

Question	Answer
Please mention URL for slide access	Slides are available from Mikes blog - the URLs is in the resources panel https://mikedietchde.com/
Is there a licence impact if we migrate from 12CR1 SE2 to 19C?	If you are upgrading from 12cR1 SE2 to 19c SE2 there is no license impact. Please note that RAC has been removed from SE2 in 19c. There is a HA edition of SE2 - more details can be found here: https://blogs.oracle.com/maa/standard-edition-2-announcing-standard-edition-high-availability
12.2.0.2 has no extended support?	That is correct - 18c (12.2.0.2) is an interim or short term release. For the longest premier and extended support experience, 19c should be targeted for upgrades. 19c (12.2.0.3) is the Long Term release.
What's the difference between CPU and PSU?	The CPU is just critical security fixes while the PSU includes security and priority fixes on top of the patchset. And of course neither CPUs nor PSUs are available starting with 12.2.0.1. From 12.2 onwards you would use RUs.
Since 20c might be coming soon, would it be recommended to wait for 20c instead of upgrading to 19c coming from 18c?	We recommend 19c, because it still has 4 years of support and also extended support remaining. The next release will only have 2 years of support, and no extended support. You will also find that applications will be certified on 19c, but any applications certifying on the next release will take a while to get there.
Biggest issue I have with patches is looking for what I needed, is it now possible nowadays to just upload your inventory and voila it shows you recommended patches	We have this capability only internally now; it is something we are exploring for customers, but we have work to do there because we know that the volume of request would likely be multiple orders of magnitude more than what our internal folks generate

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<p>Could you please talk about the example where the Update should be >= the sum of the update%2Breversion? That logic is a bit confusing. For e.g.: source is 18.2.2 and upgrade to 18.3 will raise a warning</p>	<p>Sure -- it's all based on release dates. Using this example, 18.2.0 came out in January 2018, and 18.3.0 was produced in April 2018. Now look at the RURs. 18.2.1 was released in April, the same month as 18.3.0. So 18.2.1 and 18.3.0 have the same security and regression fixes. Then, in July, 18.2.2 was released with additional security and maybe regression fixes. So, if you move from 18.2.2 to 18.3.0, you lose all the July 2018 security fixes. Does that clear it up?</p>
<p>Where do CPUs fit in with RU and RURs?</p>	<p>We do not produce CPUs as of 12.2.0.1. Only RUs and RURs.</p>
<p>When will 19C be available for cloud at customer?</p>	<p>Last I heard we were targeting the second half of CY2020. Of course nothing is a sure thing until actually released, especially right now.</p>
<p>Can you please explain about SBP for SAP-Oracle patches? In this life cycle?</p> <p>Yes I mean SAP bundle Patch. SAP releases their own Bundle Patch. My question is will SAP bundle patch use RU or RUR?</p>	<p>By SBP do you mean the SAP Bundle Patch? The intent now is to include SAP-related patches in Rus.</p> <p>Ah, thanks for the clarification. We will have to follow up on this.</p>
<p>How does patching on OCI differ to what is presented here? Is OCI only make the RU patches available?</p>	<p>Of course in a bare metal deployment you can patch however you like, but for VM systems OCI only makes a particular set of patches available. I cannot state categorically that it is only RUs, but there will be a specific set of patches available that includes RUs. In the OCI environment you will have patches available via the web-based UI. You can click a button to run a patch evaluation to make sure that the patch will apply to your system, and then click another button to apply the patch.</p>
<p>There a few applications that still only supports 18c and not 19c so will there be any possibility of extending 18c premier support beyond June 2021?</p>	<p>There are no plans to provide extended support for 18c. If you have a list of applications that are not yet certified on 19c but are on 18c, please contact your Oracle account team with those application/vendor names, and we will work with the ISVs to get them certified.</p>

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<p>With Oracle Database 12c we have OGG as well. From where we can find information that which version of OGG supported with 19c database?</p>	<p>Oracle GoldenGate supported configurations are listed under Fusion Middleware certifications: https://www.oracle.com/middleware/technologies/fusion-certification.html</p>
<p>Can you re-iterate what types of fixes are available for 12.2.0.1 in LIMITED support period and RUs RURs for 12.2.0.1 during this period?</p>	<p>In limited error correction, we will provide security fixes and P1 bug fixes. There are specific definitions for what qualifies as a P1. And of course, if an already-existing P2 or P3 fix needs to be updated to work with an RU, we will update those as well. But we don't plan on producing NEW priority 2 and 3 fixes during limited error correction. Please see the footnotes on page 4 of http://www.oracle.com/us/support/library/lifetime-support-technology-069183.pdf</p>
<p>If you recommend RU only, why Oracle keep releasing RURs?</p>	<p>This is a situation similar to CPUs and PSUs in 11.2.0.4. We recommended PSUs, but a number of customers insisted that they wanted the CPUs produced because they wanted only security fixes, not other fixes that could "change behavior." (This is a whole other discussion, because security fixes can surely change behavior, but that's perhaps a discussion for another day). In this case, we would recommend that all customers patch quarterly with RUs. But, in talking to customers we recognize that some customers cannot apply a full RU every quarter. They are still willing to apply security bundles, but they want the smallest increment possible. So, they will plan on installing an RU every 6 months or 9 months, and take the smaller RURs meanwhile. It's one of those cases where, with more than 400,000 customers worldwide, one size doesn't fit all and we try to accommodate that.</p>
<p>Any ETA 20c?</p>	<p>20c is in preview on Oracle Cloud Infrastructure today. The on-premises availability will be announced in MOS note 742060.1</p>

