



THE
RIGHT THING
SOLUTIONS

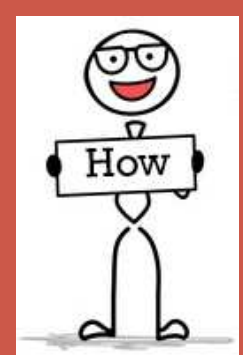
D.O.M.E.

Deployment Organization Made Easy

Agenda




- Development and deployment process and it's flow
- Importance of patches preparation as a part of deployment process
- Patches from Oracle DB developer and APEX perspective
- Different methods of Oracle DB patch preparation
- Linear and parallel approach
- Releases
- Challenges and problems
- D.O.M.E.



Zoran Tica...



- Slovenia
- Mid 80-ties - 
- Mid 90-ties - Business Analysis, Database Modeling, Software Development
- From 2000+ Oracle Technologies
- Principal Database Design & APEX Consultant at <https://right-thing.solutions>
- OCP Advanced PL/SQL, Forms and Java SE developer
- <https://www.linkedin.com/in/zoran-tica>

@zoran_tica



zoran.tica@gmail.com



Introduction



Since the
very beginning
of the software
development...



Introduction



...there was a need to move a developed program logic to other computer(s) or environment(s).

Different scenarios:

- Commercial products
- Open-source code
- Customer based software



Introduction

Development and Deployment Flow



FLOW

Introduction

Development and Deployment Flow



01. Triggering Phase



A Business Analysis



An idea



A Cry for Help

Introduction

Development and Deployment Flow



02. A Development Phase (including internal testing)



From start...



...in progress...



...to finish!

Introduction

Development and Deployment Flow



03. A Deployment Phase



Pack everything up in a patch...



...and deploy.

Introduction



Development and Deployment Flow

03. A Deployment Phase

Packing everything up:

- A very important but sensitive step in a flow
- A cherry on top of developer's efforts
- Can be time-consuming and frustrating if not done properly

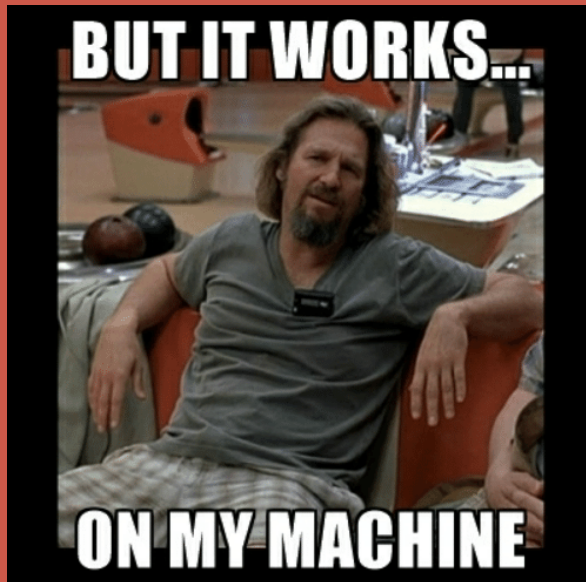


Introduction

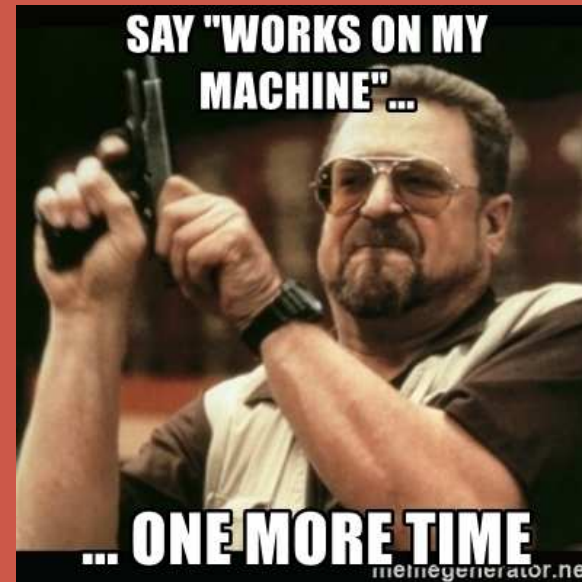
Development and Deployment Flow



03. A Deployment Phase



Developer



Manager / Customer / User

From Oracle DB Developer Perspective



- Patch – an appropriate set of DDL and DML scripts sorted in a correct order related to a certain functionality / upgrade
- Scripts for objects like PL/SQL packages, triggers, tables, sequences, insert statements, PL/SQL anonymous blocks...

