

# APEX

## Praktisk brug af REST services

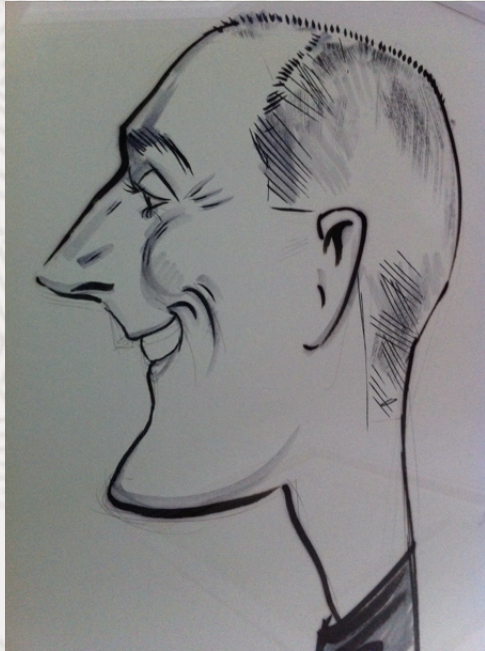
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MBN Data ApS

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# Præsentation



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ORACLE APEX SPECIALISTERNE

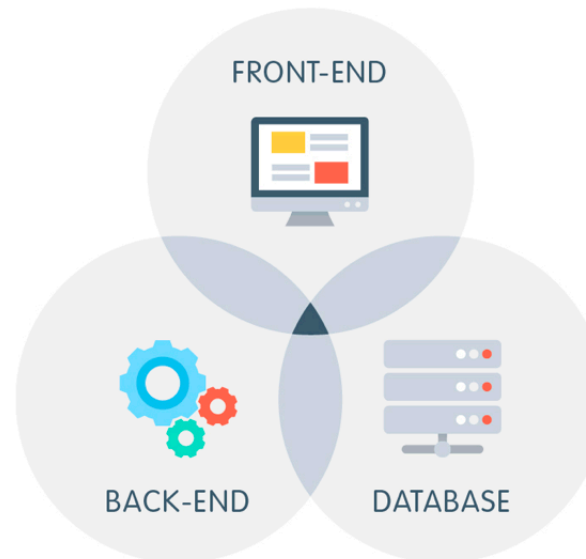
## Oracle Application Express

Build applications using only your web browser.

Get Started



## FULL-STACK DEVELOPMENT



- **MBNDATA**
- Udviklings Projekter
- Konsulentbistand
- Mentoring
- Undervisning

W: mbndata.dk  
@: martin@mbndata.dk

# Agenda

1. REST og Microservices
2. Opsætning af REST services ("expose")
3. Kald af REST services ("consume")
4. Sikkerhed: Basic Authentication, OAuth2
5. Praktiske eksempler på brug af REST

