Hello DBA,

Myself Rahul Kurkute. Recently, our team embarked on a patching activity for more than 10+ Oracle databases (19.20 to 19.21). Patching Oracle databases is a necessary but often time-consuming process. Our initial patching activities were taking more than **4 hours (Exclude prechecks time, taking backup of ORACLE HOME, etc. time)** to complete for each Node, causing disruptions and impacting the overall productivity of our team.

Recognizing the need for improvement, I decided to improve the performance of the patching activity and found Cleaning up older patch artifacts and Inactive patches will improve **OPATCH** performance.

Let's start to see how we can improve performance of the OPATCH process.

opatch maintains an ever-growing patch history in **$ORACLE_HOME/inventory/ContentsXML/oui-patch.xml.**

This file gets queried and accessed multiple times and can delay patching process massively slow. Solution for this is **"opatch util deleteinactivepatches"**

From **OPatch 12.2.0.1.37+** Oracle Introduced a new feature to remove inactive Patches from the ORACLE_HOME.

So we have new option of Opatch: **"opatch util deleteinactivepatches"** mentioned in **MOS** : **"OPatch 12.2.0.1.37+ Introduces a New Feature to Delete Inactive Patches in the ORACLE_HOME/.patch_storage Directory (Doc ID 2942102.1)"**

But before, I suggest to check INACTIVE patches present in your environment using below command.

$ORACLE_HOME/OPatch/opatch util listorderedinactivepatches

So, I checked with my environment.

```
[oracle@expr2dbadm04 19.21.0.0.231017GIRU]$ cd $ORACLE_HOME/OPatch
[oracle@expr2dbadm04 OPatch]$ ./opatch util listorderedinactivepatches
Oracle Interim Patch Installer version 12.2.0.1.37
Copyright (c) 2024, Oracle Corporation.  All rights reserved.
Oracle Home       : /u01/app/oracle/product/19.3.0.0/dbhome_1
Central Inventory : /u01/app/oraInventory
   from           : /u01/app/oracle/product/19.3.0.0/dbhome_1/oraInst.loc
OPatch version    : 12.2.0.1.37
OUI version       : 12.2.0.7.0
Log file location : /u01/app/oracle/product/19.3.0.0/dbhome_1/cfgtoollogs/opatch/opatch2024-01-16_14-30-09PM_1.log

Invoking utility "listorderedinactivepatches"
List Inactive patches option provided

The oracle home has the following inactive patch(es) and their respective overlay patches:
-Inactive RU/CPU 32218454, installed on: Sun Mar 21 03:06:35 IST 2021, with overlays: 35320424, 35037877, 34340632
-Inactive RU/CPU 32904851, installed on: Thu Sep 02 00:30:17 IST 2021, with overlays: 35320424, 35037877, 34340632
-Inactive RU/CPU 33192793, installed on: Tue Mar 08 03:00:29 IST 2022, with overlays: 35320424, 35037877, 34340632
-Inactive RU/CPU 33515361, installed on: Fri May 13 03:19:11 IST 2022, with overlays: 35320424, 35037877, 34340632
-Inactive RU/CPU 29517242, installed on: Thu Apr 18 12:51:17 IST 2019, with overlays: 35320424, 35037877, 34340632
-Inactive RU/CPU 33806152, installed on: Thu Aug 11 02:41:09 IST 2022, with overlays: 35320424, 35037877, 34340632
-Inactive RU/CPU 29585399, installed on: Thu Apr 18 12:51:33 IST 2019, with no overlays
-Inactive RU/CPU 31305087, installed on: Fri Feb 19 14:10:01 IST 2021, with overlays: 35320424, 35037877, 34340632
-Inactive RU/CPU 32222571, installed on: Sun Mar 21 03:13:45 IST 2021, with no overlays
-Inactive RU/CPU 32916816, installed on: Thu Sep 02 00:40:54 IST 2021, with no overlays
-Inactive RU/CPU 33208123, installed on: Tue Mar 08 03:09:29 IST 2022, with no overlays
-Inactive RU/CPU 33561310, installed on: Fri May 13 03:28:33 IST 2022, with overlays: 35320424, 34861493, 35037877, 34340632, 35160800,
35162446, 31222103, 34557500, 35156936, 35246710, 32727143
-Inactive RU/CPU 33815596, installed on: Thu Aug 11 02:48:51 IST 2022, with no overlays
-Inactive RU/CPU 34160635, installed on: Tue Nov 22 23:15:34 IST 2022, with no overlays
-Inactive RU/CPU 34768559, installed on: Tue May 23 23:17:43 IST 2023, with no overlays
```

```
-Inactive RU/CPU 35050331, installed on: Fri Aug 11 07:01:19 IST 2023, with no overlays
Total: 16 inactive RU/CPU patch(es) and 32 inactive overlay patch(es).

OPatch succeeded.
[oracle@expr2dbadm04 OPatch]$
```