Examples:

- `CREATE OR REPLACE PACKAGE PKG_UTILS AS ...`
- `ALTER TABLE file_download ADD ...`
- `BEGIN archive_transactions(true); END;`



From Oracle APEX Developer Perspective



- Oracle APEX is a part of the database
- All components (pages, regions, items) are stored as data in APEX-owned schemas and database tables
- Appropriate DML scripts
- APEX provides an installation scripts generation mechanism (UI and APEX_EXPORT API)
- Result is a group of PL/SQL blocks
- Single application scripts or single component scripts export



Different Methods



Different methods for patches / installation scripts preparation:

- Manually
- Tools like “Schema compare” in SQL Developer or TOAD
- Products like Git, Flyway, Liquibase...
- Internal custom-built software like D.O.M.E, RTP, Amarta install



Different Approaches



Linear approach

U1 U2 U3 U4 U5



Checkpoint - Single patch P1

U6 U7 U8



Checkpoint - Single patch P2



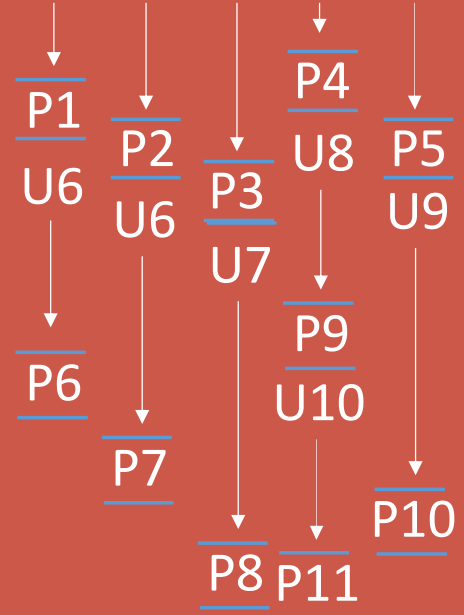
Single development
database

U(n) -> Upgrades

P(n) -> Patches with DB and APEX scripts

Parallel approach

U1 U2 U3 U4 U5

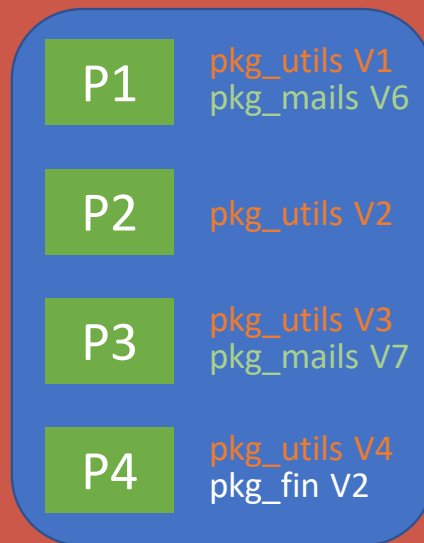


A Patch-Release Relationship

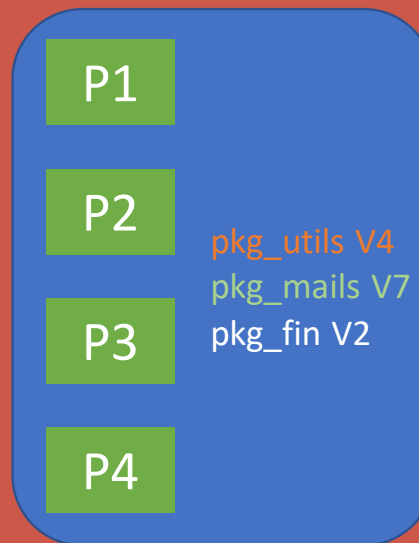


- Release -> Patches grouped or combined as a logical unit
- Organized as Linear or Combined