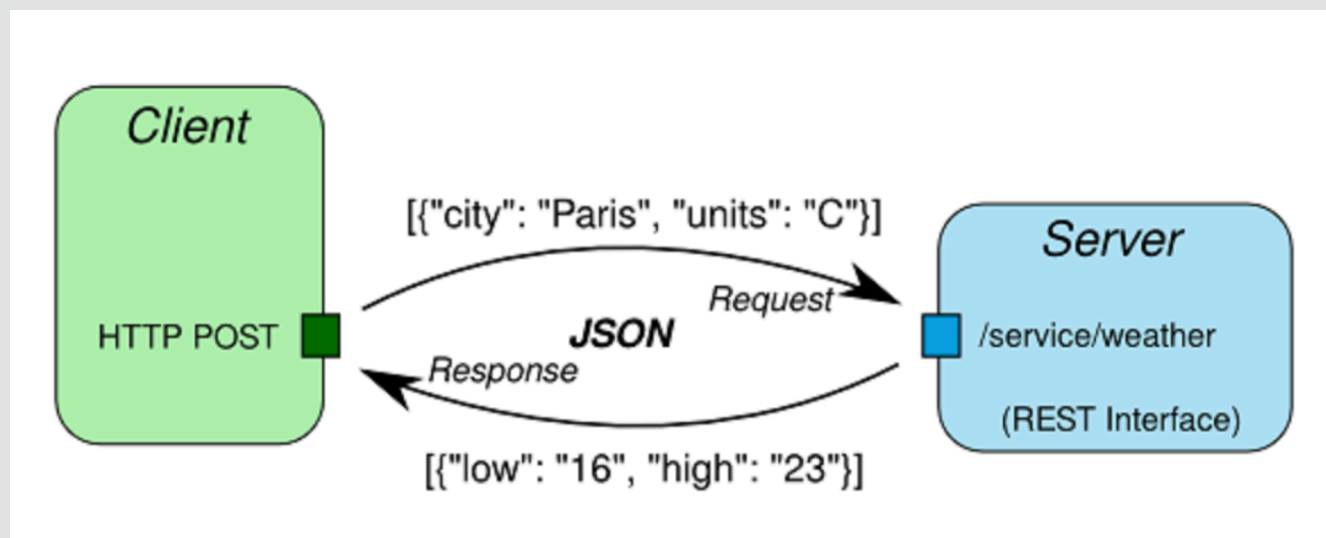


# Microservices

*In short, the microservice **architectural style** is an approach to developing **a single application as a suite of small services**, each running in its own process and **communicating** with lightweight mechanisms, often an HTTP **resource API**. These services are **built around business capabilities** and **independently deployable** by fully **automated deployment** machinery. There is a bare minimum of centralized management of these services, which may be written in **different programming languages** and **use different data storage technologies**.*



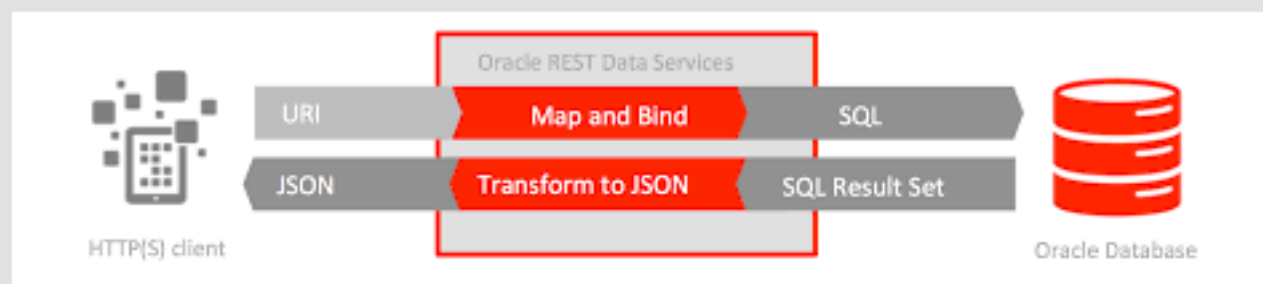
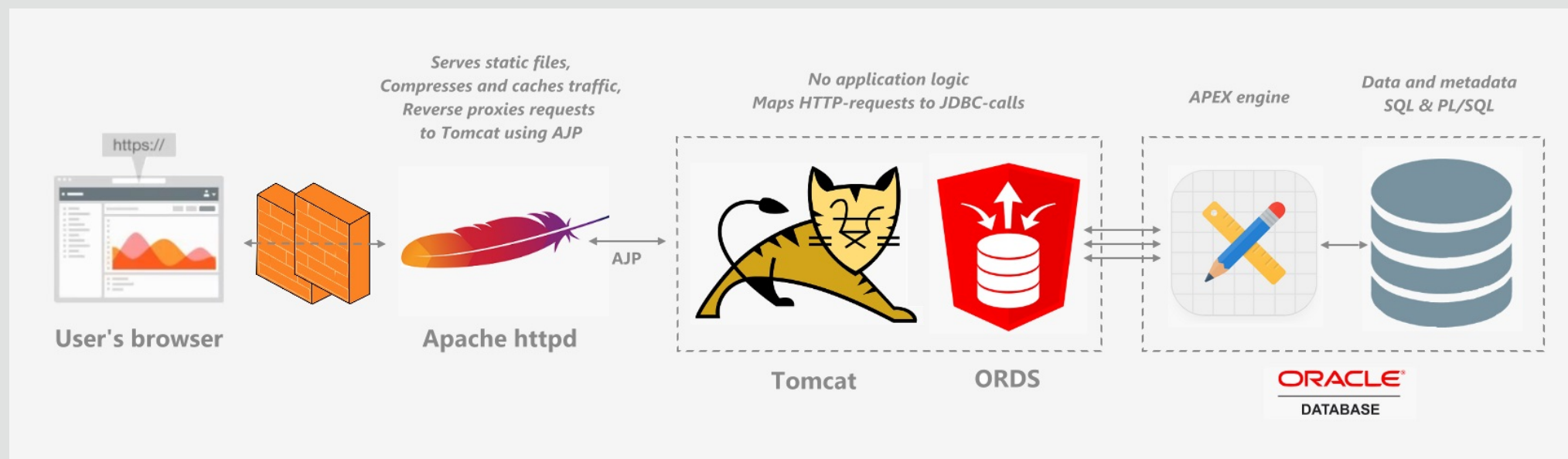
# REST



