

*Dimitri Gielis*

---

# Bringing your Oracle Database alive with APEX



[www.apexRnD.be](http://www.apexRnD.be)



[dgielis.blogspot.com](http://dgielis.blogspot.com)



@dgielis



[dgielis@apexRnD.be](mailto:dgielis@apexRnD.be)

---

---

# Dimitri Gielis

---

- ❖ Founder & CEO of APEX R&D
- ❖ 20+ years of Oracle Experience (OCP & APEX Certified)
- ❖ Oracle ACE Director
- ❖ “APEX Developer of the year 2009” by Oracle Magazine
- ❖ “Oracle Developer Choice award (ORDS)” in 2015
- ❖ Author Expert Oracle APEX
- ❖ Presenter at Conferences





[www.apexRnD.be](http://www.apexRnD.be)



[www.apexofficeprint.com](http://www.apexofficeprint.com)

# http://dgielis.blogspot.com

# @dgielis

**Dimitri Gielis Blog (Oracle Application Express - APEX)**  
I created this Blog to share my knowledge especially in Oracle Application Express (APEX) and my feelings ...

FRIDAY, SEPTEMBER 26, 2014

**APEX 4.2.6 patch available**  
Oracle released [APEX 4.2.6](#) yesterday, it's also available from My Oracle Support as a patch set 19595896.  
  
Here's the table of bug fixes.  

| Bug Number | Description                                                                   |
|------------|-------------------------------------------------------------------------------|
| 18393429   | Importing pre-4.2 application with data loading results in runtime error      |
| 18609856   | APEX_WEB_SERVICE.CLOBBASE642BLOB converts incorrectly                         |
| 18658967   | Corrupted HTML mail messages are created from APEX_MAIL.SEND                  |
| 18719750   | ORA-01858 during application import                                           |
| 18733989   | Errors picking up session with cookie when TOP CALL is not F, SHOW, or ACCEPT |
| 19021052   | Oracle Application Express 4.2.4 throwing error while generating check boxes  |
| 19313700   | Check box fails with ORA-06502 after upgrade from release 4.0 to 4.2.4        |
| 19482775   | ORA-06502 when importing application containing translations                  |

  
Applying the patch took less than 7 minutes.

```
Session altered.  
...Validating Application Express  
...Database user "SYS", database schema "APEX_040200", user# "106" 20:48:40  
...Compiled 0 out of 3014 objects considered, 0 failed compilation 20:48:40  
...271 packages  
...263 package bodies  
...452 tables  
...11 functions  
...16 procedures  
...3 sequences  
...457 triggers  
...1320 indexes  
...211 views  
...0 libraries  
...6 types  
...0 type bodies  
...0 operators  
...0 index types
```

**My next public appearances:**

- [Oracle Open World: 27-SEP/2-OCT-2014](#)
- [ORCLAPEX-BE Meetup: 19-NOV-2014](#)
- [ODTUG KScope: 21/25-JUN-2015](#)

**About Me**

[Dimitri Gielis](#)

Passionate about Oracle and especially Oracle Application Express (APEX). Building applications with love @ APEX R&D.

[View my complete profile](#)

 **ORACLE**  
ACE Director

**Need APEX consulting, training, development, then visit:**  


**Twitter**  
[Follow @dgielis](#)



# Dimitri Gielis Blog (Oracle Application Express - APEX)

I created this Blog to share my knowledge especially in Oracle Application Express (APEX) and my feelings ...

SATURDAY, AUGUST 05, 2017

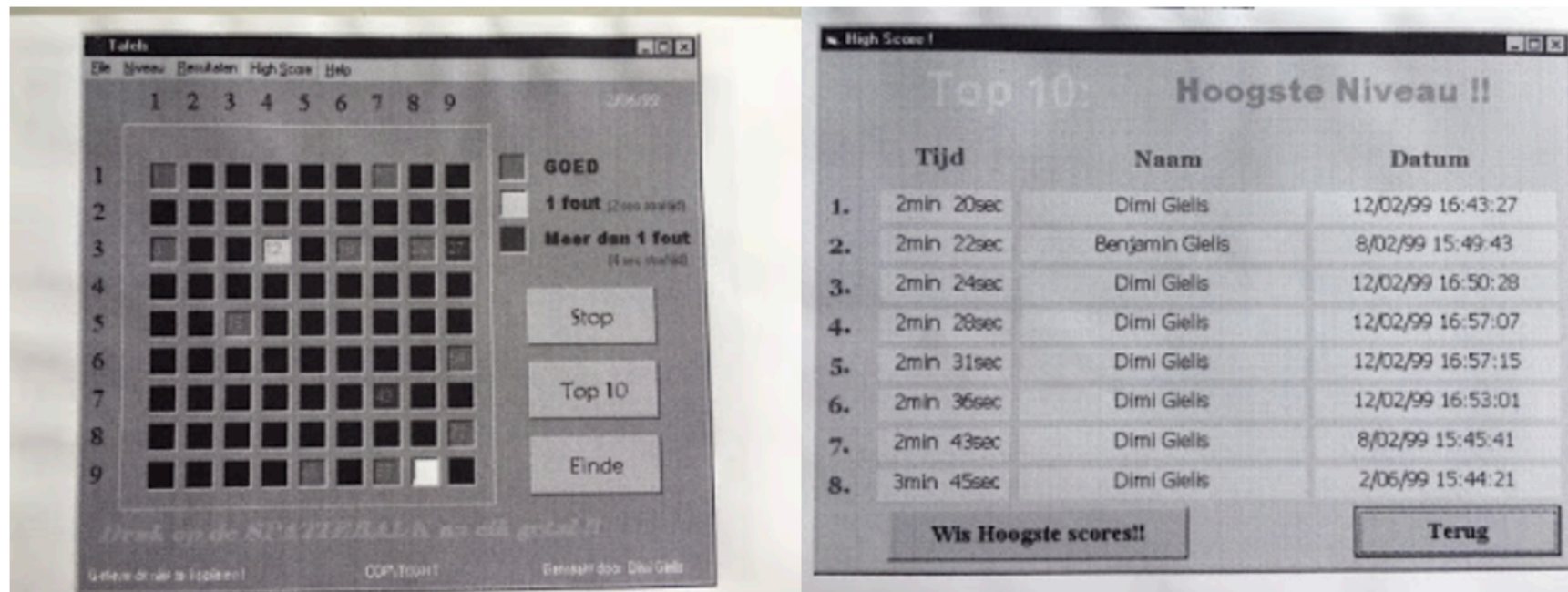
## From idea to app or how I do an Oracle APEX project anno 2017

For a long time I had in mind to write in great detail how I do an Oracle APEX project from A to Z. But so far I never took the time to actually do it, until today :)

So here's the idea; I love building projects that help people and I love to share what I know, so I will combine both. I will write exactly my thoughts and things I do as I'm moving along with this project, so you have full insight what's happening behind the scenes.