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What is the difference "Release" on 12c and 19c?	I'm not sure what you mean. 12c was the original name for the entire planned 12c family, which would have been 12.1 and 12.2 with their patchsets. When we changed to the annual release model, 12.2.0.2 was renumbered 18, and 12.2.0.3 was renumbered 19. The c remains just because it was part of the family designation.
Can you migrate directly from 12.1.0.2.0 to 19c 12.2.0.3?	Yes, you can upgrade directly from 12.1.0.2 to 19c. In the session on Thursday, Mike will talk about upgrade paths and the AutoUpgrade tool that can make upgrades easier
20c is the new database version or the family of 12c?	20c is a new version and the first interim release after 19c. We will mark a future release as a Long Term Support Release. The older 12.2.0.x numbering will not continue after 19c.
Which version of OS -supported by 19c?	Oracle 19c is now available on all the "usual" platforms Oracle supports. Linux x86-64 (including Exadata, OCI, Cloud @ Customer Gen 2), Solaris (Sparc & x86_64), Windows 64 bit, IBM Linux on System Z, HP-UX and AIX. For details of specific OS versions (e.g. the requirement for Linux 7 Update 4 or later for RHEL or OL) please check the installation guide for your platform and/or use the certifications tab at support.oracle.com .
What is the next terminal release likely to be after 19c? 23c?	At this point I would guess 23c, but as Yoda says, "Always in motion is the future"
Upgrade of 11.2 to 19c, what will be the best upgrade approach.?	This very much depends on a number of factors - downtime tolerance, database size, are you migrating to a new platform at the same time? We will cover this in detail during Thursday's session on Upgrade paths and the AutoUpgrade Tool.
My application vendor says they support 12cR2, is it safe to assume 19c is also supported if that is still in the 12.2 family?	While applications <i>should</i> run unchanged on 19c if certified on 12.2.0.1, Oracle still recommends that you run only on certified application platforms. Please ask the application vendor for their guidance.

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We are currently on 12.1.0.2 and it sounds like we are better off going to 19c then 20 and wait for 21 for next upgrade. Is that what you are indicating?	Our general recommendation is to replot production systems on long term releases such as 19c. You can upgrade directly from 12.1.0.2 to 19c. 19c will give you the longest premier and extended support experience. As for the next long term release after 19c, that will be announced when that release date is imminent.
I recall someone saying that 19c is auto (self) patching- is that fake news? - starting to sound to me like self-patching is not the case?	No idea where that comes from, unless they were talking about 19c being available in our autonomous database cloud services. But it is not self-patching. Sorry.
Not a question but - Good news on the Ltd Error correction announcement for 12.2.0.1 - it will certainly be useful to allow some of the slower app vendors to certify on 19c.	Thanks. Yes, this announcement has been met with very positive reactions.
Hi Roy - more info on issue with GI RU for 19c please. I'm waiting on an SR that's in 'development' black hole.	The specific issue I mentioned was "ALERT: Databases using ASM may crash after applying 12.2.0.1 April 2020 RU or 12.2.0.1 Apr2020 QFSDP for Exadata (Doc ID 2670164.1)"
How customers can use these DB which is launching every year because many customer is still using 11.2	This is exactly why we recommend most customers use the long term releases such as 19c, which get up to 8 years of support (including extended support).
What about the connectivity drivers? Do we need to be upgraded those all the time upgrade from one RU to the other?	Unless there are bugs that are fixed for those drivers, they shouldn't need to be upgraded for Rus.
If application is not supporting to latest version of oracle, then what you recommend	Contact your Oracle account team with the vendor/application information, and we will work with the vendor to get them certified. Often they are already in process but sometimes there are vendors who aren't up to date on releases and who need help.
Should I run datapatch (verbose)? Is OPatch enough?	OPatch and Datapatch are different parts of the process. OPatch updates the binaries in your home, Datapatch applies the SQL changes to any databases that use the home. So, both are needed.
For a standalone Restart or RAC environment, I was wondering if the ojvm patch needs to be applied in addition to GI & RDBMS patches	If the OJVM is being used, then yes, OJVM patches should also be applied. As Mike mentioned, if OJVM is not being used, you can skip these.
Can OJVM now be patched rolling? Or do you still need to take everything down.	As of 19c there is a semi-rolling approach which still requires some

