

# SMART COSMOS Getting Started Guide

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# Welcome to SMART COSMOS

Welcome to SMART COSMOS!

Are you ready to become part of creating something really big? With SMART COSMOS you can connect a universe of everyday things to the digital world. In fact, SMART COSMOS is the only platform that is purely focused on providing a fast track for both enterprises and developers to Monetize the IoT.

SMART COSMOS is an ecosystem. It consists of a robust partner network where hardware manufacturers, system integrators, software developers and enterprises come together to create the IoT. It is comprised of both SaaS and PaaS offerings that help you EMBED, ENRICH, EFFECT, and EXPLORE IoT driven data.

SMART COSMOS also includes an education portal, [SMART COSMOS Lessons](#), and a vibrant developer community at our [Partner Development Portal](#). Developers who complete the full Extension Developer learning path, passing all exams, earn the right and privileges of being a SMART COSMOS Certified Engineer.

In order to accelerate value creation with the IoT, enterprises must learn how to obtain new value from four key areas:

- Data
- Things
- People
- Process

The IoT is nothing more than combining a creative mixture of low-cost sensing hardware, auto-identification technologies like RFID, and the Cloud! Now, we invite you to take the next steps and learn how to use our proven blueprint to **Monetize the IoT**.

**EXPLORE** the full capabilities of the entire ecosystem by participating in one or more Web based learning paths at SMART COSMOS Lessons.

**CREATE** new and innovative IoT Mashups by building Extensions that perform an IaaS Cloud Pivot or integrate new applications, features, and REST Web services into the platform.

**SELL** innovative Extensions at the SMART COSMOS Market by defining the level of support provided, marketing materials, manuals, and of course an appropriate recurring revenue model.

Finally, platforms are living designs that are always evolving. If you have feedback, feature requests, or just want to meet for some drinks and talk software design patterns, contact us either at the developer portal or via email: [api@smartrac-group.com](mailto:api@smartrac-group.com)

## SMART COSMOS Objects License

You must review and accept the [SMART COSMOS Objects EULA](#) before working with this developer kit.

## Open Source Development Framework

SMART COSMOS includes a number of open sourced frameworks available under the Apache License, Version 2. You can clone freely use these frameworks in your projects, submit pull requests, and access the latest documentation at GitHub:

<https://github.com/SMARTRACTECHNOLOGY/smartcosmos-framework>



The core of the Objects server itself is proprietary and must be properly licensed when deployed in a production environment. There are two versions of the software available for single-user development environments. First, the [AWS Marketplace](#) hosts a fully function **Developer Edition** that cannot be deployed in a highly-available/load balanced topology by restricting the way user accounts are created. Second, there is a **Developer Kit** version that does not restrict user account creation, but does define a maximum number of object records that can be manipulated before the endpoint returns a 403.

In addition to the open source development framework, the entirety of the SMART COSMOS REST Web Service APIs are fully documented at our API web site, <http://api.smartcosmos.net>

## SMART COSMOS Lessons: Get Certified

Software developers have the opportunity to complete the Extension Developer learning path at our education portal, SMART COSMOS Lessons. Upon completing about 14 hours of self-paced web courses and passing all of the exams, you establish yourself as SMART COSMOS expert and have the ability to promote your expertise at the [Partner Development Portal](#).