## Background

Way back, in the year 1999, I build an application in Visual Basic to help children study the multiplication tables. My father was a math teacher and taught people who wanted to become primary school teachers. While doing the visits of the primary schools, he saw the problem that children had difficulties to automate the multiplications from 1 till 10, so together we thought about how we could help them. That is how the Visual Basic application was born. I don't have a working example anymore of the program, but I found some paper prints from that time, which you see here:



We are now almost 20 years later and last year my son had difficulties memorizing the multiplication tables too. I tried sitting next to him and help him out, but when things don't go as smooth as you hope... You have

### My next public appearances:

- [Montreal Oracle Dev Day: 25-OCT-2017](#)
- [APAC Tour: New Zealand and Australia: 17/28-NOV-2017](#)



### About Me



 [Dimitri Gielis](#)

Passionate about Oracle and especially Oracle Application Express (APEX). Founder and CEO of [APEX R&D](#), a company that provides Development, Training and Consulting in APEX.

 [View my complete profile](#)



**ORACLE**  
ACE Director



### Printing in Oracle APEX?

Check [APEX Office Print](#).





A close-up, slightly angled view of a red wheel, likely a steering wheel or a large gear. The wheel has a bright red center and a black outer rim. White text is printed on the red surface, and white tick marks are visible along the black rim. The lighting is bright, creating a strong highlight on the left side of the wheel.

**DO -**  
**YOU -**  
**WANT -**  
**EAST -**

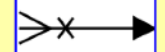
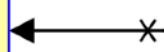
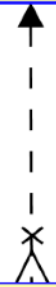
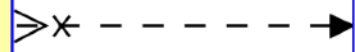
| MULTIPLICATION_TABLE.MTL_USER |                   |                     |
|-------------------------------|-------------------|---------------------|
| P *                           | ID                | NUMBER              |
| F                             | ROLE_ID           | NUMBER              |
| U *                           | EMAIL             | VARCHAR2 (255 CHAR) |
|                               | PASSWORD          | VARCHAR2 (255 CHAR) |
|                               | VERIFICATION_CODE | VARCHAR2 (255 CHAR) |
| *                             | CREATED           | DATE                |
| *                             | CREATED_BY        | VARCHAR2 (255 CHAR) |
| *                             | UPDATED           | DATE                |
| *                             | UPDATED_BY        | VARCHAR2 (255 CHAR) |
| MTL_USER_EMAIL_UNQ (EMAIL)    |                   |                     |
| MTL_USER_ID_PK (ID)           |                   |                     |
| MTL_USER_ROLE_ID_FK (ROLE_ID) |                   |                     |
| MTL_USER_EMAIL_UNQ (EMAIL)    |                   |                     |
| MTL_USER_I1 (ROLE_ID)         |                   |                     |
| MTL_USER_ID_PK (ID)           |                   |                     |

| MULTIPLICATION_TABLE.MTL_ROLE |            |                     |
|-------------------------------|------------|---------------------|
| P *                           | ID         | NUMBER              |
|                               | NAME       | VARCHAR2 (255 CHAR) |
| *                             | CREATED    | DATE                |
| *                             | CREATED_BY | VARCHAR2 (255 CHAR) |
| *                             | UPDATED    | DATE                |
| *                             | UPDATED_BY | VARCHAR2 (255 CHAR) |
| MTL_ROLE_ID_PK (ID)           |            |                     |
| MTL_ROLE_ID_PK (ID)           |            |                     |

| MULTIPLICATION_TABLE.MTL_TEAM |                   |                      |
|-------------------------------|-------------------|----------------------|
| P *                           | ID                | NUMBER               |
| F                             | USER_ID           | NUMBER               |
| *                             | NAME              | VARCHAR2 (255 CHAR)  |
|                               | TEMPLATE          | BLOB                 |
|                               | TEMPLATE_FILENAME | VARCHAR2 (512 CHAR)  |
|                               | TEMPLATE_MIMETYPE | VARCHAR2 (512 CHAR)  |
|                               | TEMPLATE_CHARSET  | VARCHAR2 (512 CHAR)  |
|                               | TEMPLATE_LASTUPD  | DATE                 |
|                               | PREFERENCES       | VARCHAR2 (4000 CHAR) |
| *                             | CREATED           | DATE                 |
| *                             | CREATED_BY        | VARCHAR2 (255 CHAR)  |
| *                             | UPDATED           | DATE                 |
| *                             | UPDATED_BY        | VARCHAR2 (255 CHAR)  |
| MTL_TEAM_ID_PK (ID)           |                   |                      |
| MTL_TEAM_USER_ID_FK (USER_ID) |                   |                      |
| MTL_TEAM_I1 (USER_ID)         |                   |                      |
| MTL_TEAM_ID_PK (ID)           |                   |                      |