Here **16 Inactive RU/CPU patches and 32 Inactive Overlay patches**. We have decided to clean-up all the inactive patches with retain two latest inactive patches in ORACLE_HOME. Hence Changed RETAIN_INACTIVE_PATCHES=1 to RETAIN_INACTIVE_PATCHES=2

If you want to keep inactive patches, then you can edit opatch.properties file and set **RETAIN_INACTIVE_PATCHES .**

```
[oracle@expr2dbadm04 OPatch]$ cat $ORACLE_HOME/OPatch/config/opatch.properties

OPATCH_HEAP_MEMORY=3072
PS_OBFUSCATION=true
RETAIN_INACTIVE_PATCHES=2
```

Next, we executed "**$ORACLE_HOME/OPatch/opatch util deleteinactivepatches"** for ORACLE DB user.

Please make a note below output is not from my environment. It's from reference blog.

```
$ORACLE_HOME/OPatch/opatch util deleteinactivepatches
Oracle Interim Patch Installer version 12.2.0.1.37
Copyright (c) 2023, Oracle Corporation.  All rights reserved.


Oracle Home       : /u01/app/oracle/product/19
Central Inventory : /u01/app/oraInventory
   from           : /u01/app/oracle/product/19/oraInst.loc
OPatch version    : 12.2.0.1.37
OUI version       : 12.2.0.7.0
Log file location : /u01/app/oracle/product/19/cfgtoollogs/opatch/opatch2023-05-15_22-13-57PM_1.log

Invoking utility "deleteinactivepatches"
Inactive Patches Cleanup option provided
Delete Inactive Patches .....

Opatch will delete the following inactive patch(es) and their overlays:
-Inactive RU/CPU 32218454, installed on: Wed Jan 20 00:53:50 CET 2021, with overlays: 33197296
-Inactive RU/CPU 32545013, installed on: Wed Apr 21 14:22:28 CEST 2021, with overlays: 33197296
-Inactive RU/CPU 32904851, installed on: Fri Aug 06 21:09:30 CEST 2021, with overlays: 33197296
-Inactive RU/CPU 29517242, installed on: Thu Apr 18 09:21:17 CEST 2019, with no overlays
-Inactive RU/CPU 30557433, installed on: Tue Jan 21 21:13:29 CET 2020, with overlays: 33197296
-Inactive RU/CPU 33192793, installed on: Wed Dec 15 23:04:33 CET 2021, with overlays: 33197296
-Inactive RU/CPU 33515361, installed on: Wed Jan 19 21:37:55 CET 2022, with overlays: 33197296
-Inactive RU/CPU 30869156, installed on: Wed Apr 15 00:10:36 CEST 2020, with overlays: 33197296
-Inactive RU/CPU 31281355, installed on: Wed Jul 15 10:17:40 CEST 2020, with overlays: 33197296
-Inactive RU/CPU 31771877, installed on: Wed Oct 21 11:47:02 CEST 2020, with no overlays
-Inactive RU/CPU 33192694, installed on: Thu Dec 16 00:07:03 CET 2021, with no overlays
```

-Inactive RU/CPU 33561310, installed on: Wed Jan 19 22:12:28 CET 2022, with no overlays
-Inactive RU/CPU 34086870, installed on: Wed Jul 20 21:11:37 CEST 2022, with no overlays
Total: 13 inactive RU/CPU patch(es) and 8 inactive overlay patch(es).