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	amount of downtime for your Java processing capabilities in the OJVM (see "RAC Rolling Install Process for the "Oracle JavaVM Component Database PSU/RU (MOS Note: 2217053.1)"). In the next release, OJVM patching will be fully rolling.
How to check Application is using OJVM or not?	I'm not sure how to determine this -- it's easy to determine whether the OJVM is installed and whether it is valid, but determining whether it is being used is another thing entirely.
Would using the mitigation patch be a valid way of 'scream testing' if anyone is using OJVM?	It would show whether they are using the features of the JVM that get disabled, but they could still be using other features that have never shown security vulnerabilities. So, I guess it wouldn't quite do that.
<p>When will the Critical Patch Update April 2020 for Windows will be available?</p> <p>When I tried to download for 18c & 19c for Windows 64bit, I get: Details for Patch 30901317 not found. Details for Patch 30901451 not found.</p>	The Windows Bundle Patch 19.7.0 suffered from delays in production, but should be released this week. Please see Assistant: Download Reference for Oracle Database/GI Update, Revision, PSU, SPU(CPU), Bundle Patches, Patchsets and Base Releases (Doc ID 2118136.2) for the latest patches available, but please be aware that as of 20-MAY in the morning the patch is listed there but still not available. It is on a day-to-day basis at this point.
Can you please explain the difference between Bundle Patch (BP) and Release Update (RU)?	RUs are basically exactly the same as the BP (or also called DBBP) from 12.1.0.2.
Will Opatchauto will patch RAC database in rolling fashion. We don't have to shut down the databases	Yes opatchauto can do both rolling and non-rolling patching.
Can we run datapatch while application is connecting to database too? I know we don't need downtime for database when datapatch command here.	Datapatch can be run while applications are accessing the database. It is still a good idea to patch a ta low activity period, because datapatch activity may invalidate objects that need to be dynamically recompiled, and of course packages being replaced will be subject to locking if they are in use.
Does datapatch run with more than 100 pdbs in a CDB... What is the maximum number of PDBs datapatch works with?	Datapatch will upgrade PDBs in parallel based on the default parallelism implemented by the underlying catcon.pl infrastructure. This is based on the CPU_COUNT available. So, if you have

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	more PDBs than CPUs, datapatch would not overwhelm the CPUs by running, say, 100 sessions on 32 cores.
<p data-bbox="193 344 842 421">Could you give us tips/tricks for patching on standby database (Data Guard)?</p> <p data-bbox="193 456 842 600">What would be best way for primary/standby situation please? For example OPatch to standby binary first and then datapatch after switchover from primary to standby etc.?</p>	<p data-bbox="842 344 1401 1003">In a standby configuration, for RUS you can apply the binaries via OPatch on the standby and bring the standby back up using that newly patched home. This is called “standby first patching” and allows you to verify that the patches install correctly and that the binaries, at least, do not affect the basic operations such as redo apply. You can even open in snapshot standby mode to test that way. You just cannot apply the SQL changes to the standby via datapatch. For datapatch you would either switchover to the standby and run datapatch there, or switchover, then patch the binaries on the primary, switch back and then run datapatch on the primary.</p>
<p data-bbox="193 1003 842 1041">Does every patch requires to run datapatch?</p>	<p data-bbox="842 1003 1401 1406">I’ll amend what I said live. I think that every patch does need to run datapatch, because even those patches that have only binary changes (e.g. no SQL changes) would need to be recorded as being installed by the database. One of the functions of datapatch is to update the DBA_REGISTRY_SQLPATCH in the database to list the patches that have been applied, in case there were future patches that might conflict.</p>
<p data-bbox="193 1406 842 1482">Will there be any discussion of out of place patching?</p> <p data-bbox="193 1518 842 1594">In place vs out-of-place patching to reduce downtime from patching</p>	<p data-bbox="842 1406 1401 1921">We do have deeper presentations about patching at the upgrade blog (see the resources on the side). Out of place patching simply means creating a new Oracle Home and patching that, instead of taking down the database and then applying patches to the existing home. This reduces downtime because all the OPatch work is done while the production system is running, and reduces risk because you have the old pre-patch home still available if something goes wrong with the new home.</p>
<p data-bbox="193 1921 842 1960">Can you migrate directly from 11.1 to 19c</p>	<p data-bbox="842 1921 1401 2033">You cannot upgrade directly from 11.1 to 19 using the command-line, AutoUpgrade or DBUA. For a direct</p>

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	migration I would suggest either data pump expdp/impdp or transportable tablespaces.
From which version onward we can use OPatch cleanup util safely?	I do see that there were issues with OPatch Cleanup deleting OS files outside the Oracle Home. We will have to follow up on this, because OPatch falls outside our immediate area of expertise.
Do I need to open DB in UPGRADE mode, for JVM Patch? Generally I saw this practice doing in my project.	You do not need to be in upgrade mode for the OJVM patch. The README for the OJVM patch has been incorrect on this point, and we have raised this issue with the team responsible for producing those patches.
Patching via OPatch is very complicated, is there any chance the process can be made easy via a GUI?	Enterprise Manager does have GUI interfaces for patching, and the Lifecycle Management Pack is especially useful when you have many databases to manage. At the command line, Fleet Patching and Provisioning (FPP, formerly known as Rapid Home Provisioning) can also help automate the process across multiple databases.
What is the difference between CPU patching and RUR?	CPUs were restricted to only security fixes and allowed customers to stay on the CPU track without adopting functional, regression or optimizer fixes indefinitely. RURs are updates to the RUs. While the RUR contains only security and regression fixes, they are different from CPUs in that 1) there are only 2 RURs for a given RU, and 2) when you move from one RUR to the next such as 18.4.2 -> 18.5.2, you will consume all the functional and optimizer fixes in the 18.5 RU.
Just to reclarify - is an RU different to a BP? If my delivery partner has applied BP on top of 12.2.0.1 base - can we switch to RU?	I am not aware of BPs that are produced in 12.2.0.1. RUs and BPs are basically the same thing.
What is diff between SQL patch and data patch?	SQL Patch was used in 11.2.0.4 and earlier. Datapatch was implemented starting in 12c. There is a different code base, but the high level functionality (apply SQL changes to the database) is the same. One major difference is that SQL Patch was from the pre-multitenant world, and datapatch was developed knowing about PDBs, for example.

