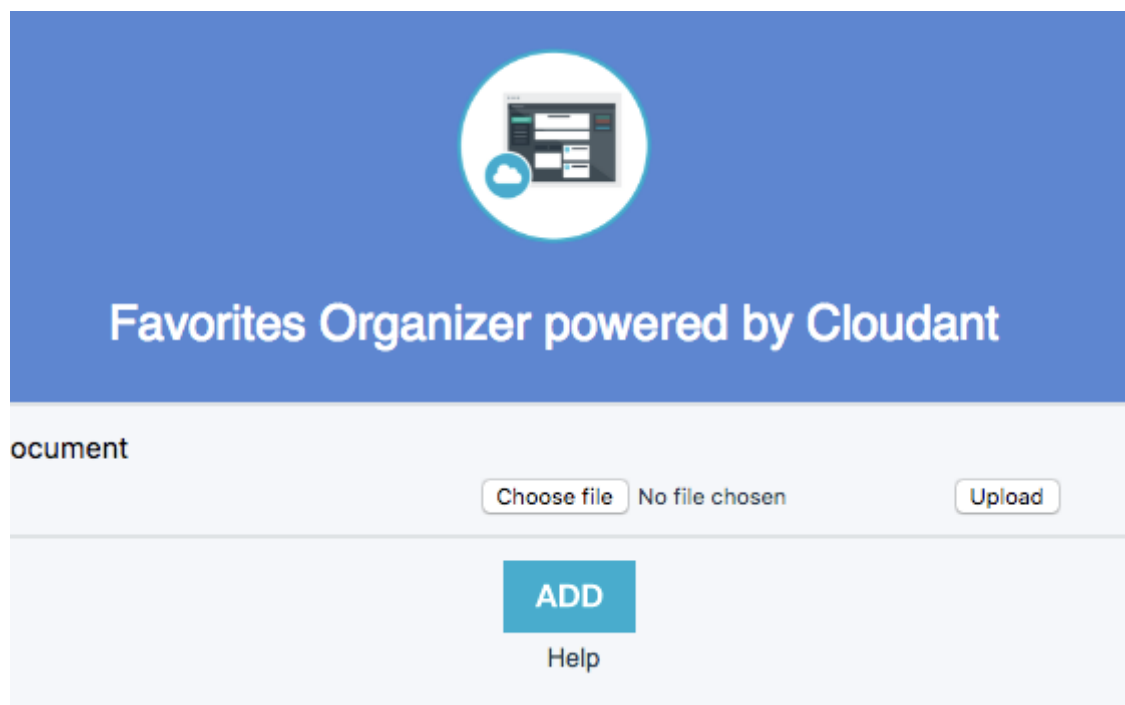
Org: miketodo@mail.com

Location: US South

Space: dev

Click on **Visit App URL**

Here is the application screen:



Task 9 : Modify app.js

In a text editor, open the file **app.js** and modify the document name of the file, the file description, and the value:

- Line 354: Change the docName from 'sample_doc' to 'test_doc'

- Line 355: Change the docDesc from 'A sample Document' to 'A test Document'
- Line 358: Change the value from 'A sample Document' to 'A test Document'

```

330 });
331
332 app.get('/api/favorites', function(request, response) {
333
334     console.log("Get method invoked.. ")
335
336     db = cloudant.use(dbCredentials.dbName);
337     var docList = [];
338     var i = 0;
339     db.list(function(err, body) {
340         if (!err) {
341             var len = body.rows.length;
342             console.log('total # of docs -> ' + len);
343             if (len == 0) {
344                 // push sample data
345                 // save doc
346                 var docName = 'sample_doc';
347                 var docDesc = 'A sample Document';
348                 db.insert({
349                     name: docName,
350                     value: 'A sample Document'
351                 }, '', function(err, doc) {
352                     if (err) {
353                         console.log(err);
354                     }
355                     // Change docDesc to 'A test Document'
356                     // Change value to 'A test Document'
357                 });
358             }
359         }
360     });
361 }


```

Save the file.