OPatch will keep the following inactive patch(es) and their overlays:
-Inactive RU/CPU 34411846, installed on: Tue Nov 08 22:35:03 CET 2022, with no overlays
Total: 1 inactive RU/CPU patch(es) and 0 inactive overlay patch(es).

Do you want to proceed? [y|n]
y
User Responded with: Y
Deleted patch: 33197296
Deleted patch: 32218454
Deleted patch: 32545013
Deleted patch: 32904851
Deleted patch: 29517242
Deleted patch: 30557433
Deleted patch: 33192793
Deleted patch: 33515361
Deleted patch: 30869156 Deleted patch: 31281355
Deleted patch: 31771877
Deleted patch: 33192694
Deleted patch: 33561310
Deleted patch: 34086870

OPatch succeeded.

After that I checked **cd $ORACLE_HOME/.patch_storage** size it was reduced to 55 MB only.

After completion on above all activity for both GRID and ORACLE user. We performed Patching and got completed within **1.15 Hr** Only. Big improvement from **4 Hours** to **1:15 Hours**.

Below are the results:

Before:

```
[oracle@exdr2dbadm01 ~]$ cd $ORACLE_HOME/OPatch
[oracle@exdr2dbadm01 OPatch]$ ./opatch lsinv |grep applied
Patch  35648110     : applied on Mon Jan 15 21:45:02 IST 2024
Patch  35643107     : applied on Mon Jan 15 21:07:26 IST 2024
Patch  35655527     : applied on Mon Jan 15 20:41:46 IST 2024
[oracle@exdr2dbadm01 OPatch]$
```

```
Last login: Mon Jan 15 21:54:21 IST 2024
[grid@exdr2dbadm01 ~]$ cd  /u01/app/19.3.0.0/grid/OPatch
[grid@exdr2dbadm01 OPatch]$ ./opatch lsinv |grep applied
Patch  35643107     : applied on Mon Jan 15 19:30:20 IST 2024
Patch  35652062     : applied on Mon Jan 15 19:17:50 IST 2024
Patch  35655527     : applied on Mon Jan 15 19:06:27 IST 2024
Patch  35553096     : applied on Fri Oct 20 18:00:44 IST 2023
Patch  33575402     : applied on Tue Jul 25 00:37:42 IST 2023
[grid@exdr2dbadm01 OPatch]$
```

After:

```
[grid@expr2dbadm03 u01]$ cd $ORACLE_HOME/OPatch
[grid@expr2dbadm03 OPatch]$
[grid@expr2dbadm03 OPatch]$ ./opatch lsinv| grep appl
Patch  35553096     : applied on Tue Jan 16 18:44:44 IST 2024
Patch  35643107     : applied on Tue Jan 16 18:35:49 IST 2024
Patch  33575402     : applied on Tue Jan 16 18:29:16 IST 2024
Patch  35652062     : applied on Tue Jan 16 18:11:06 IST 2024
Patch  35655527     : applied on Tue Jan 16 18:06:39 IST 2024
[grid@expr2dbadm03 OPatch]$
```