- HTTP Protokollen
- Dataformatet er JSON
- Services udbydes som "resourcer"
- Benytter HTTP "Metoder" : GET, POST, PUT, PATCH, DELETE...
- Sikkerhed baseret på SSL samt Authentication (basic, OAuth2, API key...)
- URL/HTTP Header benyttes til angivelse af parametre
- Ingen standard for pagination



# Opsætning af REST services (ORDS)



SQL  
PL/SQL

# DEMO


## Opsætning af REST services

- RESTful Data Services
  - Enabled Objects
  - Modules
    - oracle.example.hr
      - empinfo/
      - employees/
        - GET
      - employees/:id
      - employeesfeed/
      - employeesfeed/:id
      - empsec/:empname
      - empsecformat/:empname
      - version/
  - Privileges
  - Roles



# DEMO

## Kald af REST services

 <b>APEX</b> <b>App Builder</b> ▾   SQL Workshop ▾   Team Development ▾   App Gallery ▾					
↑ Application 52645 \ Shared Components \ <b>REST Data Sources</b>					
<b>REST Data Sources</b> Utilization   History					
<div><input type="text" value="Q"/> ▾   <input type="button" value="Go"/>   <input type="button" value="Grid"/>   <input type="button" value="Table"/>   <input type="button" value="Actions"/> ▾</div>					
REST Source Name	Updated	Operations	Authentication Required	Remote Server Name	Endpoint URL
External Employees	5 days ago	1	No	mbndata-dk-ords-demo	https://mbndata.dk/ords/demo/hr/employees/
iTunes search	7 minutes ago	1	No	itunes-apple-com	https://itunes.apple.com/search



# Sikkerhed

- Encryption (HTTPS)
- Netværks sikkerhed (VPN...)
- URL Sikkerhed (rewrite...)
- **Authentication (Basic, OAuth2...)**



# ORDS Privileges

ORDS Privileges Definition Cancel Create Privilege

Owner **HR**

\* Name  ?

\* Title  ?

Description  ?

Comments

Roles

OAuth2 Client Developer		
SQL Developer		
RESTful Services		
Schema Administrator		
oracle.dbtools.autorest.any.schema		
SODA Developer		
oracle.dbtools.role.autorest.HR		

My Custom Role

Protected Modules

Modules


oracle.example.hr

- ORDS "Brugere" har en "rolle"
- "Privileges" giver rettighed til en eller flere moduler, for 1 eller flere "roller"
- ORDS Brugere oprettes enten med ords.war (basic), eller i databasen (Oauth2)

# Basic Authentication

- Der oprettes brugere på OS niveau
- Brugeren tildeles 1"rolle"

```
[root@mbn01 ords2021]# java -jar ords.war help
java -jar ords.war <COMMAND> [Options] [Arguments]
```

The following commands are available:

user	Create or update a user, specify its password and role. ORDS Administrator example: user ords_admin "Listener Administrator" ORDS Developer example: user ords_dev "SQL Developer"
------	--

```
[root@mbn01 ords2021]# java -jar ords.war user my_user "My Role"
Enter a password for user my_user: █
```

The screenshot shows the 'Authorization' tab of a REST client interface. The 'TYPE' dropdown is set to 'Basic Auth'. A warning message states: 'Heads up! These parameters hold sensitive data. To keep this data secure while working in a collaborator...'. The 'Username' field contains 'my\_user' and the 'Password' field is masked with dots.