Linear organization



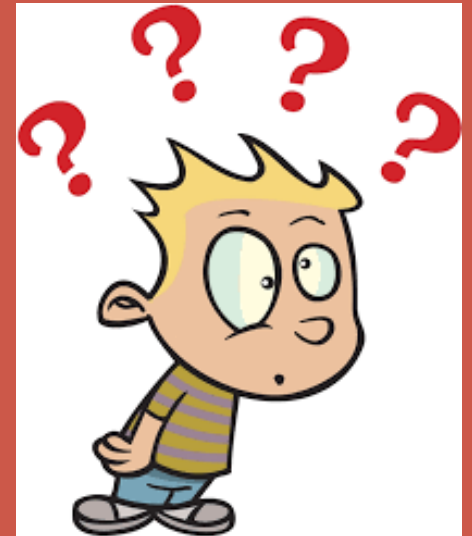
Combined organization



Challenges and Problems 1/2



- “Guys, is everything packed up in installation scripts? Did we forget something? Last time we had 25 invalid objects after the release... hardly got everything right...”
- “Is it safe to install scripts on target database? I mean... will some packages be overwritten with older versions?”
- “Am I allowed to modify the package and include it in my patch after I finish? Is someone else already working on it?”
- “Was the deploy successful? Can someone check the logs?”



Challenges and Problems 2/2



- “Are we going to put a functionality which wasn’t tested and confirmed yet? Skipping object versions?”

P1

pkg_utils V1
page128 V1

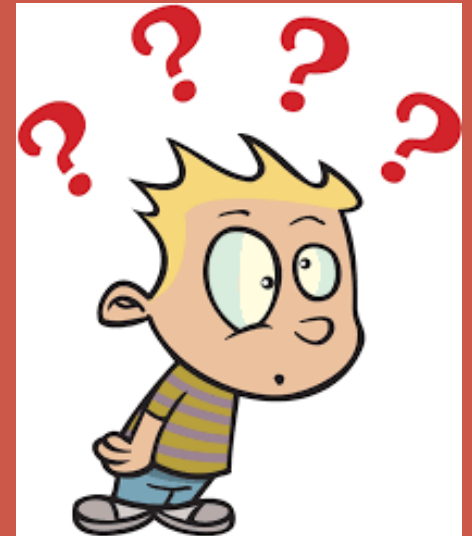
P2

pkg_utils V2
page128 V2

P3

pkg_utils V3
page128 V3

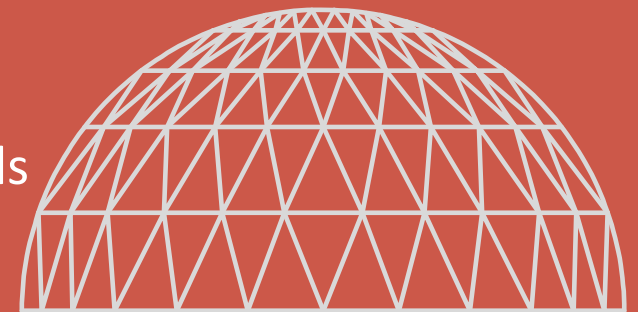
- “Are there any dependencies between patches? Are we safe to go?”
- “Who the Hell changed this package and why is it included in installation scripts???”



D.O.M.E.



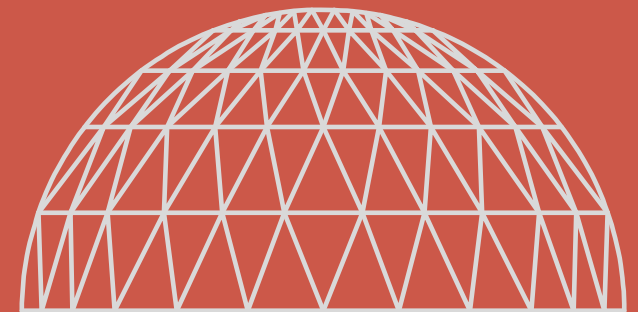
- “Deployment Organization Made Easy”
- A custom-built software for speeding up, control and organize deployment process and patches / releases preparation
- Resides within database, installed in separated schema and can be easily integrated with development schemas with minimal intrusion
- Requires no additional infrastructure changes
- Supports both database and APEX object scripts
- Parallel or linear approach to patches
- Can be 2-ways integrated with different deployment tools
- UI developed in APEX



