Securing ORDS

APEX World 2018 Rotterdam, 2018-03-22

Securing access to REST Data Services

About me

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✓Fulltime APEX developer
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✓APEX World 2018
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✓Kscope18


over 160
... colleagues work in the Netherlands
over 40
... colleagues work in the Caribbean

Today’s menu

Our use case

What is REST & ORDS?

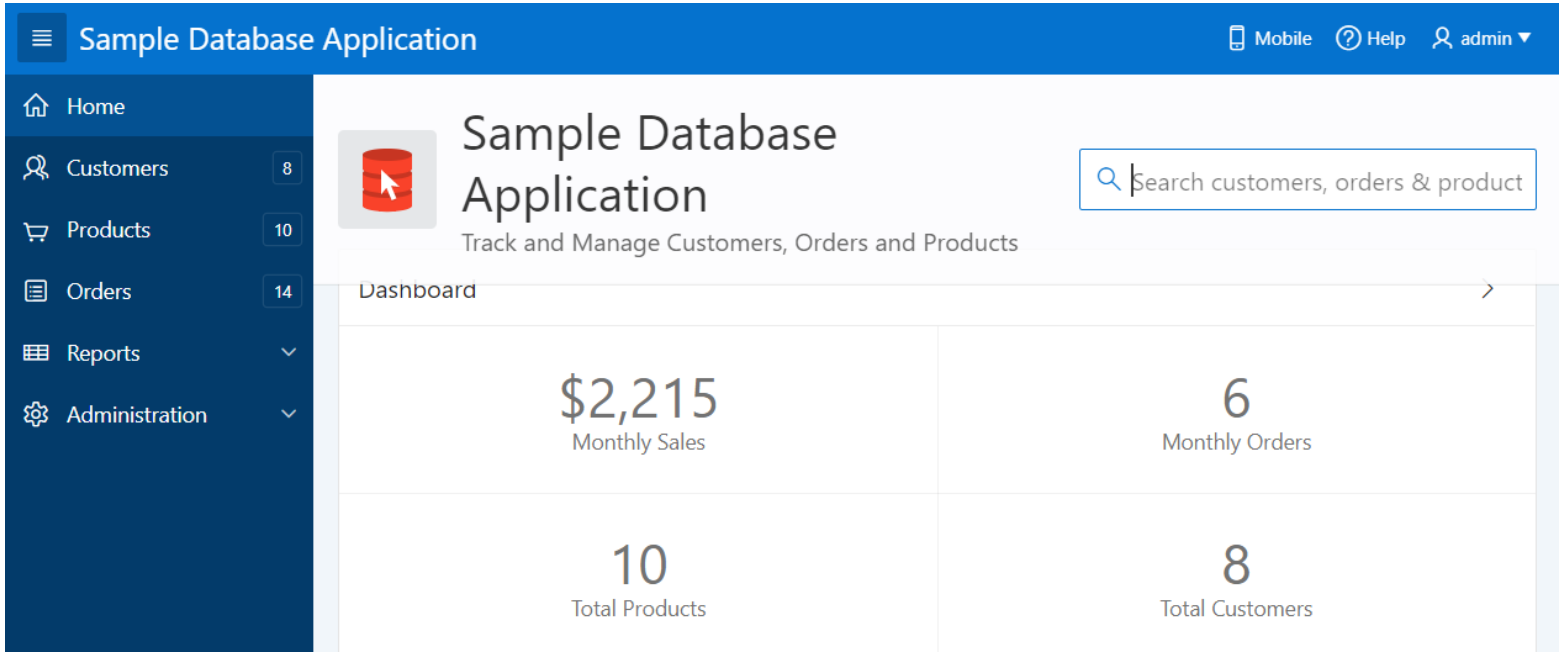
Creating the REST API

Securing the REST API

Using the REST API

Our use case

We offer an online Sales App for Third Parties



And one of our clients wants more..

"I want to expand my business"

"I want to open an online fashion store!"

"Can I manage my sales trough my own online App?"

And we say: "Sure, we will provide a REST API"

Requirements

Our REST API needs to provide the following

Access to global resources:

- Get product information
- Create new user accounts

Access to user/ customer resources:

- Get user account details
- Place an order
- Get order history

What do we need?