| MULTIPLICATION_TABLE.MTL_PLAYER_TEAM     |            |                     |
|------------------------------------------|------------|---------------------|
| P *                                      | ID         | NUMBER              |
| F *                                      | PLAYER_ID  | NUMBER              |
| F *                                      | TEAM_ID    | NUMBER              |
| *                                        | CREATED    | DATE                |
| *                                        | CREATED_BY | VARCHAR2 (255 CHAR) |
| *                                        | UPDATED    | DATE                |
| *                                        | UPDATED_BY | VARCHAR2 (255 CHAR) |
| MTL_PLAYER_TEAM_ID_PK (ID)               |            |                     |
| MTL_PLAYER_TEAM_PLAYER_ID_FK (PLAYER_ID) |            |                     |
| MTL_PLAYER_TEAM_TEAM_ID_FK (TEAM_ID)     |            |                     |
| MTL_PLAYER_TEAM_I1 (PLAYER_ID)           |            |                     |
| MTL_PLAYER_TEAM_I2 (TEAM_ID)             |            |                     |
| MTL_PLAYER_TEAM_ID_PK (ID)               |            |                     |

| MULTIPLICATION_TABLE.MTL_PLAYER |                |                     |
|---------------------------------|----------------|---------------------|
| P *                             | ID             | NUMBER              |
| F                               | USER_ID        | NUMBER              |
| *                               | NAME           | VARCHAR2 (255 CHAR) |
|                                 | IMAGE          | BLOB                |
|                                 | IMAGE_FILENAME | VARCHAR2 (512 CHAR) |
|                                 | IMAGE_MIMETYPE | VARCHAR2 (512 CHAR) |
|                                 | IMAGE_CHARSET  | VARCHAR2 (512 CHAR) |
|                                 | IMAGE_LASTUPD  | DATE                |
| *                               | ACTIVE         | VARCHAR2 (1 CHAR)   |
| *                               | CREATED        | DATE                |
| *                               | CREATED_BY     | VARCHAR2 (255 CHAR) |
| *                               | UPDATED        | DATE                |
| *                               | UPDATED_BY     | VARCHAR2 (255 CHAR) |
| MTL_PLAYER_ID_PK (ID)           |                |                     |
| MTL_PLAYER_USER_ID_FK (USER_ID) |                |                     |
| MTL_PLAYER_I1 (USER_ID)         |                |                     |
| MTL_PLAYER_ID_PK (ID)           |                |                     |



A person with short, light-colored hair is shown in a close-up, looking downwards with a serious expression. They are wearing a dark jacket and a gold chain. The background is dark with out-of-focus lights in shades of blue and yellow.

**GIVE IT  
TO ME**

# Build stunning, scalable apps. Fast.

[Get Started for Free](#)

**NEW** Oracle APEX 18.2 Now Available!

[Explore Features](#)

[View Announcement](#)

# Oracle APEX

Database-centric web application development framework



Develop desktop and  
mobile web apps



Visualize and  
maintain  
database data



Leverage SQL Skills  
and database  
capabilities

# Oracle APEX

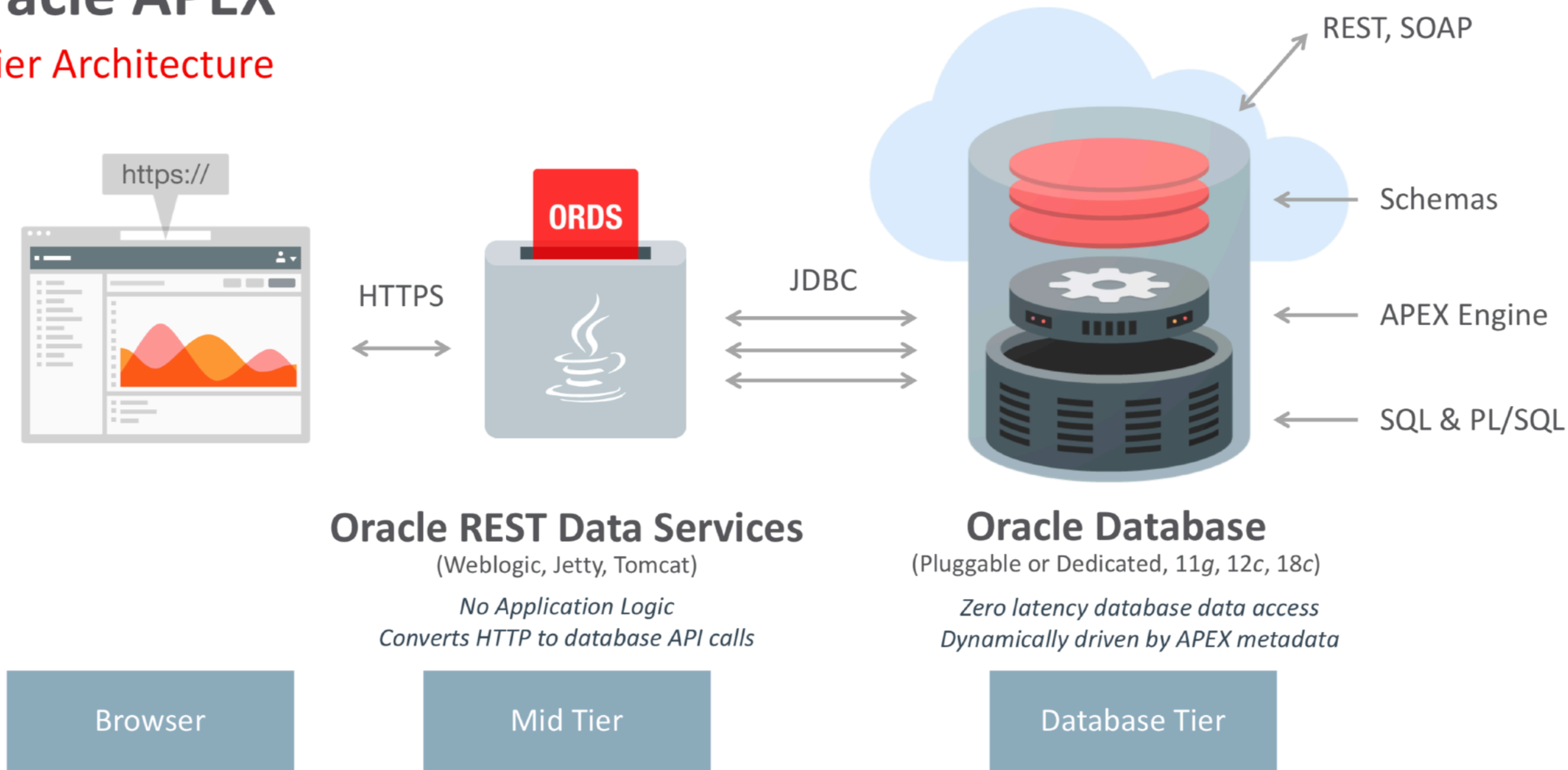
## No cost feature of the Oracle Database