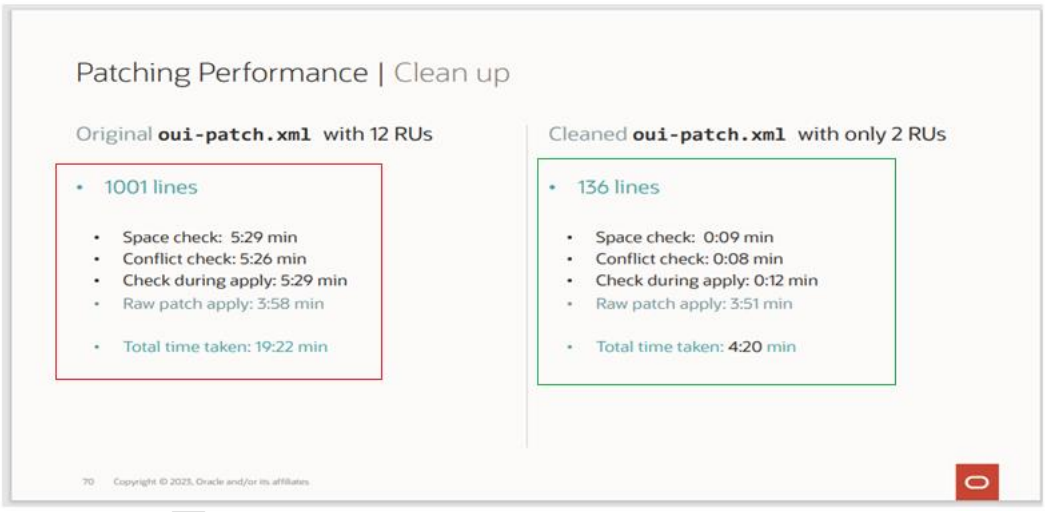
```
[oracle@expr2dbadm03 OPatch]$ ./opatch lsinv | grep appl


Patch  35648110     : applied on Tue Jan 16 19:11:51 IST 2024
Patch  35643107     : applied on Tue Jan 16 19:01:39 IST 2024
Patch  35655527     : applied on Tue Jan 16 18:54:20 IST 2024
[oracle@expr2dbadm03 OPatch]$
[oracle@expr2dbadm03 OPatch]$
```

As we can see, **Patch 35643107** for oracle user (In Before Image **Started at 20:41 and completed at 21:07**) took approx. **26 Mins** but after removal of Inactive patches it took **only 7 Mins** (In After Image **Started at 18:54 and completed at 19:01**)

The culmination of our efforts yielded remarkable results. What once took us over **4 hours** now completed within just **1.15 hours**.

This not only minimized downtime but also increased the efficiency of our team, allowing them to focus on more strategic tasks.

As per the reference blogs below are the results.



Key Notes:

1) **Please be aware that cleanup calls take long time to cleaned up the inactive patches. I recommend performing above cleaning activities before DOWNTIME or Patching activity would be time saving.**
2) **OPatch includes a proper cleanup for inactive patches from Opatch version 12.2.0.1.37+ (April 2023) onward.**
3) **Take a backup of both ORACLE_HOME and GRID_HOME before removing inactive patches.**
4) **Use its -silent option for your scripts/automation.**
   `<ORACLE_HOME>/OPatch/opatch util deleteinactivepatches -silent`

Thanks for taking your time and reading this.

Please share your opinions, Results, suggestions if any.

LinkedIn Profile: Rahul Kurkute

References:

MOS : OPatch 12.2.0.1.37+ Introduces a New Feature to Delete Inactive Patches in the ORACLE_HOME/.patch_storage Directory (Doc ID 2942102.1)

https://oracle-base.com/articles/misc/clean-up-the-patch-storage-directory#delete-inactive-patches

https://mikedietrichde.com/2023/05/16/cleaning-up-older-patch-artifacts-improving-opatch-performance/

https://mikedietrichde.com/2022/05/10/binary-patching-is-slow-because-of-the-inventory/

https://dohdatabase.files.wordpress.com/2023/05/ukoug_patch_me_if_you_can.pdf ***(From slide no 68)***