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<p>When we go for apply datapatch, it's taking too much time -more than 45 minutes. What are the possible cause for this time taking?</p>	<p>Datapatch execution time can depend on things such as the complexity of your dictionary, the amount of patch content that has to be applied, and user activity that might cause locking of objects on the system. The two main recommendations to improve performance right now are a) patch when user activity is minimal, if possible, and b) run utlrp.sql prior to running datapatch, because invalid objects will slow datapatch down as it has to recompile them on the fly.</p>
<p>Is there a need to run datapatch on database created after patches were applied?</p>	<p>Prior to 12.2 you would need to run datapatch after creating a database, because DBCA did not automatically run datapatch. As of 12.2.0.1, DBCA does the right thing and handles this for you, <i>as long as you create a custom database</i>. Please see https://mikedietchde.com/2017/05/25/d-bca-execute-datapatch-oracle-database-12-2/ For more details.</p>
<p>What is Proactive patch?</p>	<p>Proactive patches are the quarterly bundles (RUs, or in earlier releases CPUs, PSUs, BPs) that Oracle recommends all customers apply to prevent possible error scenarios or vulnerabilities. This is in contrast to reactive patches, which would be the case where you encounter an error and then request a patch to fix it. In the first case we are patching proactively, to prevent an error, and in the second case we are being reactive, to respond to an error.</p>
<p>We have recently started an Oracle patching automation project. Each quarter we plan to produce patched 12.1 and 19c gold images, and then stagger their rollout to servers and toggle databases over to these newer patched homes. Reading online about producing gold images showed some always start each quarter with a base install and then apply the latest patch on top, whilst others maintain an existing gold image and just keep patching on top of this.</p>	<p>I don't see either method as being inherently different, so long as you end up with the same patches in the newly produced gold image. This is because our quarterly patch bundles are actually delivered as "composite" patches. This means that the individual patches are all there individually, but they are built and tested to remove and resolve patch conflicts.</p>

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<p>My question is around backout, if we toggle a database over to a new home and it hits an issue, and we need to return to the prior home. Can you foresee any downside for backout with using the first option for making gold images (base install %2B latest RU) vs. the second option, specifically for datapatch and what it would expect to have available in the home?</p>	<p>So, whether you build your 19.7 gold image by first downloading 19.3.0 and then applying the 19.7.0 RU, or instead take your 19.6 gold image and then apply the 19.7.0 RU, you will end up with the same binaries in your 19.7 gold image.</p> <p>When it comes to backout, datapatch will just “do the right thing” where needed. What datapatch does is</p> <ol style="list-style-type: none"> 1. Look at the set of patches installed in the Oracle Home by OPatch 2. Look at the set of patches applied to the database by datapatch 3. Rollback or apply patches as needed using the SQL scripts for those individual patches <p>Thus, when you backout from a newer image to an older one, you would likely end up rolling back lots of patches (those representing the incremental content in the latest RU) and perhaps applying a few (those one-off fixes that were applied to the old image, but which had newer versions in the latest RU).</p>
<p>How can I upgrade Oracle JAVA SE?</p>	<p>Java SE is the JDK, not to be confused with the OJVM. Installation and upgrade instructions are located here: https://docs.oracle.com/en/java/javase/14/install/overview-jdk-installation.html#GUID-8677A77F-231A-40F7-98B9-1FD0B48C346A Note that JDK patches are now included in database RUs.</p>
<p>What should we do if we unplug a PDB from a CDB which is patched with a new RU and plug it into a CDB that is on a lower RU? Do we run datapatch again on the destination CDB to update the newly plugged PDB</p>	<p>The ideal procedure, if you know that the target CDB has a different set of patches from the source PDB, is to perform the rollback in the source PDB first via datapatch (giving an explicit command to roll back the patches in question), and then run datapatch again in the target. Indeed, this will be required until 18c because the rollback and apply scripts for the PDB patches</p>

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	<p>won't exist in the Oracle Home of the target CDB.</p> <p>Starting in 18c, we actually store the patch apply and rollback scripts in the PDB itself, specifically to deal with this situation. So, you could simply unplug the PDB, plug into the new CDB and then run datapatch. I still recommend rolling back first if you are aware of the situation, just in case there is some issue with rollback.</p>
<p>Due to any reason, Can we rollback any applied patches in an easy manner E.g. to testing performance of the application etc.?</p>	<p>It depends on the patch. SQL patches (e.g. a new version of a PL/SQL patch) can be rolled back via datapatch without bringing the database down. Binary changes, however, require running OPatch to roll them back, and must be done while no database is accessing the Oracle Home. This is why we strongly recommend out of place patching – producing a new Oracle Home. This makes rollback as simple as shutting down the database, starting in the old home, and running datapatch.</p>
<p>Is datapatch used for single instance environments?</p>	<p>Yes</p>
<p>Can we do AutoUpgrade through platinum gateway to 12.1 to 19c</p>	<p>AutoUpgrade is a command-line utility and requires OS level access, so if platinum gateway provides those capabilities, you can use AutoUpgrade in that situation.</p>
<p>In a RAC environment we would have RUs for GI and DB. Would the opatchauto apply, apply the RU into both the GI and Oracle DB?</p>	<p>Opatchauto can apply both GI and DB RUs. You would want to first apply the GI RU, and then once satisfied with that apply the DB RU. These would be separate operations, because you would want one to complete before starting the other.</p>
<p>/u01/oracle/12.1.0/bin/kfod op=patchlvl (Patch ID or value count) is this step should mandatory pass during RAC Patch?</p>	<p>I just had to educate myself on this, which I did by looking at “After Patching 12.1.0.2 RAC Cluster, Opatch Shows Two Different Patch Levels (Doc ID 2266613.1)” Apparently the patchlvl script will check the patch levels on all instances in a RAC, and any differences would indicate that there was an error encountered during patching or rollback</p>