- No-cost fully supported feature
  - Any number of apps, developers & end-users
  - Specialized Oracle Support Team
  - 11gR2, 12c, 18c
  - All DB editions: EE, SE2, XE
- Included with Oracle Cloud Services
  - Exadata Express Service
  - Database as a Service
  - No cost evaluation <http://apex.oracle.com>
- Easy to install
  - Included by default with all editions of Oracle database
  - Download latest release from <https://apex.oracle.com/otn>



# Oracle APEX

## 3 Tier Architecture



LIVE  CODING

# MILANO LEGENDS



**PES**  
PRO EVOLUTION SOCCER



OFFICIAL  
PARTNER



INTER

**PES2018**  
PRO EVOLUTION SOCCER

GLOBAL FOOTBALL  
VIDEO GAME PARTNER

---

# What we will build

---

- ❖ Teams
  - ❖ Different teams with logos
- ❖ Players
  - ❖ Part of one or more teams
- ❖ Administration
  - ❖ View activity of app



# Oracle Database Cloud

[Get Started >](#)

---

# Agenda

---

- ❖ From idea to Oracle APEX app
- ❖ Create the Oracle Database Objects
- ❖ Build a starter APEX app with Blueprint
- ❖ Enhance the APEX app

# From idea to Oracle APEX app

# Dimitri Gielis Blog (Oracle Application Express - APEX)

I created this Blog to share my knowledge especially in Oracle Application Express (APEX) and my feelings ...

SATURDAY, AUGUST 05, 2017

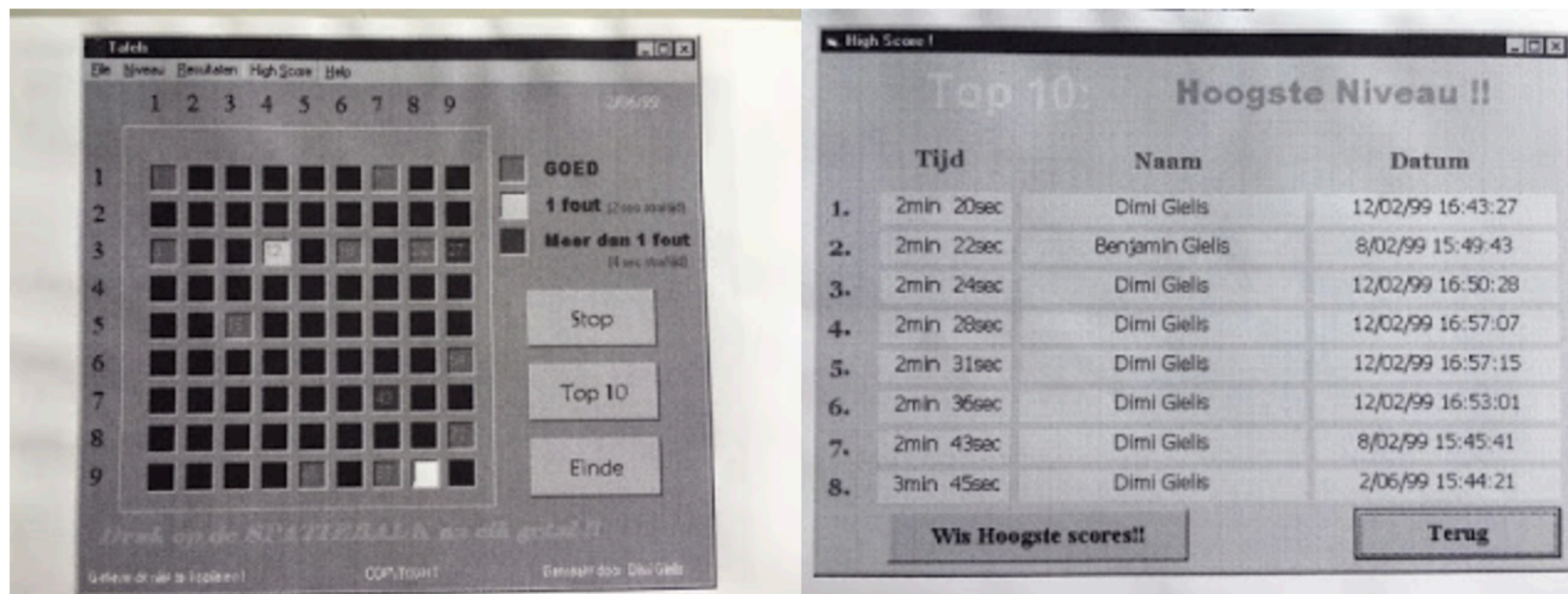
## From idea to app or how I do an Oracle APEX project anno 2017

For a long time I had in mind to write in great detail how I do an Oracle APEX project from A to Z. But so far I never took the time to actually do it, until today :)

So here's the idea; I love building projects that help people and I love to share what I know, so I will combine both. I will write exactly my thoughts and things I do as I'm moving along with this project, so you have full insight what's happening behind the scenes.

## Background

Way back, in the year 1999, I build an application in Visual Basic to help children study the multiplication tables. My father was a math teacher and taught people who wanted to become primary school teachers. While doing the visits of the primary schools, he saw the problem that children had difficulties to automate the multiplications from 1 till 10, so together we thought about how we could help them. That is how the Visual Basic application was born. I don't have a working example anymore of the program, but I found some paper prints from that time, which you see here:



We are now almost 20 years later and last year my son had difficulties memorizing the multiplication tables too. I tried sitting next to him and help him out, but when things don't go as smooth as you hope... You have

### My next public appearances:

- [Montreal Oracle Dev Day: 25-OCT-2017](#)
- [APAC Tour: New Zealand and Australia: 17/28-NOV-2017](#)



### About Me



 [Dimitri Gielis](#)

Passionate about Oracle and especially Oracle Application Express (APEX). Founder and CEO of [APEX R&D](#), a company that provides Development, Training and Consulting in APEX.