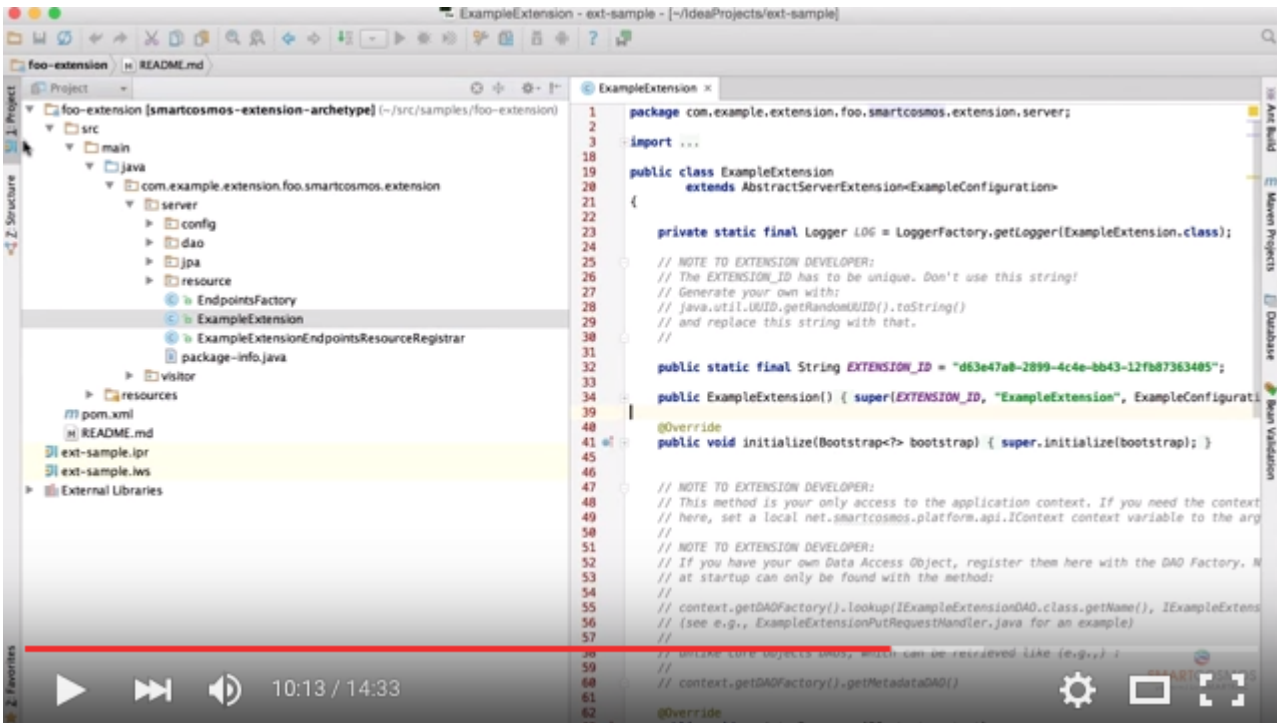


You need a code to complete the [SMART COSMOS Lessons self-signup](#). If you don't have one, just ask for one by dropping us an email at [api@smartrac-group.com](mailto:api@smartrac-group.com).

# Partner Development Portal

The [Partner Development Portal](#) is the online community for all things SMART COSMOS. Here you can review partner profiles, developer profiles, access technical white papers, review technical use cases, register for contests, and much more. If you haven't already, you should visit the site and register as a developer to gain access to more technical data about the SMART COSMOS platform and network with other professionals using SMART COSMOS to Monetize the IoT.

## Extension Developer Quick Start



There is a short 15 minute video, [Extension Developer Quick Start](#), at the SMART COSMOS DevTube channel. This video will help you quickly setup a suitable development environment for creating and selling SMART COSMOS Extensions.

## Maven Central

Java developers that rely on Maven Central can access the SMART COSMOS libraries by searching for groupId of **net.smartcosmos**.

The [core framework](#) has the following coordinates:

```
<dependency>
  <groupId>net.smartcosmos</groupId>
  <artifactId>smartcosmos-core</artifactId>
  <version>2.10.13</version>
</dependency>
```

The [extension API](#) has the following coordinates:

```
<dependency>
  <groupId>net.smartcosmos</groupId>
  <artifactId>smartcosmos-extension-api</artifactId>
  <version>2.10.13</version>
</dependency>
```

Finally, if you want to use a Maven Archetype to get started, use the following coordinates:

```
<dependency>
  <groupId>net.smartcosmos.extension</groupId>
  <artifactId>smartcosmos-extension-archetype</artifactId>
  <version>2.10.13</version>
</dependency>
```



Remember, the artifacts in Maven Central are **living** artifacts and will have new releases from time to time. You are **strongly encouraged** to visit <https://search.maven.org> to find the latest version after 2.10.13.

If you are a Java developer interested in just building an Objects client, with no interest in building extensions, then you may consider using the SMART COSMOS Java Client for easy access to the platform without having to worry about the underlying HTTP, JSON, and REST calls. The Maven Central coordinates for this library are:

```
<dependency>
  <groupId>net.smartcosmos</groupId>
  <artifactId>smartcosmos-java-client</artifactId>
  <version>2.10.13</version>
</dependency>
```

## Getting Started

Once you have become SMART COSMOS Certified and gained access to the SMART COSMOS Objects Developer Kit you need to get your server up and running. This section helps with some basic

commands to get you started.

## About the Kit

In your SMART COSMOS Developer Kit are several files:

- **README.pdf** — The document you're reading right now. This document is open source and we encourage feedback and improvements at <https://github.com/SMARTRACTECHNOLOGY/smartcosmos-framework>
- **CONTRIBUTING.pdf** — The main framework or SMART COSMOS is actually Open Source and available at <https://github.com/SMARTRACTECHNOLOGY/smartcosmos-framework> this guide provides ways for you to contribute.
- **javadocs** — Java Docs for the SMART COSMOS Extension API. These Java Docs are also available online at <https://api.smartcosmos.net>
- **apacheds.yml** — Configuration file necessary to run the Embedded Apache Directory Service Authentication Service Extension for your SMART COSMOS Embedded installation
- **objects.yml** — Configuration file for your SMART COSMOS Objects Developer Edition server.
- **smartcosmos-extension-starter-test-all.jar** — This is the test harness for the SMART COSMOS Framework that will be expanded upon heavily to help you, the developer, test and verify your extensions. Additionally, this package also helps you populate your SMART COSMOS Objects server with some basic objects and an account to get you started.
- **smartcosmos-objects-devkit-edition.jar** — SMART COSMOS Objects Developer Edition packaged to include **H2 Database Engine** so you can get up and running without needing to install **MariaDB** or another JDBC capable server.
- **version.yml** — We're always trying to provide you with the most up-to-date and best software, so the DevKit is automatically built each time we build SMART COSMOS Objects. This file just helps let you know what version you have and when it was built.