Params	Authorization	Headers (8)	Body	Pre-request Script	Tests	Settings
<b>TYPE</b>						
Basic Auth						
The authorization header will be automatically generated when you send the request. <a href="#">Learn more about authorization</a>						
Username						my_user
Password						.....





# Oauth2

- Der oprettes brugere på database niveau
- Brugeren tildeles 1"rolle"
- 3 parts authentication.
- Token baseret





# Oauth2 - Opsætning

```
BEGIN
  OAUTH.grant_client_role(
    p_client_name => 'emp_client',
    p_role_name   => 'emp_role'
  );

  COMMIT;
END;
/
```

```
BEGIN
  OAUTH.create_client(
    p_name          => 'emp_client',
    p_grant_type    => 'authorization_code',
    p_owner         => 'My Company Limited',
    p_description   => 'A client for Emp management',
    p_redirect_uri  => 'https://localhost:8443/ords/hr/redirect',
    p_support_email => 'tim@example.com',
    p_support_uri   => 'https://localhost:8443/ords/hr/support',
    p_privilege_names => 'emp_priv'
  );

  COMMIT;
END;
/
```

```
-- Display client details.
COLUMN name FORMAT A20
```

```
SELECT id, name, client_id, client_secret
FROM   user_ords_clients;
```

ID	NAME	CLIENT_ID	CLIENT_SECRET
10333	emp_client	gxqNSyxPbLUJhSj1yBe8qA..	E-_mKJB10TfTdHc_zISniA..

OAuth 2.0

The authorization data will be automatically generated for the request. [Learn more about authorization](#)

Add authorization data to

Request Headers

Body Cookies Headers (28) Test Results

Pretty Raw Preview Visualize Text

```
1
2
3
4
5 {"resultCount":50,
6  "results": [
7  {"wrapperType":"track", "kind":"song",
   "collectionCensoredName":"How t
```

GET NEW ACCESS TOKEN

Token Name

Token Name

Grant Type

Client Credentials

Access Token URL ⓘ

https://xxx/ords/xxapext/oauth/token

Client ID ⓘ

grf4xaffTtShUq\_dfwHKw9JfwU32g..

Client Secret ⓘ

gQ9eNy7fwee4VfffrfgyyqVe2sLZrfw..