D.O.M.E. – Functionality 1/2



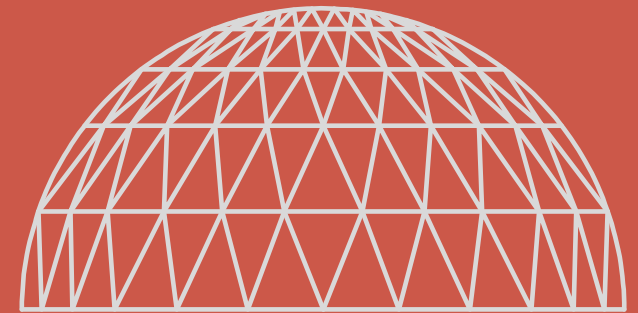
- Automatic patch scripts generation
- Records DDL operations in database schemas and stores them in appropriate patches
- Multiple target environments definitions
- Tracks “who did what”
- Works on both APEX component level and APEX application level
- Database and APEX objects versioning
- Locking database objects and APEX pages
- Handling concurrency during development
- Linking patches (objects share)
- Tracks deployment to different environments



D.O.M.E. – Functionality 2/2




- Patch / release dependencies check
- Script templates ([OPAL tools](#))
- Quick overview of patches with search and filtering
- Groups patches into releases
- Prepares a release documentation
- Hierarchical organization of patches (projects – task groups – tasks – patches)
- Utilities such as:
 - source wrapping
 - export source (for GIT or other version control)
 - prepare installation scripts for binary files




D.O.M.E. – Quick glance





Deployment Organization
Made Easy

Remember username 

[Sign In](#)

D.O.M.E. – Quick glance



The screenshot displays the D.O.M.E. web application interface. The top navigation bar includes the title "Deployment Organization Made Easy" and the user profile "zoran tica". A left sidebar lists navigation options: Home, Projects, Task groups, Tasks, Patches, Releases, Tools, and Administration. The main content area is titled "Active patches" and features a search bar, a "Go" button, a dropdown menu for "1. Primary Report", and an "Actions" dropdown. There are also buttons for "New patch" and "New task". A filter is applied: "My Patch = 'Yes'". Below this is a table with the following data:

Start or stop working	Task Name	Patch Number	Download Source	Project And Group Name	Owner
	MOY-5373 - Download translate NL-EN-FR-DE-ES	1		MLD - Multi Lingual Database (Auctim)	Zoran Tica
	test 4 - test 4	0		T.1 - Overall testing (Auctim)	Zoran Tica

Page 1-2

D.O.M.E. – Quick glance



The screenshot displays the D.O.M.E. web application interface. The top navigation bar includes the title "Deployment Organization Made Easy" and a user profile "zoran tica". A left sidebar lists navigation options: Home, Projects (highlighted), Task groups, Tasks, Patches, Releases, Tools, and Administration. The main content area is titled "Projects" and features a search bar, a "Go" button, and an "Actions" dropdown. Below this is a table with one project entry:

	Code	Name	Project Users	Database schemas	Applications	Settings	Environments	Wrap Source Settings	Document Parts	Exclude From Recording
	MOY	Auctim								

The table also includes a "1-1" indicator at the bottom right.

D.O.M.E. – Quick glance



Deployment Organization Made Easy ? zoran tica

Home
Projects
Task groups
Tasks
Patches
Releases
Tools
Administration

Patches Ready for prod. Add to Release Check dependencies Create

Go 2. Active patches (not installed on production) Actions

Installed on production = 'No' Task Group

Task Group: ACDM - Academy environment (Auctim)

<input type="checkbox"/>	Task Name ↑	Patch Number	Release Code	Confirmed	Confirmed On	Ready for Production	Download	Installed On	Installed on production	Currently Works On Patch
<input type="checkbox"/>	MOY-5417 - Blocking ACA - blocking countries -> 404 page	0	-	✓	03.10.2022 13:45:39	-	📄	TEST: 03.10.2022 13:49 ACDM: 03.10.2022 13:52	No	-

Task Group: FINIMP - Finance - improvements (Auctim)

<input type="checkbox"/>	Task Name	Patch Number	Release Code	Confirmed	Confirmed On	Ready for Production	Download	Installed On	Installed on production	Currently Works On Patch
<input type="checkbox"/>	MOY-5413 - INVOICES do not get to EOL	0	-	✓	04.10.2022 07:16:05	-	📄	TEST: 04.10.2022 07:17	No	-

Task Group: MLD - Multi Lingual Database (Auctim)

<input type="checkbox"/>	Task Name	Patch Number	Release Code	Confirmed	Confirmed On	Ready for Production	Download	Installed On	Installed on production	Currently Works On Patch
<input type="checkbox"/>	MOY-5373 - Download translate NL-EN-FR-DE-ES	1	-	-	-	-	📄		No	-

D.O.M.E. – Quick glance



Deployment Organization Made Easy zoran tica

Home \ Patches \ Patch Cancel Delete Download Check dependencies Unlock patch Apply Changes