 [View my complete profile](#)



**ORACLE**  
ACE Director



### Printing in Oracle APEX?

Check [APEX Office Print](#).



## Multiplication Table - [mtable.online](http://mtable.online)

| x | 1 | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  |
|---|---|----|----|----|----|----|----|----|----|
| 1 | 1 |    |    |    |    |    |    |    | 9  |
| 2 |   |    |    | 8  | 10 |    |    |    |    |
| 3 |   |    |    | 12 |    |    | 21 | 24 |    |
| 4 |   |    |    |    | 20 |    | 28 |    | 36 |
| 5 | 5 |    |    |    |    | 30 |    | 40 | 45 |
| 6 |   | 12 |    |    |    |    |    |    |    |
| 7 | 7 |    |    |    |    |    |    |    |    |
| 8 |   |    |    | 32 | 40 |    |    |    |    |
| 9 |   |    | 27 |    | 45 |    |    | 72 | 81 |

The application helps children (typically between 7 and 11 years old) to automate multiplications between 1 and 10. It also helps their parents to get insight in timings and mistakes of their children's multiplications.

## Timeline

No project without deadline, so I've set my go-production date to August 20th, 2017. So I've about 2 weeks, typically one sprint in [our](#) projects.

## Following along and feedback

I will [tweet](#), [blog](#) and create some [videos](#) to show my progress. You can follow along and reach me on any of those channels. If you have any questions, tips or remarks during the development, don't hesitate to add a comment. I always welcome new ideas or insights and am happy to go in more detail if something is not clear.

## High level break-down of plan for the following days

- [Create user stories and supporting ERD](#)
- [List of the tools I use and why I use them](#)
- [Set up the development environment](#)
- [Create the Oracle database objects](#)
- [Set up a domain name](#)
- [Set up reverse proxy and https](#)
- [Create a landing page and communicate](#)
- [Build the Oracle APEX application: the framework](#)
- [Refine the APEX app: create custom authentication and authorization scheme](#)
- [Refine the APEX app: adding the game](#)
- [Refine the APEX app: improve the flow and navigation](#)
- [Refine the APEX app: add ability to print results to PDF](#)
- [Set up build process](#)
- [Check security](#)
- [Communicate first version of the app to registered people](#)
- [Check performance](#)
- [Refine the APEX app: add more reports and statistics](#)
- [Check and reply to feedback](#)
- [Set up automated testing](#)
- [A word on debugging](#)
- [Refine the APEX app: making final changes](#)
- [Set up backups](#)
- [Verify documentation and lessons learned](#)
- [Close the loop and Celebrate :\)](#)

### Subscribe to this Blog



[Subscribe in a reader](#)

Subscribe by mail:

Subscribe



### Blog Archive

- ▼ 2017 (20)
    - ▶ November (1)
    - ▶ October (4)
    - ▶ September (2)
    - ▼ August (8)
      - [Create a Custom Authentication and Authorization S...](#)
      - [Build the Oracle APEX application: the framework](#)
      - [Set up domain and launch page](#)
      - [Create the Oracle database objects](#)
      - [Set up an APEX development environment](#)
      - [List of the tools I use and why I use them](#)
      - [Create user stories and supporting ERD](#)
      - [From idea to app or how I do an Oracle APEX projec...](#)
  - ▶ March (1)
  - ▶ February (3)
  - ▶ January (1)
- ▶ 2016 (10)
  - ▶ 2015 (43)
  - ▶ 2014 (28)
  - ▶ 2013 (18)
  - ▶ 2012 (49)
  - ▶ 2011 (42)
  - ▶ 2010 (93)
  - ▶ 2009 (85)
  - ▶ 2008 (122)