In addition to the files included in the Developer Kit, some directories will be created the first time you run SMART COSMOS Objects:

- **apacheds-work** — this folder contains your working files for **Apache Directory Service**
- **files** — all file entries created in SMART COSMOS Object go into this folder. This is the default **Storage Service Extension** in SMART COSMOS Developer Kit, unlike the AWS Marketplace Developer Edition that uses S3.
- **log** — By default all of the server logs are written out to this folder into the **objects.log** file. If you keep your server running this file will roll over daily. Read the **logging** section of the **objects.yml** file for how you can change this functionality.
- **server-work** — The schema for the **Apache Directory Service** is written out to this folder. Since the default Developer Edition runs with an embedded database, if you delete or move the database make sure you also delete or move this file, since your passwords and authentication details are

stored in here. This is a **Server Extension** and the **Directory Service Extension**.

- `objects.mv.db` and `objects.trace.db`—These are [H2 Database Engine](#) files for the embedded database. They are created by the database connection at server start, and are specified in the `objects.yml`.

## Running SMART COSMOS Objects

Your SMART COSMOS Objects Server comes already fully configured and ready to run, right out of the package. To start your server, simply run the following from the command line:

```
java -jar smartcosmos-objects-devkit-edition.jar server objects.yml
```

The server starts up and is available by default on port `8080`, if you open your browser to <http://localhost:8080/> you should see some helpful information about SMART COSMOS Objects. At this point the server is ready to respond to all REST calls:

```
~ curl http://localhost:8080/admin/ping -v
* Trying 127.0.0.1...
* Connected to localhost (127.0.0.1) port 8080 (#0)
> GET /admin/ping HTTP/1.1
> User-Agent: curl/7.40.0
> Host: localhost:8080
> Accept: */*
>
< HTTP/1.1 200 OK
< Date: Thu, 01 Oct 2015 19:14:54 GMT
< Cache-Control: must-revalidate,no-cache,no-store
< Content-Type: text/plain; charset=ISO-8859-1
< Content-Length: 5
<
pong
* Connection #0 to host localhost left intact
```

## Populating YOUR Server

The DevKit comes with the SMART COSMOS Test Harness packaged in, which is code freely available in the SMART COSMOS Framework located at <https://github.com/SMARTRACTECHNOLOGY/smartcosmos-framework> the default class for the Test Harness is a `PopulateObjectsServer` JUnit test that will connect to your server and populate the database with some details. You can run the Test Harness with the following:

```
java -jar smartcosmos-extension-starter-test-all.jar
```

This will create a SMART COSMOS Account with a login of `api@smart-cosmos4.com` and password `1QXFBDRcf1?6` as well as putting some Objects, Metadata, Relationships, and Interactions into the server database. All of the code for the Test Harness is open source, and provides an excellent sample base for interacting with SMART COSMOS. The code used in the Test Harness is available at <https://github.com/SMARTRACTECHNOLOGY/smartcosmos-framework>

If you want to customize the login, password, or even the server you're connecting to they can be overridden with system properties:

```
java \  
-De2eAccountRealm=example.com \  
-De2eAccountEmail=api@example.com \  
-De2eAccountPassword=waldo \  
-jar smartcosmos-extension-starter-test-all.jar
```

## Adding YOUR Extension

Once you develop your own Extension you'll want to add it to test with your own SMART COSMOS Objects Server. This involves running the SMART COSMOS Server so that it can also detect your jar file. The easiest way to do this is to create a new folder in the directory called `lib`, put your SMART COSMOS Extension into that folder, and run with the following command:

```
java -cp "lib/*" -jar smartcosmos-objects-devkit-edition.jar server objects.yml
```



Notice the addition of the `-cp "lib/*"` to the java command line.

You'll also need to make sure you included your Extension's details in the `objects.yml` file.

## Special Procedure for Directory Service Extensions

SMART COSMOS Objects Developer Edition locks the Directory Service Extension to the Embedded Apache DS Directory Service Extension. However, developers for Directory Service Extensions need to be able to test their software. For that reason, **only** the Developer Kit comes with the capability to switch to `DevKit` mode. This limits the amount of Objects you can store in your Objects Server to **500**, but unlocks the Directory Service Extension so that developers can test their Extension. All of these changes are done in the `objects.yml` configuration file.



This procedure is only necessary for those that want to create a Directory Service Extension!



1. Change the `license.edition` to `DevKit`
2. Change the `license.editionKey` to the alternative key denoted in the file with the comment `CHANGE TO DEVELOP AN AUTHENTICATION SERVICE` above it.
3. Change the `license.objectCount` to `500`
4. Comment out the `EmbeddedApacheDS` entries to disable the ApacheDS Server Extension:

```
serverExtensions:  
  #  
  # Embedded LDAP server bundle  
  # EmbeddedApacheDS : net.smartcosmos.bundle.apacheds.ApacheDSBundle  
  
serverExtensionConfigurationPaths:  
  # EmbeddedApacheDS : ./apacheds.yml
```