Scope ⓘ

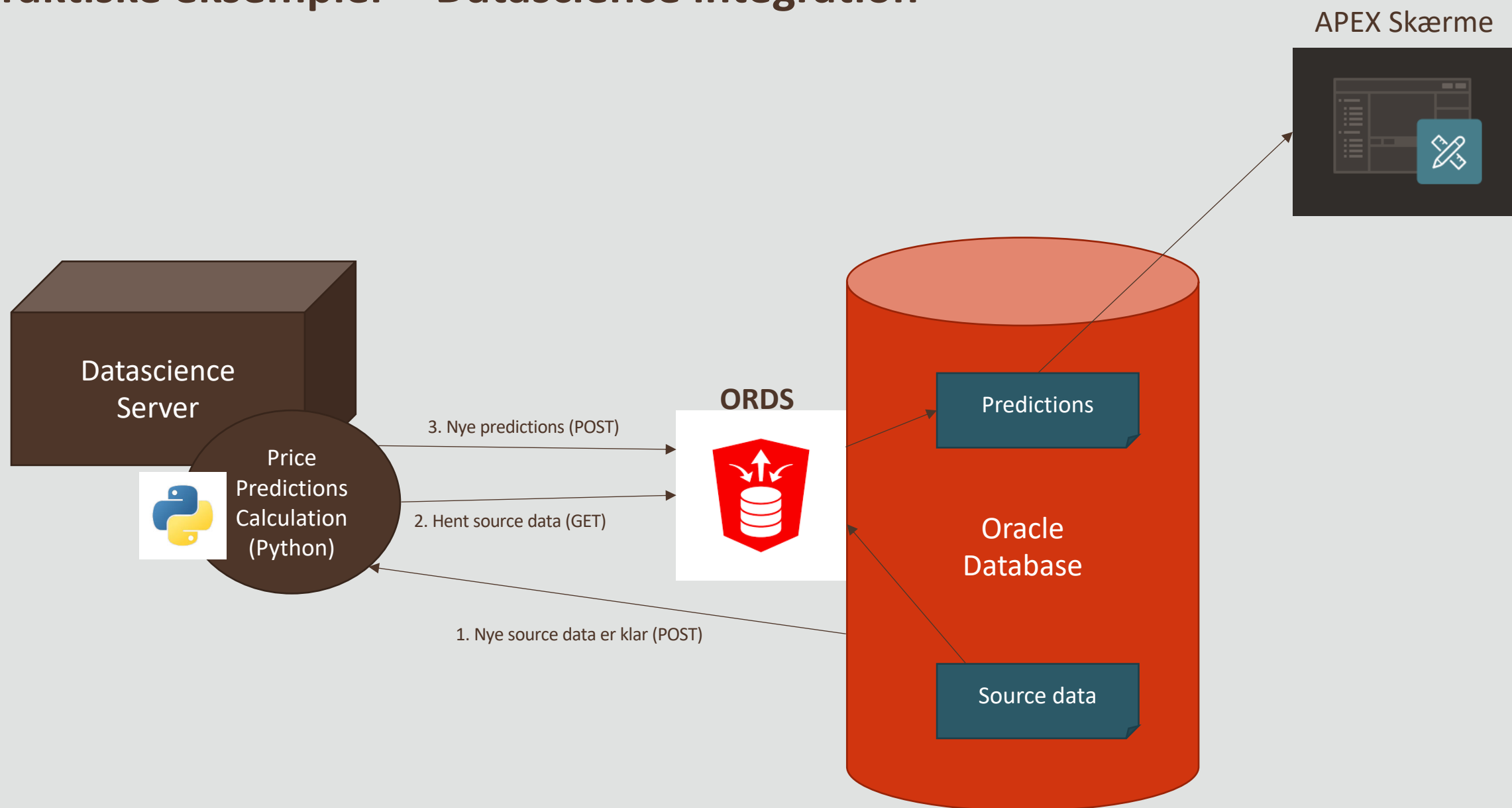
e.g. read:org

Client Authentication