Database ORDS HTTP Server

What is REST & ORDS

REST – Representational State Transfer

REST is a set of rules to:

- Provide access to resources via URIs
- Use CRUD operations on these resources via HTTP methods

CRUD operation	HTTP method
CREATE	POST
READ	GET
UPDATE	PUT
DELETE	DELETE

REST – Example

Getting a list of products from our Sales App

```
GET http://localhost:8080/ords/demo/api/products
```

```
{
  "items": [{
      "product_id": 6,
      "product_name": "Ladies Shoes"
    },
    {
      "product_id": 7,
      "product_name": "Belt"
    }
  ]
}
```

ORDS – Oracle REST Data Services

Enables us to develop REST interfaces for relational data in the Oracle Database

Source: oracle.com

And run APEX..

Creating the REST API (Demo)

Getting a list of products from our Sales App

```
GET http://localhost:8080/ords/demo/api/products
```

Securing the REST API

How to secure a REST resource with ORDS

Follow these two steps

Client application	Products, Customers
Customer	Accountdetails

What kind of users can access the REST API

Users known to the HTTP server (most common):

- Local users
  - File based entries in HTTP Server configuration
  - Useful during development
- Database users stored in our tables
  - Accessed by HTTP server trough JDCB
  - Passwords should be stored with SHA256 hash
- LDAP users
- OAuth clients (using client credentials flow)

Which HTTP Server can work with external user data store

HTTP Server	Local users	JDBC users	Downside
ORDS Standalone (Jetty)	Y	N	Only local users
Glassfish	Y	Y	Will be desupported
Tomcat	N	N	Current bug in ORDS 17.4
Weblogic	Y	Y	Paid license

We will use Glassfish for the demo because it still works but will get desupported.

Choosing an authentication scheme

You have to choose an authentication scheme

The two options are:

- Basic Authentication
  - Client has username & password credentials
- Bearer Authentication
  - Client has an access token

Basic authentication

Can be used in the following scenario:

- Internal REST API within your organization

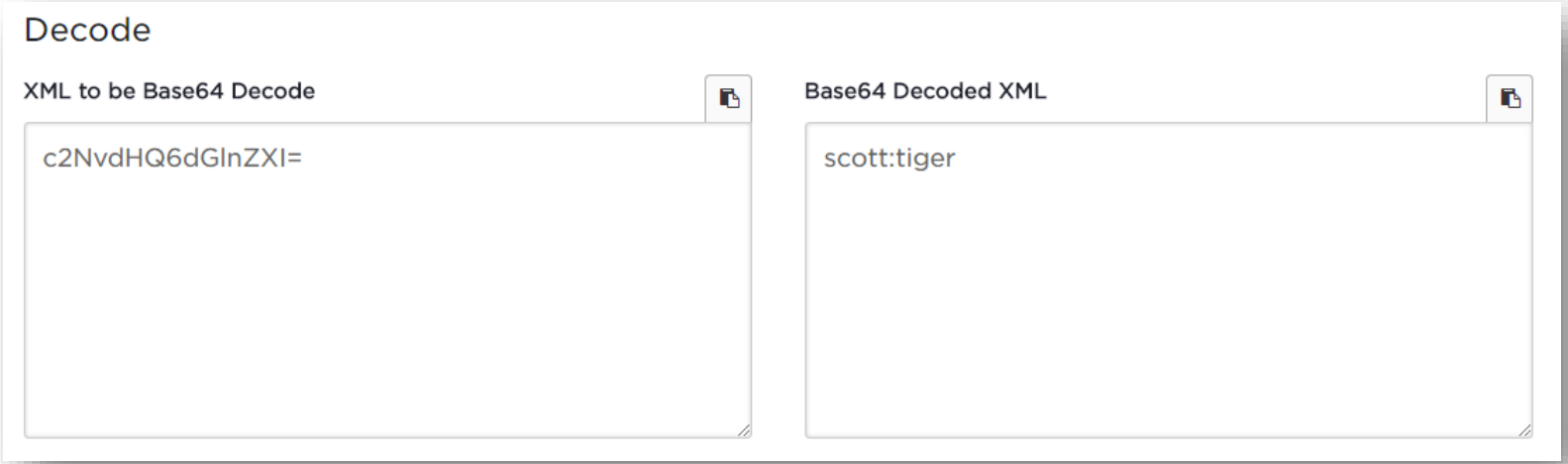
Why avoid external usage:

- The credentials are send in the header of every request
- Somebody might intercept your network request
- If you do want to use it externally, make sure the requests are send via HTTPS

How a hacker could get your credentials

Request header

```
GET http://localhost:8080/ords/demo/api/products
Authorization: Basic c2NvdHQ6dGlnZXI=
```



Bearer authentication

Is part of OAuth2 specification

Safer choice because:

- Requires HTTPS
- Does not send credentials in request header
- Access token is short-lived
  - Expires in one hour by default in ORDS

Step 1: Create a OAuth client in ORDS

The client app always makes REST requests using an Oauth client

Via a database procedure:

```
OAUTH.CREATE_CLIENT(
   p_name             VARCHAR2 IN,
   p_grant_type       VARCHAR2 IN,
   p_owner            VARCHAR2 IN DEFAULT NULL,
   p_description      VARCHAR2 IN DEFAULT NULL,
   p_allowed_origins VARCHAR2 IN DEFAULT NULL,
   p_redirect_uri     VARCHAR2 IN DEFAULT NULL,
   p_support_email    VARCHAR2 IN DEFAULT NULL,
   p_support_uri      VARCHAR2 IN DEFAULT NULL,
   p_privilege_names VARCHAR2 IN)
```

Step 2: Assign role to client

The client app must have the appropriate role to access resources

Via a database procedure:

```
OAUTH.GRANT_CLIENT_ROLE(
   p_client_name VARCHAR2 IN,
   p_role_name   VARCHAR2 IN);
```

Main goal of OAuth2: obtain an access token for a user

There are three different flows to obtain a token

Oauth flow	Users need to grant access?	Refresh token included?
Client credentials	N	Y
Authorization code	Y	Y
Implicit	Y	N

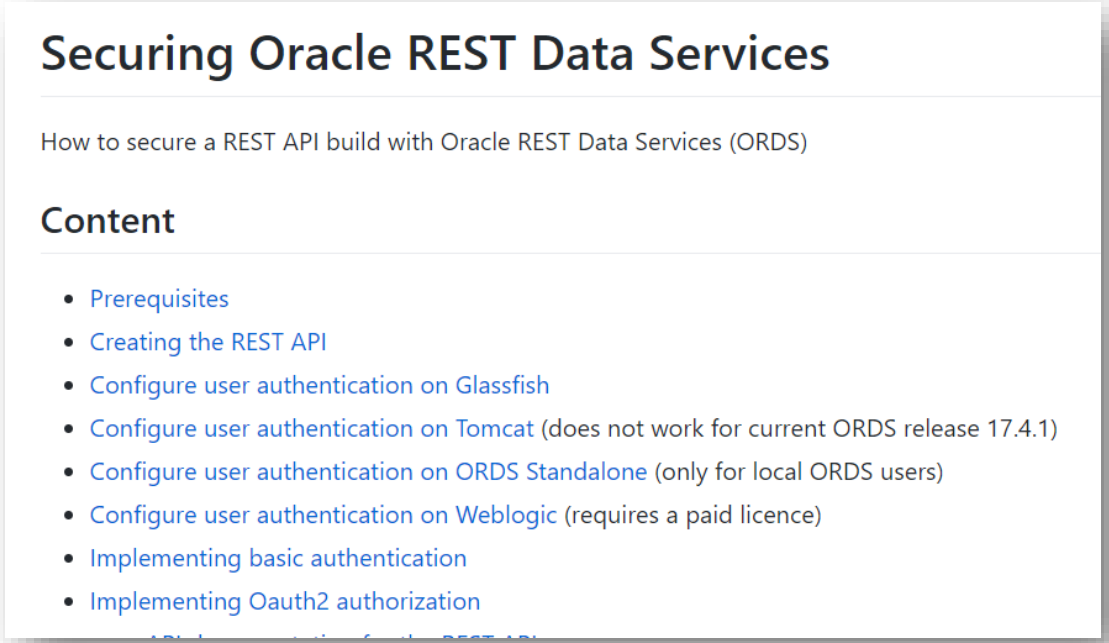
Demo: The fashion store app

Some important notes

- OAuth is not the same as Social Authentication
- OAuth clients are created for applications, not for end users
- End users must be able to login on HTTP server (except client credentials flow for OAuth)
- Use client credentials flow or authorization code flow for server side applications
- Use implicit flow for client side applications

The demo and other resources are on GitHub

https://github.com/mennooo/securing-ords



Securing Oracle REST Data Services

How to secure a REST API build with Oracle REST Data Services (ORDS)

Content

- Prerequisites
- Creating the REST API
- Configure user authentication on Glassfish
- Configure user authentication on Tomcat (does not work for current ORDS release 17.4.1)
- Configure user authentication on ORDS Standalone (only for local ORDS users)
- Configure user authentication on Weblogic (requires a paid licence)
- Implementing basic authentication
- Implementing Oauth2 authorization

Thank you