* Task **MOY-5413 INVOICES do not get to EOL; Finance - improvements; Auctim** * Patch Number: 0

User created **Aleš Kravos** Created On **04.10.2022 07:12:42** Owner **Aleš Kravos** User Confirmed **Aleš Kravos** Confirmed On **04.10.2022 07:16:05**

User Comments

Show All Scripts Database Objects Applications and components Linked patches Release info Installations

Scripts Resequence Create script

Go Actions

	Order By	Content Preview	Script Type	Schema Name	User created	Created on	User Comments
	1	<pre>BEGIN SYS.DBMS_SCHEDULER.DISABLE (name => 'MBA.EXACT_ONLINE_EXPORT_1'); END;</pre>	Pre-install	MBA	Aleš Kravos	04.10.2022	-
	2	<pre>BEGIN SYS.DBMS_SCHEDULER.ENABLE (name => 'MBA.EXACT_ONLINE_EXPORT_1'); END;</pre>	Post-install	MBA	Aleš Kravos	04.10.2022	-

1-2

D.O.M.E. – Quick glance



Deployment Organization Made Easy zoran tica

Home \ Patches \ Patch

Cancel Delete Download Check dependencies Unlock patch **Apply Changes**

* Task **MOY-5413 INVOICES do not get to EOL; Finance - improvements; Auctim** * Patch Number **0**

User created **Aleš Kravos** Created On **04.10.2022 07:12:42** Owner **Aleš Kravos** User Confirmed **Aleš Kravos** Confirmed On **04.10.2022 07:16:05**

User Comments

Show All Scripts **Database Objects** Applications and components Linked patches Release info Installations

Database Objects

Search: All Text Columns Go Actions Edit Save Reset

As patch script

	Object Schema [↑] 1	Object Type [↑] 2	Database Object [↑] 3	Object Version	User Comment	Added On	User Added	Script	History	Lock	Refresh
▼ As patch script: No											
<input checked="" type="checkbox"/>	MBA	PACKAGE	MBA_PKG_ASR	6		04.10.2022	Aleš Kravos				
<input type="checkbox"/>	MBA	PACKAGE BODY	MBA_PKG_ASR	6		04.10.2022	Aleš Kravos				

1 rows selected Total 2

D.O.M.E. – Quick glance



Deployment Organization Made Easy

Home \ Patches \ Patch

Cancel Delete Download Start Confirm patch Apply Changes

Task: MOY-5373 Download translate NL-EN-FR-DE-ES; Multi Lingual Database; Auctim Patch Number: 1

User created: Zoran Tica Created On: 29.09.2022 08:00:10 Owner: Zoran Tica User Confirmed: Confirmed On

User Comments: Import - will change task later when ticket is created in Jira
Include import wizard

Show All Scripts Database Objects Applications and components Linked patches Release info Installations

Application components

Refresh register Select components

Search: All Text Columns Go Actions Edit Save Add Row Reset

<input type="checkbox"/>	Object Type	Application component	Object Version	Added On	User Comments	User Added	History	Lock
<input checked="" type="checkbox"/>	PAGE	400:9035 - 9035, Templates		29.09.2022	import button	Zoran Tica		
<input type="checkbox"/>	PAGE	400:9030 - 9030, Mail Templates		29.09.2022	import button	Zoran Tica		

1 rows selected Total 2

Applications

Search: All Text Columns Go Actions Edit Save Add Row Reset

<input checked="" type="checkbox"/>	Application	Object Version	Added On	User Added	User Comments	History
<input checked="" type="checkbox"/>						

1 rows selected Total 1

D.O.M.E. – Quick glance



Deployment Organization Made Easy zoran tica

Home \ Patches \ Patch Cancel Delete Download Check dependencies Unlock patch Apply Changes

* Task **MOY-5417 Blocking ACA - blocking countries -> 404 page; Academy environment; Auctim** Patch Number **0**

User created **Jure Zakotnik** Created On **03.10.2022 13:39:36** Owner **Jure Zakotnik** User Confirmed **Jure Zakotnik** Confirmed On **03.10.2022 13:45:39**

User Comments

Show All Scripts Database Objects Applications and components Linked patches Release info Installations