Send as Basic Auth header

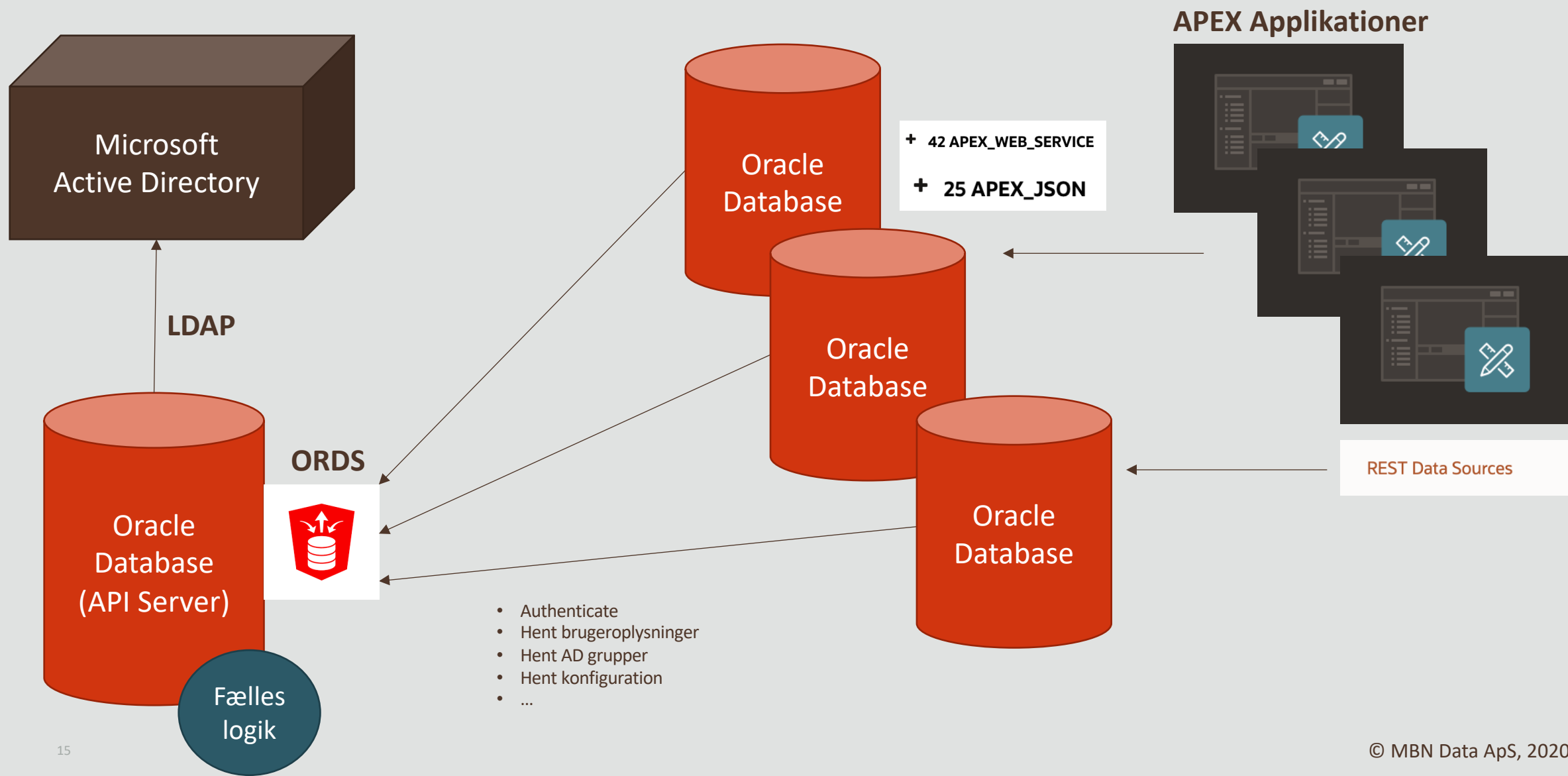