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	of some instance. It is not mandatory to run this, but it seems like a good idea to me as a validation step!
Hi, I have a question regarding upgrade from 11.2.0.4 to 19c. We upgrade the grid infrastructure first. The upgrade identifies patch 28553832 is a mandatory pre-requisite. This is only available to customers with extended support. We managed to get the patch after a week or so, but in the meantime we had to upgrade via 18c. Are you able to make this patch generally available please?	Please see https://mikedietrichde.com/2020/01/07/gi-patch-28553832-may-be-needed-before-you-upgrade-to-19c/ For a discussion of this issue. The patch was not produced until several months into extended support. There are options such as disabling the docker engine or installing with -ignoreSysPreReqs to avoid the message.
What about 11.1?	There is no direct upgrade from 11.1 to 19c. The last version that supported upgrade from 11.1 was, I think, 12.1.0.2. Patching ended for 11.1.0.7 nearly 5 years ago. So, for 11.1 you would either have to upgrade to a release in the middle first, or use something like data pump or transportable tablespaces.
A follow on from the last session to do with numbering. When Oracle moves to v13.x.x.x (as the underlying version) will the numbering reflect the change or will it just be the next year number in the sequence?	We are now using the year-based numbering. 18 for 2018, 19 for 2019, and so on. This is true of the internal version in the database as well - there is no underlying version 13 or 14.
How do we upgrade a 12.1.0.2 database currently running on Linux-6 to Linux-7 since in-place upgrade of OS to Linux-7 is not possible (if I have heard correctly)?	You are correct that an in-place upgrade of Linux 6 to 7 is not supported. In this case you would have to reimage your server with Linux 7. Whether this means backing up your database first and then restoring it after the OS upgrade, or whether you can leave the database on disk where it sits will depend on how your storage is configured.
I have GI running 18c on my EXADATA. Do I need to upgrade GI first?	The GI version needs to be the same major release number as the highest level database version you intend to run. So yes, in this case, you will need 19c Gi before upgrading your database Also you can (and should) upgrade your GI first, before your database. That allows you to make sure that you have no problems with the new GI before upgrading the database. Because as Alex said, the GI has to be at or above the release of the database, and once you upgrade your database you would not be

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	able to downgrade the GI if there was an issue.
Is gathering stats on dict: index is documented in pre-steps?	Yes it is. This is also something the preupgrade tool will recommend, and AutoUpgrade will perform this step automatically if needed.
I have an Oracle 12.1.0.2 Active Data Guard with a Broker configuration on Windows, can I use AutoUpgrade to upgrade my environment? If so, will AutoUpgrade upgrade Grid Infrastructure (GI on Windows)?	AutoUpgrade is only for the database, not for GI. As for data guard, Mike will describe what we do and don't do there (yet). But as a preview, you can use AutoUpgrade to upgrade the database, but you would need to disable the broker and defer log file transport yourself. We are working on automating all those steps, but that will be in a future update to AutoUpgrade.
We have DB (12.1) running on GI (12.1). To upgrade to 19c, Does the GI require to upgrade to 19c as well?	Yes, the GI version needs to be equal to or greater than the database version you intend to run.
Does AutoUpgrade check kernel parameters, O/S packages, limits, etc.?	Those things are generally verified by the installer, not by AutoUpgrade. AutoUpgrade will look at things like disk space available for a guaranteed restore point, but it assumes that the installer has verified the basic system requirements that you describe.
So can you have a 19.6 GI and a 19.7 DB (not that I would do it) but it appears this is supported?	This is supported, but not recommended. The VERSION of GI has to be at or above the database, but the PATCH (RU) for GI can lag behind. But we strongly recommend that the GI patch also be at or above the database patch level. Worth noting that this is only the case from 18c onwards.

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<p>I have APEX 5.1.4 running in both 11.2.0.4 and 12.2.0.1 at the moment, if upgrade to 19c, do I need to drop the old APEX and install brand new APEX 18c, or there is an upgrade for APEX?</p>	<p>Very good question -- you are anticipating something I will discuss later. There is an upgrade for APEX, and it is separate from the database. You can upgrade to a newer version of APEX (minimum for 19c is APEX 18.2, latest is 20.1) now, because the later versions of APEX support 11.2.0.4 databases. Since 18c, the database upgrade does not automatically upgrade APEX, so it is definitely best to upgrade APEX first.</p>
<p>Is it mandatory to use multi-tenant DB from 19c?</p>	<p>19c still supports non-CDB databases. The release AFTER 19c will be CDB-only. But, for 19c you can choose whether to move to multitenant or not. And of course now you can have 3 user-created PDBs in a CDB without paying for the multitenant option.</p>
<p>Can AutoUpgrade handle a change of character set as part of an upgrade</p>	<p>Character set migration is not part of database upgrade. Generally, the easiest way to deal with a character set change is via data pump export/import. It can also be done via character set change scripts, but the vast majority of customers perform character set migrations when moving to a new server, so that you aren't exposed to problems if the migration somehow fails in the middle. Also, please use DMU (Database Migration assistant for Unicode) to identify and address any character set migration issues up front.</p>
<p>Can we use AutoUpgrade if we want to have Oracle 19c on a new server that is separate from the server where we have current instance 11.2.0.4? Or does AutoUpgrade need 19c to be on the same host as the older version of Oracle being upgraded?</p>	<p>You can use AutoUpgrade in this case, which is one of the several advantages that AutoUpgrade has over DBUA.</p>
<p>It would be great if you could make the compatible parameter change an online change. We have to take 2 outages for an upgrade which is very difficult for systems which are 24*7. Mike's blog says take a second outage to change the compatible from 11.2.0 to 19</p>	<p>Yes, I understand this completely. This is on our list of things to do, but as you might imagine we would have done it already if it was easy. One factor, for example, is that there are somethings that get loaded into the SGA based on COMPATIBLE when an instance starts up. Figuring out how to deal with that and NOT have disruption similar to</p>