Task 10 : Use Cloudant DB console


We have just modified the code that creates the sample document in the database. The **sample document** must be deleted from the database before you restart the application to allow the database to be populated again. Click on the Cloudant Connection at the bottom of the application overview:

Cloud Foundry apps /


 **myapp1230** ● Running [Visit App URL](#)

Org: miketodo@mail.com Location: US South Space: dev

Runtime




BUILDPACK
SDK for Node.js™



INST/
All instance
Health

Connections (1)

 123Cloudant

Then click on the green Launch button to get access to the Cloudant DB console:

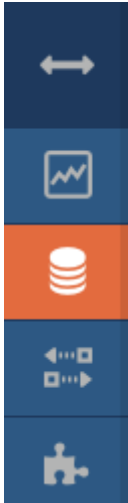


Location: US South Org: miketodo@mail.com Space: dev

Cloudant NoSQL DB

LAUNCH 

At this point, locate the **my_sample_db** and click on that link:

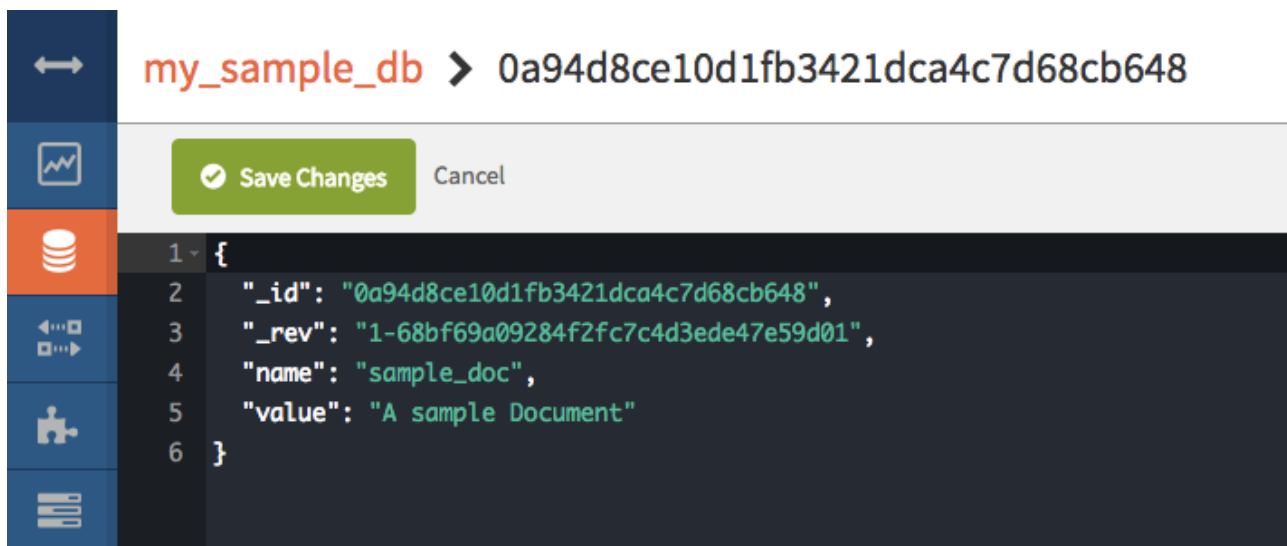


Databases

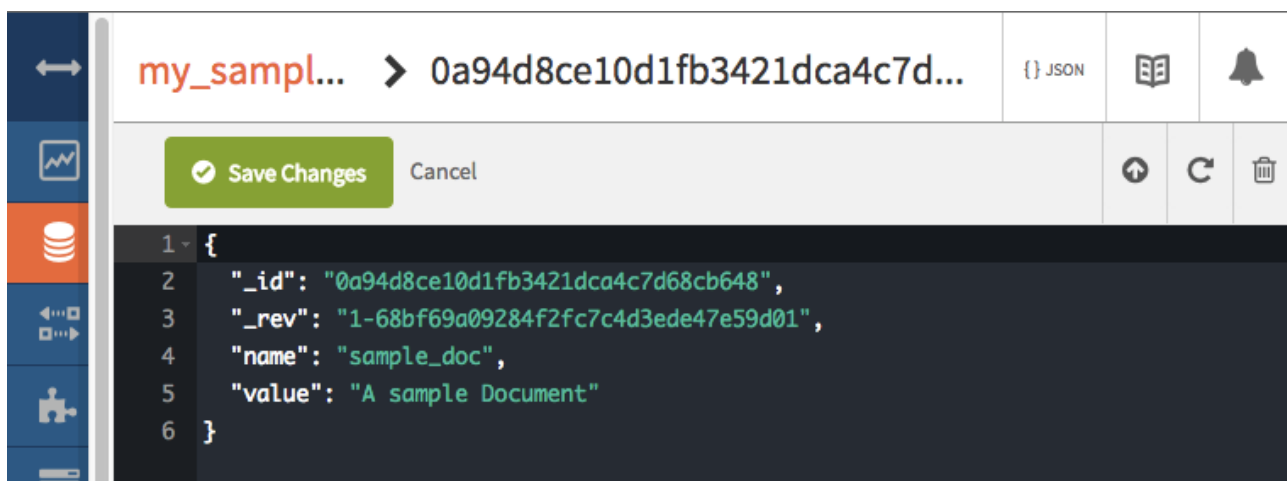
Your Databases

Name
my_sample_db

Edit the database document (this should be the sample document):



Delete the document by clicking on the dustbin on the right:



Confirm the deletion if necessary. You can close the Cloudant console.

Task 11 : Push the modified app

Redeploy and push your application from the command-line:

```
bx cf push myappXXX -c "node app.js" -m 128M --no-manifest
```

```

Stopping instance 7257024d-ae5c-48a2-9c1e-0ad323f1811d
Destroying container
Successfully destroyed container

1 of 1 instances running