Installations

Search: All Text Columns Go Actions Edit Save Add Row Reset

<input type="checkbox"/>	Environment	Start Date	End Date ↑	User Comment	External Code	External Reference
<input checked="" type="checkbox"/>	TEST - Testing environment	03.10.2022 13:49:34	03.10.2022 13:49:40		OPAL	658
<input type="checkbox"/>	ACDM - Academy environment	03.10.2022 13:52:28	03.10.2022 13:52:30		OPAL	659

1 rows selected Total 2

D.O.M.E. – Quick glance



Deployment Organization Made Easy ? zoran tica

Home Projects Task groups Tasks Patches **Releases** Tools Administration

Releases + Create

Q Go Actions

	Code	Description	Project	Patches in release	User created	Download	Objects in release	Check dependencies
	22.14.1	Release 22.14.1 FASTLINE	MOY - Auctim	MOY-5348_0 - FW: VIES controle DRINGEND TE BEKIJKEN - PROD FIX MOY-5363_0 - Alloceren betalingen ONL 29036 BUYER 1 - Van Dongen Bereging BV MOY-5368_0 - CMNE BV - EXACT ONLINE ERROR	Uroš Adlešić			
	22.15	Release 22.15	MOY - Auctim	MOY-5265_0 - App - manage cache (after release22.14) + Logging version and hide user sites MOY-5321_0 - template - translation issue - legal MOY-5328_0 - Jan Ernst - open dossier - urgent request MOY-5334_0 - BTW splitting up - using landcode MOY-5334_1 - BTW splitting up - using landcode MOY-5337_0 - Monitoring mail Queue - REGISTRATION - validation MOY-5343_0 - Application errors - LOT page (redirect and cleaned monitoring query) MOY-5345_0 - Blocker: Delete dossier and lots from auction. BEN MOY-5350_0 - Scheduler jobs (google api, sc_gen_doc) MOY-5353_0 - VIES - statistic MOY-5370_0 - EXACT ONLINE - Change way of proces job MOY-5371_0 - AME, WEBSOCKETS, AOP MOY-5378_0 - CN BTW aanmaken BUG Urgent - Dirk MOY-5389_0 - MBA - Performance improvements and split up reports MOY-5391_0 - Security - MBA (mixed roles - abuse it accounts)	Uroš Adlešić			
				MOY-4814_0 - Analytic Report - Dossiers => Analytics Finance - download button				

D.O.M.E. – Quick glance



The screenshot displays the 'Deployment Organization Made Easy' (D.O.M.E.) web application. The left sidebar contains a navigation menu with the following items: Home, Projects, Task groups, Tasks, Patches, Releases, Tools (highlighted in green), Administration, Export source, and Generate LOB script (highlighted in green). The main content area is titled 'Generate LOB script' and includes a 'Create Script' button. Below the title, there is a section for 'Upload document or read from table' with two buttons: 'Upload document' (highlighted in green) and 'Read from table'. A 'File' upload area is shown with a dashed border, containing the text 'Drop file here' and a plus sign icon. Below this, a table selection dropdown is set to 'AOP_TEMPLATES'. The 'Column' dropdown is set to 'DOCUMENT', and the 'Column type' dropdown is set to 'BLOB' (highlighted in green). The 'Where' clause is set to 'code = 'SUMMARY''.