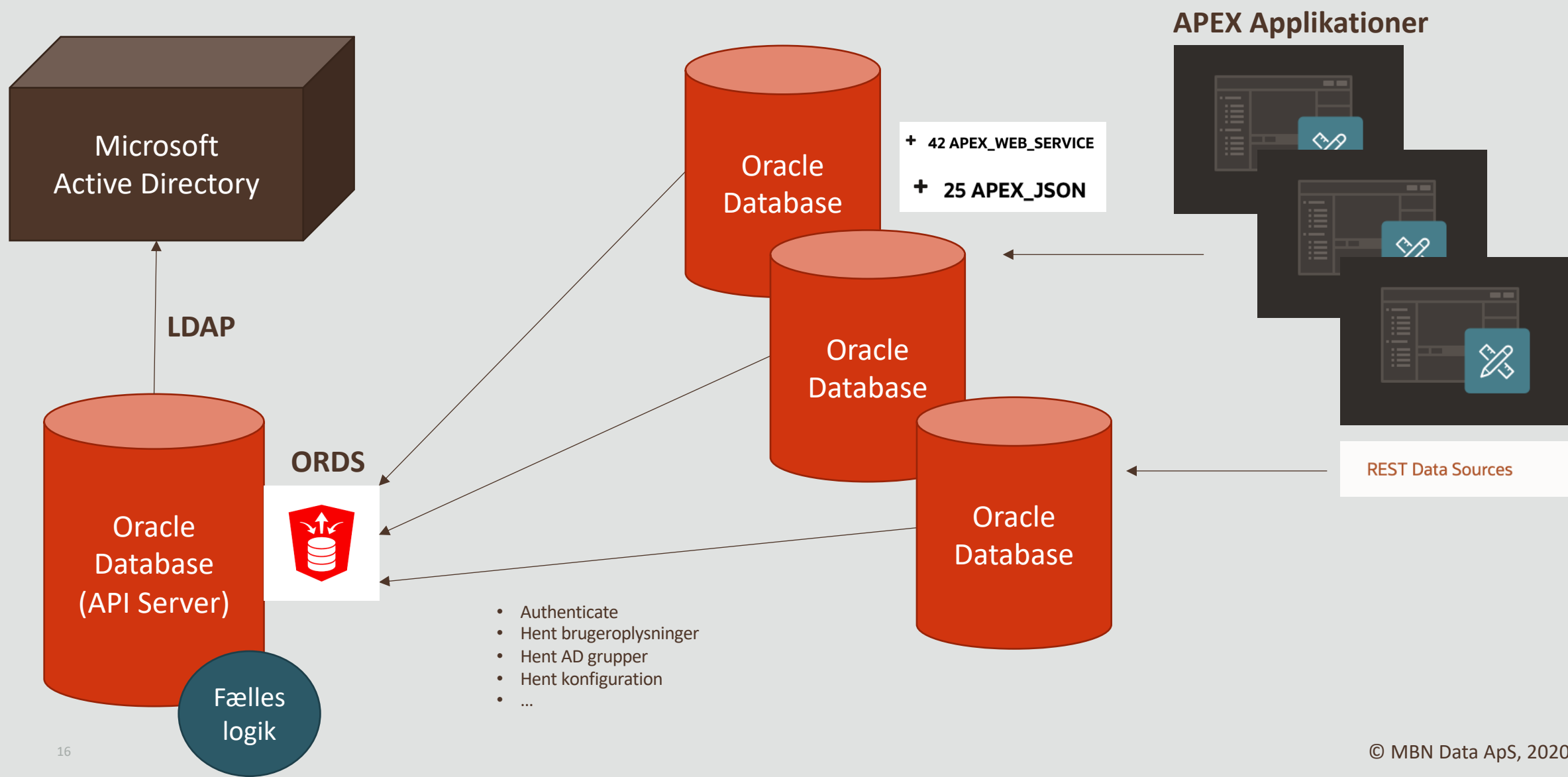
# Praktiske eksempler – Datascience integration