Question	Answer
	restarting the database is a real challenge. But we're looking at it.
Does the ASM instance version need to be upgraded as well to 19c, or the lower version (12.2.0.1) supports the 19c database?	The GI (and therefore ASM) version needs to be equal to or greater than the database version you intend to run. You will need 19c GI to support 19c Databases (as well as 18, 12.2.0.1 databases)
Does the 'adjust parameter' of AutoUpgrade config work with RAC instances and with ASM?	Yes, this works with RAC/ASM. In fact, right now it requires ASM when doing this for RAC (I think), but we are working on making it work with RAC on filesystem. There is a bit more of a challenge to deal with updating parameters on multiple nodes when the init files are in filesystem locations.
"3 user-created PDBs in a CDB without paying for the multitenant option" will this be in SE2 too?	Yes, this applies to SE2 as well. As the language in https://docs.oracle.com/en/database/oracle/oracle-database/19/dblic/Licensing-Information.html#GUID-0F9EB85D-4610-4EDF-89C2-4916A0E7AC87 says, "For all offerings, if you are not licensed for Oracle Multitenant, then you may have up to 3 user-created PDBs in a given container database at any time."
After upgrade, if I got any error, there is no method specify and auto upgrade is not taking old oracle home backup	I will need clarification on what you mean here.
Just to clarify your answer in a previous question, is the "license-free" user-created PDB available now in 19c (or just for the upcoming 20c)? Thanks.	This is available now in 19c - you may have 3 user PDBs per CDB. Prior to 19c, you could have 1 user PDB per CDB)
It would also be acceptable if the downgrade can handle a compatible change :-)	Yes, well...I suppose if we could somehow detect whether your data files contain any new objects or structures that wouldn't be supported and somehow deal with that... ;-)

Question	Answer
Can you use AutoUpgrade to upgrade from Solaris Sparc to Redhat operating system?	Sorry, but moving from Sparc -> Intel x86-64 is a Big Endian to Little Endian migration. We can't upgrade in that case; you would need to use data pump or transportable tablespaces (or better, Full Transportable Export/Import) for this case.
If the change the compatible parameter, can we still flashback the database to old version?	Nope, when you change COMPATIBLE you can neither flashback nor downgrade. That's why our general recommendation is to wait 7-10 days before raising COMPATIBLE as part of an upgrade. Of course not all systems can find downtime a week or two after the upgrade, which makes it a trade-off.
If application have 5 databases related, can I allocate the 5 databases into 2 CDBs? Like 1 CDB have 3 pluggable DBs and the other CDB have 2 pluggable DBs?	Yes, that would be fine. Each PDB is a separate application database, and they would work together (across dblinks, etc) the same as they did as non-CDBs.
Does AutoUpgrade work with TDE enabled?	Yes
Do you foresee the analyse step of AutoUpgrade coming up with exceptions that may render use of AutoUpgrade as invalid? In other words, for whatever reason can our move from 11.2.0.4 to 19c use AutoUpgrade fail because the fixup can't fix certain exceptions?	There are error conditions that would prevent AutoUpgrade from proceeding, but those would be the same ones that would prevent any other upgrade. For example, if you were upgrading an 11.2.0.4 database that still have COMPATIBLE=10.2 for some reason, we would flag that as an error and not proceed, because raising COMPATIBLE is one thing we won't do automatically.
You mentioned moving to new hardware, what would be the method for upgrading/migrating a 12.1 Non-CDB to a 19C PDB on new hardware?	The main requirement for moving non-CDB to PDB is that you pre-create the CDB, because we can't really know in advance whether you will be going to single tenant, consolidating with other PDBs, and so on. Other than that the steps would be the same as any other AutoUpgrade when moving to new hardware: analyse and fixups on the source system, then -mode upgrade on the target system.

Question	Answer
When is a timezone upgrade needed?	Timezone upgrade is something that you need to do based on your application usage and how global your data is. As "Oracle Database - Overview of Database Patch Delivery Methods for 12.2.0.1 and greater (Doc ID 2337415.1)" says: No recommendations - use of this patch depends much on the application and whether latest timezone information is important OR not. Where it is important recommend to be on the latest release across the enterprise. Notes There are special considerations when patching for timezone updates as communicating systems should use the same TZ information.
Except AutoUpgrade -is there are other upgrade options available?	Yes, there is still the regular command-line upgrade, and also the Database Upgrade Assistant (DBUA, the GUI). And of course you can upgrade by using data pump export/import or transportable tablespaces.
In Data Guard environment, Is it possible to upgrade on standby database using AutoUpgrade? Or should I fresh install Oracle 19c and rebuild Data Guard for standby side? And sorry back to previous session, how about patching on Standby database? How to run datapatch verbose on mounted standby database? (Lorensius, Jakarta, Indonesia)	Remembering that a Standby database is open only for redo apply, you cannot upgrade (or run datapatch) while it is in managed recovery mode. If you want to upgrade the standby, you would do this in a Data Guard Rolling Upgrade approach, where you first convert from physical to logical standby, and then upgrade the logical standby. And yes, AutoUpgrade can be used for that upgrade.
How do we rollback the upgrade if we want to go back to the older version?	Your fallback options would be flashback to the guaranteed restore point (which is created by default with AutoUpgrade) or the downgrade scripts. You can also migrate backwards with data pump by using the VERSION parameter on export.
In the auto upgrade, there is no step to take source oracle_home backup	That is true. We assume that you will be upgrading to a new Oracle Home, and that the original Oracle Home will remain untouched. This is out of place installation, which has been our recommendation since 11.2.0.1.