App started

OK

App myapp1230 was started using this command `node app.js`

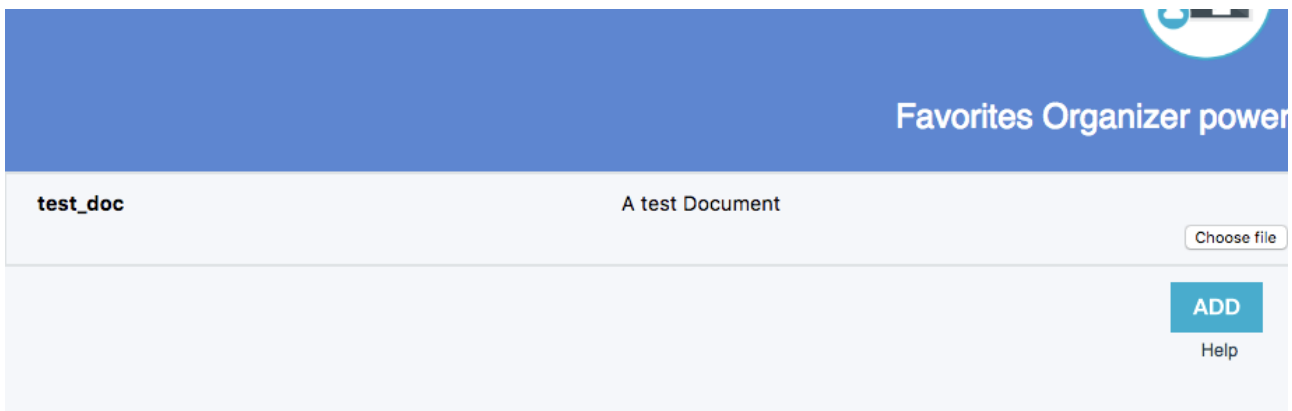
Showing health and status for app myapp1230 in org miketodo@mail.com / space dev as mik
OK

requested state: started
instances: 1/1
usage: 128M x 1 instances
urls: myapp1230.mybluemix.net
last uploaded: Mon Dec 4 15:55:33 UTC 2017
stack: cflinuxfs2
buildpack: SDK for Node.js(TM) (ibm-node.js-6.11.4, buildpack-v3.15-20171024-1528)

#0 state since cpu memory disk details
phil:[myapp]:

```

Go back to the IBM Cloud console, select the application and try the **Visit App URL** link again. You will notice that a test_doc has replaced the sample_doc in the main menu.



Task 12 : Delete app and service

Delete the application and service and confirm the deletion when prompted by running the following two commands:

This command deletes the app and routes:

```
bx cf d myappXXX -r
```

This command deletes the Cloudant DB service:

Results

Successful exercise !

You finally did the following points:

- ✓ You login with the CLI from a terminal window
 - ✓ You browsed the catalog from the CLI
 - ✓ You downloaded the application from GitHub
 - ✓ You deployed the application using the push command
 - ✓ You created the DB service instance from the CLI
 - ✓ You started this application
 - ✓ You were able to manipulate the created application
 - ✓ You deleted the app and service from the CLI
-

End of Lab

Practical IBM Cloud