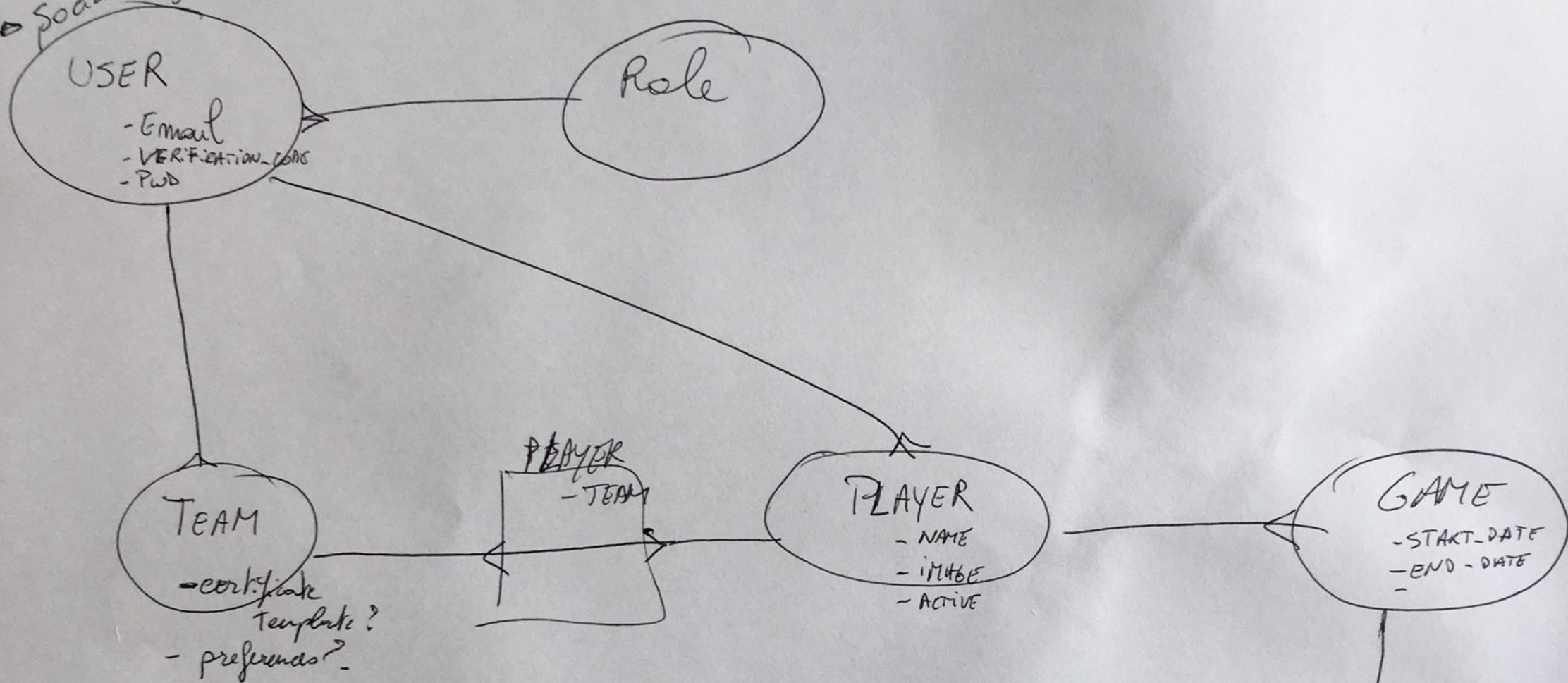
# Create the ERD & Database Objects

APEX 5.2

↳ social login: FB / Tw. / ...

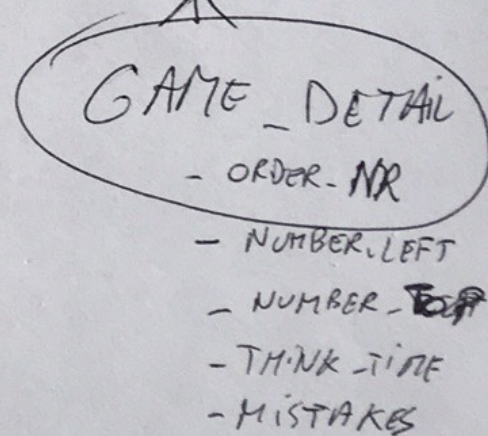
MULTIPLICATION TABLE

TABLES v1.0 (2)

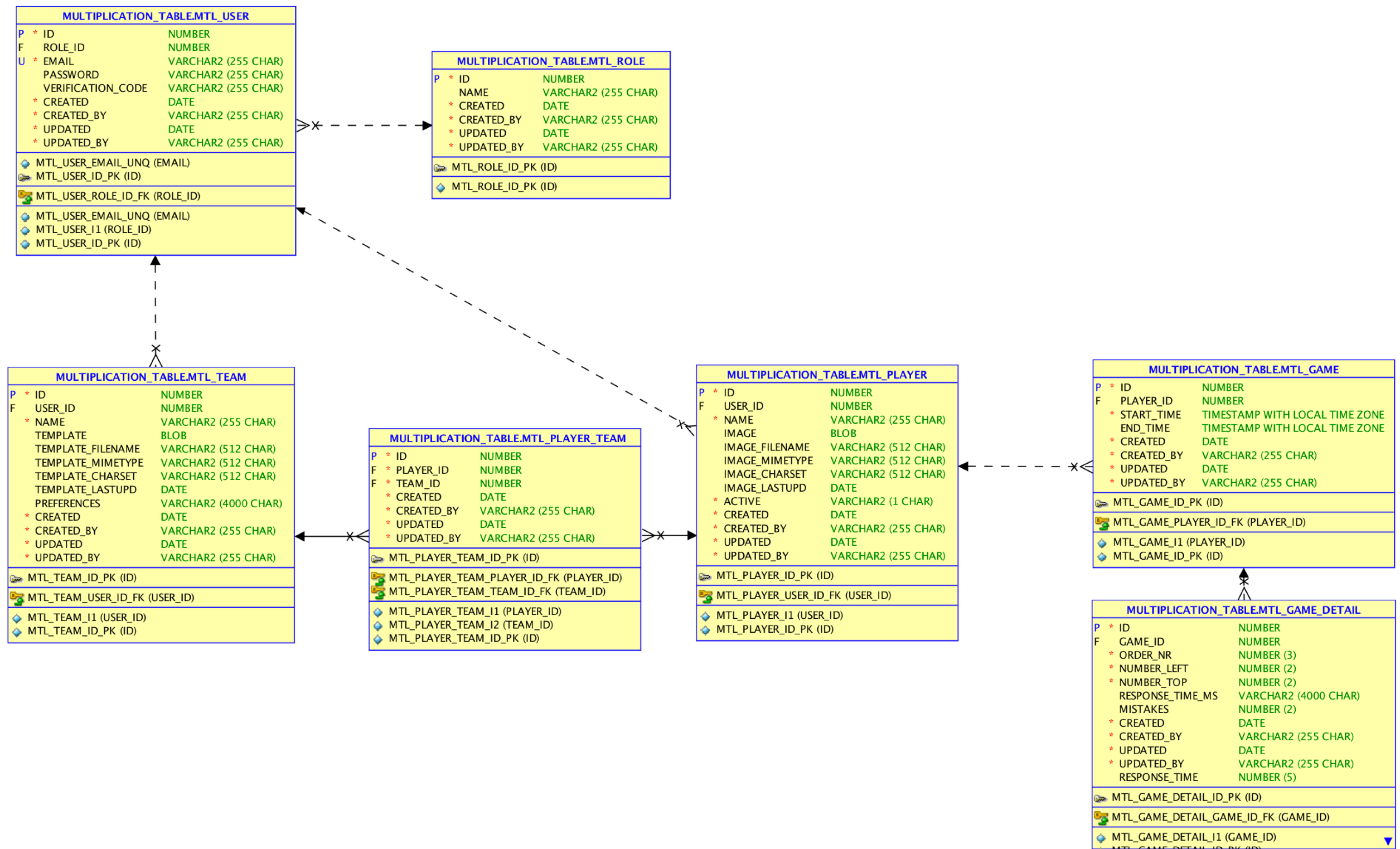


# IDEA

- PARENT Logs in (= user) (can apply to teacher too)
- Creates children (= PLAYER)
- Children plays game (= GAME)
- ~~The~~ Group children to get into entry (= TEAM) (can apply to class too)  
Child can belong to one or more Teams