Question	Answer
Does AutoUpgrade can we do RAC databases also?	Yes. We handle setting CLUSTER_DATABASE appropriately, shutting down the database on all but one instance, stopping and starting services, and so on.
Can we have n number of CDBs with 3 PDBs in each CDB without need for CDB license?	Yes
AutoUpgarde is recommended only for multiple database or single database upgrade as well?	We recommend AutoUpgrade for single databases as well as for multiple databases.
Is there an Oracle document for upgrading a database sitting on Linux-6 to Linux-7 with minimal downtime?	Upgrading Linux 6 to 7 on the same hardware cannot be done with minimal downtime, because upgrading the OS in place is not supported -- it is a full reimage/reinstall for the OS when you go from Linux 6 to 7. Sorry.
What tools can we use to plan for an upgrade with the least downtime?	This depends whether you are moving to new hardware or not. If you are upgrading on the same hardware, then the tips we gave in the previous session about upgrade performance are your best bet. When moving to new hardware, then techniques such as Data Guard Rolling Upgrade, GoldenGate, or Transportable Tablespaces with Incremental Backups are your best bets.
The AutoUpgrade failed with unable to find a file "dbmsclr.plb" file. This file is not exist on LINUX server.	It looks like this is an issue with any migration from Windows to Linux: During DB migration from Windows to Linux, Upgrade gives error "SP2-0310: unable to open file - dbmsclr.plb" (Doc ID 2325124.1). Not something specific to AutoUpgrade, but one you would run into with any upgrade. I would advise following this note and either ignoring that error or copying the file as they describe.
<p>We did GI upgrade from 18.1 to 19.4 what happen with TFA after GI upgrade</p> <p>After GI has been upgraded from 18.1 to 19.4 TFA doesn't start automatically</p>	My understanding is that TFA should be in the GIMR, and that the GIMR should be maintained during this upgrade. HOWEVER, I'm not a GI upgrade expert, so if there is an issue here it would need to be raised as an SR.

Question	Answer
Is Oracle 19c better supported on Linux or Windows?	Like any parent, the answer you will get is that we love all our platforms equally. :-) We have thousands of customers on both platforms, so I would say that you should use the OS with which you are most comfortable, and in which you have the necessary expertise to manage the systems.
AutoUpgrade.jar should be run from which home?	AutoUpgrade.jar is a separate file that can be downloaded even if you don't have 19c installed. It will access the running database in the source version for analyse and fixups, and in the target home for upgrade and post-upgrade. You can run it directly from the 19c home, but we do recommend getting the latest autoupgrade.jar from the MOS note, because we are able to update it more frequently in MOS.
What are the steps / pre-requisite processes required when there is a data guard (broker) configured on the DBs to be upgraded to 19c using AutoUpgrade?	In a Data Guard environment, you would disable the broker prior to running the upgrade, and you should probably defer logfile transport as well. Then re-enable those afterwards. We are working on functionality for AutoUpgrade to take care of these steps automatically, but that is a few months away.
Any technique upgrade with zero down time like using physical Standby database?	Yes...Data Guard Rolling Upgrade is the one you would likely want to use in a data guard environment. It isn't quite zero downtime, but it's close -- however long a switchover takes for your applications.
Can AutoUpgrade be used to upgrade one instance at a time in RAC environment	IF you mean to upgrade one DATABASE at a time, then yes. But each INSTANCE of a database in a RAC environment has to be the same version -- after all, RAC is a shared storage architecture, and while there are separate homes on each node in the cluster, there is just the one database with its dictionary.
What is the latest SQL developer version support with 19c?	The current 19.2 version of SQL Developer supports 19c Database