D.O.M.E. – Quick glance



```
1 DECLARE
2
3     lcClob clob;
4     lbBlob blob;
5
6     function decode_base64(p_clob_in in clob) return blob is
7         v_blob blob;
8         v_result blob;
9         v_offset integer;
10        v_buffer_size binary_integer := 48;
11        v_buffer_varchar varchar2(48);
12        v_buffer_raw raw(48);
13    begin
14        if p_clob_in is null then
15            return null;
16        end if;
17        dbms_lob.createtemporary(v_blob, true);
18        v_offset := 1;
19        for i in 1 .. ceil(dbms_lob.getlength(p_clob_in) / v_buffer_size) loop
20            dbms_lob.read(p_clob_in, v_buffer_size, v_offset, v_buffer_varchar);
21            v_buffer_raw := utl_raw.cast_to_raw(v_buffer_varchar);
22            v_buffer_raw := utl_encode.base64_decode(v_buffer_raw);
23            dbms_lob.writeappend(v_blob, utl_raw.length(v_buffer_raw), v_buffer_raw);
24            v_offset := v_offset + v_buffer_size;
25        end loop;
26        v_result := v_blob;
27        dbms_lob.freetemporary(v_blob);
28        return v_result;
29    end decode_base64;
30
31 BEGIN
32     lcClob := lcClob || 'UESDBBQABgAIAAAAIQDfPnJswgEAAcAFAAATAAgCW0NvbnRlbnRfVHlwZXNdLnhtb';
33     lcClob := lcClob || 'bCCiBAIoAACAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA';
34     lcClob := lcClob || 'AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA';
35     lcClob := lcClob || 'AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA';
36     lcClob := lcClob || 'AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA';
37     lcClob := lcClob || 'AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA';
38     lcClob := lcClob || 'AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA';
39     lcClob := lcClob || 'AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA';
40     lcClob := lcClob || 'AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA';
41     lcClob := lcClob || 'AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA';
```

```
309     lcClob := lcClob || 'AH4DAAUAAAAAAAAAAAAAAAAAKaOAB3b3JkL3d1YlNlGHRpbmdZLnhtbFBLAQi';
310     lcClob := lcClob || 'ABQABgAIAAAAIQDCQVHwBAIAAHQGAASAAAAAAAAAAAAAAAAACaQAB3b3JkL2Zv';
311     lcClob := lcClob || 'bnRUyWJsZS54bWxQSwECLQAUAAYACAAACEAEVIzwnCBAADtAgAAEQAAAAAAAA';
312     lcClob := lcClob || 'AAAAAABULAAAZG9jUHJvcHMvY29yZS54bWxQSwECLQAUAAYACAAACEAODT6zt8B';
313     lcClob := lcClob || 'AADhAwAAEAAAAAAAAAAAAAAAAACLWAAZG9jUHJvcHMvYXBwLnhtbFBLBQYAAAAA';
314     lcClob := lcClob || 'CwALAMECAAAAMgAAAAA=';
315
316     lbBlob := decode_base64(lcClob);
317
318     UPDATE AOP_TEMPLATES SET DOCUMENT = lbBlob WHERE code = 'SUMMARY';
319
320     COMMIT;
321
322 -END;
323 /
```

D.O.M.E. – Quick glance



Deployment Organization Made Easy

Administration \

Patch templates

Q Go Actions Create

	Name	Procedure Name	Template Files
	OPAL tool	pkg_patch_templates.p_opal_template_files	

1 - 1

- Home
- Projects
- Task groups
- Tasks
- Patches
- Releases
- Tools
- Administration**
 - Users
 - Object types
 - Patch Script types
 - Release patch types
 - Database
 - Apps
 - Locked objects
 - Patch templates**
 - Settings

Conclusion



Conclusion



- Development and deployment process and flow
- Patches and releases from Oracle DB developer and APEX perspective
- Different methods of Oracle patch preparation
- Approach to patches and releases
- Challenges and problems in development and deployment phases
- D.O.M.E. - introduction



Conclusion



By introducing D.O.M.E. - what we achieved:

- Speed up patch preparation process and reduced manual work
- Speed up release preparation process with required documentation generation
- Significantly less errors during patch deployment to target databases
- Significantly less conflicts, code loss and similar problems during development
- Improved control over what is deployed where
- Additional objects and components source code versioning
- ...



Conclusion

(asking myself...)



1. Has it taken a lot of time to develop such a tool?
Yes... but this is an investment in the future.
2. Does it require an extra amount of coffee to develop it?
OH YES... no pain no gain!
3. Was it hard to persuade other team members to use it?
CAN NOT IMAGINE... stubbornness level 100...
but You need to be at least level 101.
4. Was it worth the effort to implement such a tool?
DEFINITELY!!!



A Gift for Community



The screenshot shows the GitHub repository page for 'zorantica/dome'. The repository is public and has 1 branch and 1 tag. The commit history shows a recent update to the README.md file. The README content is as follows:

D.O.M.E. (Deployment Organization Made Easy)

DOME for Oracle database and Oracle APEX is a tool which helps developer teams to organize and speed-up deployment scripts production processes.

Main features:

- Swift and automatic patch scripts generation
- Records DDL operations in database schemas and stores them in appropriate patches
- Multiple target environments definitions
- Tracks "who did what"
- Works on both APEX component level and APEX application level
- Database and APEX objects versioning

The right sidebar shows the repository's metadata: MIT license, 0 stars, 1 watching, 0 forks, and 1 release (Initial release, Latest, 37 seconds ago). The languages section shows PLSQL at 100.0%.

<https://github.com/zorantica/dome>

Questions?





References



- <https://flywaydb.org/>
- <https://github.com/daust/opal-tools>