# SQL Developer Data Modeler



# Quick SQL

Quick SQL

 Saved Models  Administration  Help  dgielis@apexrnd.be ▼



AA6R.2

 Save

 Generate SQL

+ Worksheet ▼  Clear

 Syntax and Examples

 Settings

```
#prefix: mtl, auditcols: true, apex: true
```

```
role
  name

user
  email          /nn /lower /unique
  password       vc(255)
  verification_code vc(255)
```

```
player
  name  /nn
  image file
  active vc(1) /cc Y, N /default Y
```

```
game
  start_time tswltz /nn
  end_time   tswltz
```

```
game_detail
  order_nr      num(3) /nn
  number_left   num(2) /nn
  number_top     num(2) /nn
  response_time_ms
  mistakes      num(2)
```

```
team
  name      /nn
  template  file
  preferences
```

```
player team
  player id /nn
  team id  /nn
```

```
view player_team_vw player team player_team
```

```
1  -- drop objects
2  drop table MTL_ROLE cascade constraints;
3  drop table MTL_USER cascade constraints;
4  drop table MTL_PLAYER cascade constraints;
5  drop table MTL_GAME cascade constraints;
6  drop table MTL_GAME_DETAIL cascade constraints;
7  drop table MTL_TEAM cascade constraints;
8  drop table MTL_PLAYER_TEAM cascade constraints;
9  drop view MTL_PLAYER_TEAM_VW;
10
11 -- create tables
12 create table MTL_ROLE (
13     ID                                NUMBER GENERATED BY DEFAULT ON NULL AS IDENTITY
14     constraint MTL_ROLE_ID_PK primary key,
15     NAME                             VARCHAR2(255),
16     CREATED                           DATE not null,
17     CREATED_BY                         VARCHAR2(255) not null,
18     UPDATED                           DATE not null,
19     UPDATED_BY                         VARCHAR2(255) not null
20 )
21 ;
22
23 create table MTL_USER (
24     ID                                NUMBER GENERATED BY DEFAULT ON NULL AS IDENTITY
25     constraint MTL_USER_ID_PK primary key,
26     ROLE_ID                           NUMBER
27     constraint MTL_USER_ROLE_ID_FK
28     references MTL_ROLE on delete cascade,
29     EMAIL                             VARCHAR2(255)
30     constraint MTL_USER_EMAIL_UNQ unique not null,
31     PASSWORD                           VARCHAR2(255),
32     VERIFICATION_CODE                 VARCHAR2(255),
33     CREATED                           DATE not null,
34     CREATED_BY                         VARCHAR2(255) not null,
35     UPDATED                           DATE not null,
36     UPDATED_BY                         VARCHAR2(255) not null
37 )
38 ;
39
40 create table MTL_PLAYER (
```

Demo

# Reverse Engineer ERD to QuickSQL

# Dimitri Gielis Blog (Oracle Application Express - APEX)

I created this Blog to share my knowledge especially in Oracle Application Express (APEX) and my feelings ...

FRIDAY, DECEMBER 08, 2017

## Reverse engineer existing Oracle tables to Quick SQL

If you didn't hear about [Oracle Quick SQL](#), it's time to read about it as it's something you have without knowing (it's a packaged app in Oracle APEX) and I believe you should start using :)

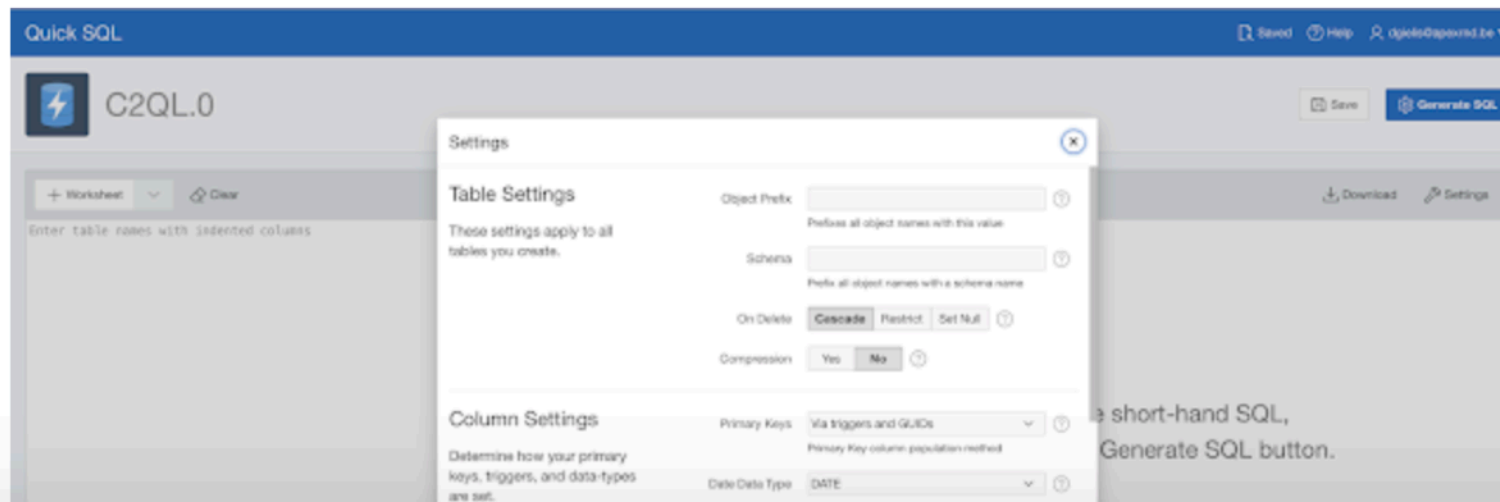
Quick SQL enables you to rapidly design and prototype data models using a markdown-like shorthand syntax that expands to standards-based Oracle SQL. You can easily create master detail relationships, check constraints, and even generate sample data.