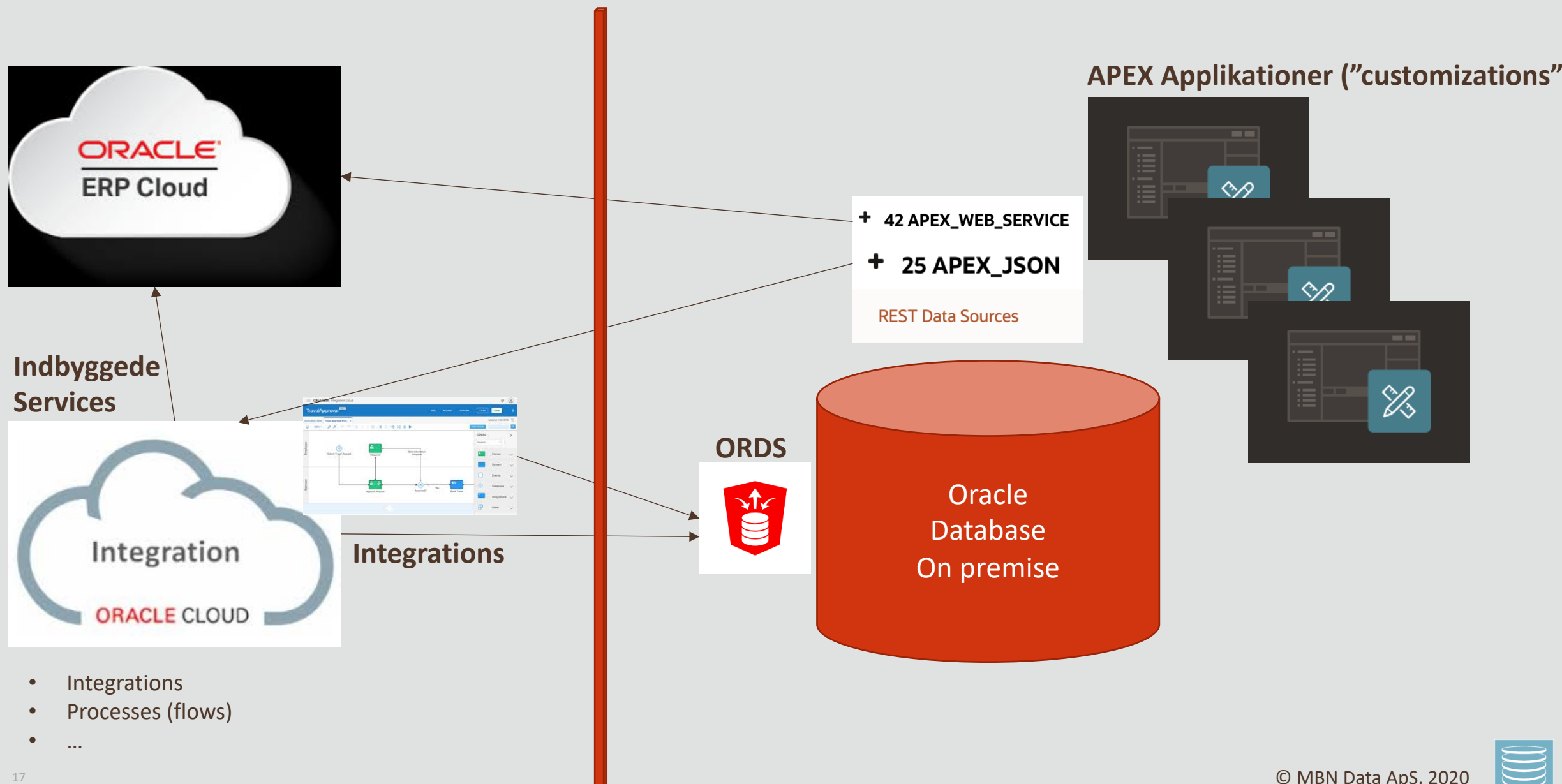


# Praktiske eksempler – Konsolidering af interne services





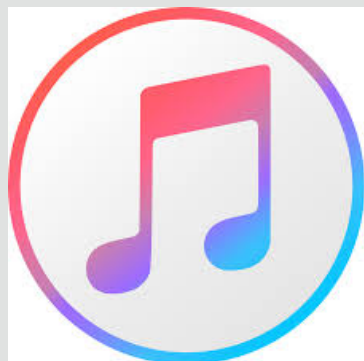
# Praktiske eksempler – Integration med Oracle ERP samt Integration



- Integrations
- Processes (flows)
- ...

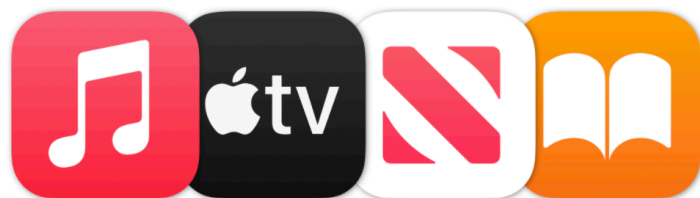


# Praktiske eksempler – iTunes (APEX Curriculumn kursus)



## DEMO

Kald af REST services



iTunes Search API

Search the fray					Go
Country ↑	Track	Artist	Preview	Release Date	Price
USA	How to Save a Life (New Version)	The Fray		4/28/2003	1.99 USD
USA	J. S. Bach: Sonata for Violin and Piano No. 4 in C Minor, BWV 1017: I. Siciliano - II. Allegro	Valeriy Sokolov & David Fray		6/28/2013	1.99 USD
USA	How to Save a Life	The Fray		4/28/2003	5.97 USD
USA	The Making of: Never Say Never	The Fray		5/19/2009	1.99 USD
USA	She Is	The Fray		5/19/2009	1.99 USD
USA	Happiness	The Fray		5/19/2009	1.99 USD
USA	Over My Head (Cable Car)	The Fray		4/28/2003	5.97 USD
USA	All At Once	The Fray		4/28/2003	5.97 USD

# Spørgsmål