In my blog post [Create the Oracle database objects](#) I go over the history how I created database objects and why I think Quick SQL is great and why I use it.

I guess most people typically use Quick SQL at the start of a new project, as it's the quickest way to create your data model and Oracle database objects. That is my primary use case too, but I started to use Quick SQL even on projects where database objects already exist.

In the project I'm currently involved in, the datamodel was generated by another tool, but as we iterate through the project, tables change, columns get renamed and added, row version were requested, triggers need to be made Oracle APEX aware...

Now we could do those changes manually, but I thought it made much more sense to create the data model in Quick SQL and use the features that come with Quick SQL. By clicking a checkbox we can include a Row version, Quick SQL generates the triggers automatically in an APEX aware form, we can generate as much sample data as we want by adding /insert and we can use all the other features that come with Quick SQL. For example when you want to include a history table in the future it's just another checkbox to click.



### My next public appearances:

- [APEX Meetup Paris: 14-MAR-2018](#)
- [APEX World: 22/23-MAR-2018](#)
- [APEX Connect: 24/26-APR-2018](#)
- [ODTUG KScope: 10/14-JUN-2018](#)



### About Me



[Dimitri Gielis](#)

Passionate about Oracle and especially Oracle Application Express (APEX). Founder of [AOP](#) and [APEX R&D](#), a company that provides Development, Training and Consulting in APEX.

[View my complete profile](#)



**ORACLE**  
ACE Director



### Printing in Oracle APEX?

Check [APEX Office Print](#).



Make your template in Word, Excel or Powerpoint and print into Word, Excel, Powerpoint, PDF or HTML5. One APEX

# Build a starter APEX app with Blueprint

# Create an Application

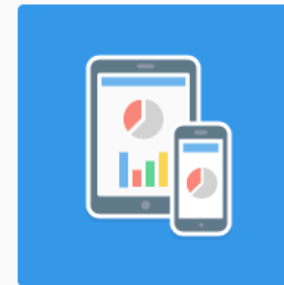
What type of application would you like to create?



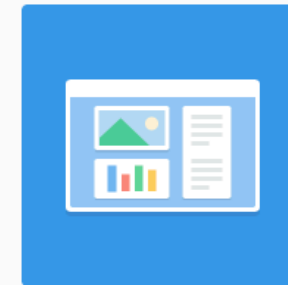
Blueprint



Desktop



Mobile



Websheet

[From a spreadsheet](#) · [Copy an existing application](#)

[▶ About](#)

Cancel

Help

Next >

Demo

Enhance the APEX app

---

# Blueprint as basis

---

- ❖ Use Blueprint as starting point
- ❖ then enhance...

---

# Different ways to enhance

---

- ❖ Using different components (Cards, Lists, ...)
- ❖ Use of APEX Plug-ins
- ❖ Using APEX APIs
- ❖ Changing Universal Theme (Theme Roller, Template Options, ...)
- ❖ Custom CSS
- ❖ Including JavaScript

# Printing & Exporting



Examples: See AOP in action

|                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div><div>Overview</div><div>Start</div><div>Tour</div><div>Examples</div><div>Doc</div><div>More</div><div>Support</div></div> | <div>Reports</div> <div><div><div>Custom Report (SQL)</div></div><div><div>Classic Report</div></div><div><div>Classic with Totals</div></div><div><div>Tabular Form</div></div><div><div>Excel sheet generation</div></div><div><div>Interactive Report</div></div><div><div>Combo: Classic and IRs</div></div><div><div>Interactive Grid</div></div><div><div>Multiple reports (IR, IG, Classic, Custom, Charts) in one PDF</div></div><div><div>Dashboard (charts with reports)</div></div><div><div>More Examples</div></div></div> | <div>Features</div> <div><div><div>AOP Starter Template</div></div><div><div>Native Office Charts</div></div><div><div>JET Charts</div></div><div><div>Other Charts (HighCharts, ...)</div></div><div><div>Images</div></div><div><div>QR and Barcodes</div></div><div><div>HTML (Rich Text) Editor</div></div><div><div>Markdown Editor</div></div><div><div>Create template in HTML and output in PDF/Word</div></div><div><div>Inline PDF</div></div><div><div>Print PDF directly to local Printer</div></div></div> | <div>Backend</div> <div><div><div>Dynamic Print</div></div><div><div>Mailings: Mail Merge - Labels</div></div><div><div>Send Print by Email</div></div><div><div>Send HTML Email</div></div><div><div>PL/SQL API</div></div><div><div>Scheduled Print</div></div><div><div>Print in Batch</div></div><div><div>Multiple Prints to Zip</div></div><div><div>Tag Count</div></div><div><div>Output to Directory on Server</div></div><div><div>Print PDF directly to IP Printer</div></div></div> | <div>Testing</div> <div><div><div>Process Plug-in</div></div><div><div>Dynamic Action Plug-in</div></div><div><div>Table with Templates</div></div><div><div>Office Types<br/>Word, Excel, Powerpoint</div></div><div><div>HTML, Markdown and Text</div></div><div><div>Plug-in Template and Data Types</div></div><div><div>Custom REST call</div></div><div><div>Error Testing</div></div><div><div>AOP Usage</div></div><div><div>Debugging</div></div><div><div>Automated Tests</div></div></div> |
|---------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

---

# Recap

---

- ❖ From idea to Oracle APEX app
- ❖ Create the Oracle Database Objects
- ❖ Build a starter APEX app with Blueprint
- ❖ Enhance the APEX app

---

# Q&A

APEX RD  
research & development



[www.apexRnD.be](http://www.apexRnD.be)



[dgielis.blogspot.com](http://dgielis.blogspot.com)



@dgielis



[dgielis@apexRnD.be](mailto:dgielis@apexRnD.be)

---

---

# Consulting, Development, Training

---

- ❖ Looking for consulting, training and development in Oracle Application Express (APEX)?
- ❖ Contact : [www.apexRnD.be](http://www.apexRnD.be)
- ❖ Mail : [info@apexRnD.be](mailto:info@apexRnD.be)