Question	Answer
<p>We have upgraded some our databases to 19.3 all been good. Bit as expected we have issue with applications that use old ojdbc drivers. By default ojdbc6 can't connecto to 12%2B database until sqlnet.ora fixup applied to allow clients from 11g. What is risk (security, performance etc) is running ojdbc6 for 19c connections? Are there any that required immediate ojdbc upgrade to 8 or 10?</p>	<p>I assume you mean that you had to set the sqlnet.allowed_logon_version_server parameter? I don't know of the specific risks involved in using older versions, but the reason that the protocol versions increase are primarily security-related. Not saying that running the old driver automatically puts you at risk, but there may be improvements implemented in newer versions such as advances in encryption algorithms, support for longer passwords, and so on.</p>
<p>What version of the OEM 13c we have to have to be able to manage database 19.4</p>	<p>MOS note 2297801.1 is the best place to check the compatibility matrix for EMCC, DB and ASM management</p>
<p>Just want to clarify, does AutoUpgrade converts your non-CDB to CDB?</p>	<p>Not unless you tell it to</p>
<p>If we upgrade 11.2.0.4 database to 19c without upgrading GI at Exadata</p>	<p>GI/ASM 11.2 does not support 19c Databases. You will need to upgrade the GI/ASM version to 19c before upgrading the database</p>
<p>Can we use auto upgrade to migrate database from one server to second server with same database version? same OS version?</p>	<p>Assuming you are upgrading and the server platform is the same architecture - e.g. Linux X86_64, then yes, but you will need to do the physical migration of the datafiles between the servers. The Analyze and fixups would be run on the source, and the upgrade action run on the target host once the database has been moved</p>
<p>Where to find Oracle Database Upgrade Quick Start Guide</p>	<p>https://www.oracle.com/au/a/otn/docs/database-upgrade-quick-start-guide.pdf</p>
<p>Our PeopleSoft DBs are on 12c, non-CDB, so we can't upgrade to 19c since CDB is mandatory on 19c?</p>	<p>PDBs are not mandatory in 19c. The Multitenant architecture will be mandatory from 20c onwards</p>
<p>Can we use the auto upgrade (database) as part of an Oracle EBS 12.1.3 upgrade to Oracle EBS 12.2.9</p>	<p>The AutoUpgrade is only for the database, not for application upgrade. If you are upgrading the database underneath EBS then AutoUpgrade can be used, but it won't handle the EBS upgrade itself, nor will it handle the interop patches that can be so time consuming.</p>
<p>What if file in asm ...do we need to specified copy parameter</p>	<p>Are you referring to having datafiles in ASM and moving non-CDB to PDB? In this case no, you do not have to specify a COPY parameter.</p>

Question	Answer
<p>If you DB data is on something like dNFS, and the array is capable of cloning the dataset, is there a 'copy' option which recognises that data is in the new location?</p>	<p>Yes, conversion to a PDB can use the COPY option.</p>
<p>If using target_pdb_copy_option with ASM, can/will the PDB's datafiles be moved under the PDB's GUID directory?</p> <p>For the DB COPY, my intention was to have the array clone the DB, and then have the clone mounted in the copy to location, without the need to duplicate all the blocks.</p>	<p>The target_cdb_copy_option allows you to specify the file_name_convert parameter as you would for creating a PDB. So, you could certainly tell us to place the files in the PDB GUID directory if you wanted.</p> <p>Having the storage array create the data file copy is harder to fit into the process, because the CREATE PLUGGABLE DATABASE doesn't really have syntax to account for this. It would be sort of like saying "COPY THIS TO MY DESIRED LOCATION, EXCEPT THAT I WILL DO THE COPY." I don't think that is possible. However, the storage array copy of data files could certainly be used in a transportable tablespace migration.</p>
<p>Can we exit AutoUpgrade console while the database is still upgrading?</p>	<p>Right now, if you exit the console the upgrade jobs will stop. You can then restart them by running the same AutoUpgrade command. However, you can also run AutoUpgrade with no console by specifying the -noconsole command line parameter</p>
<p>Do Oracle clients need upgrading?</p>	<p>You should maintain client software just as you do the database itself. MOS note 207303.1 outlines client/database version compatibility. Client 12.2 and higher is Supported with 19c - (11.2 and 12.1 are supported for customers with Extended Support)</p>
<p>Does it need Client version updated? Is there minimum version of client required for 19c? and JDBC version?</p>	<p>You should maintain client software just as you do the database itself. MOS note 207303.1 outlines client/database version compatibility. Client 12.2 and higher is Supported with 19c - (11.2 and 12.1 are supported for customers with Extended Support)</p>
<p>Why the AutoUpgrade cannot be done via a GUI? The command prompts are confusing to some people</p>	<p>Database Upgrade Assistant (DBUA) exists for people who prefer a GUI. We are also integrating with Enterprise Manager for those who want a GUI that</p>

Question	Answer
	can handle more than one database at a time.
If there is an issue with the upgrade, does AutoUpgrade flashbacks the database automatically or do I need to manually perform the restore?	AutoUpgrade will not automatically flashback, because you have the option to restart the upgrade if you want, and if the reason the upgrade was interrupted can be resolved. For example, let's say it was something as trivial as you mistakenly closed your xterm in which the AutoUpgrade was running -- you could restart from where you left off, and probably wouldn't want us to automatically flashback at that point.
In my Oracle 19c OH/rdbms/admin, there has autoupgrade.jar file already. Do I need to download the latest version of the autoupgrade.jar if I want to upgrade few old database to this host	We recommend you always download the latest version of the AutoUpgrade tool from My Oracle Support. This way you will get any fixes to issues that may have been encountered with the AutoUpgrade tool
Which is latest supported 19c database version for Oracle EBS 12.2.9? Does it support all features for Oracle EBS 12.2.9 application?	EBS 12.2.9 is certified on Database 19c, and we would always recommend that you install the latest release update (RU) for 19c. Yes it supports all the EBS 12.2.9 features.
Once upgraded to 19c can Oracle client 12 supported with Oracle 19c	You should maintain client software just as you do the database itself. MOS note 207303.1 outlines client/database version compatibility. Client 12.2 and higher is Supported with 19c - (11.2 and 12.1 are supported for customers with Extended Support)
If upgrading/migrating 12.1 non-cdb into a 19c PDB in pre-existing 19c CDB - is it required that the PDBs timezone piece be updated?	This is not required. PDBs are allowed to have a different DST version from the CDB\$ROOT. The one restriction is that the target Oracle Home has to support the DST version in the PDB. So, if you had a non-CDB at DST v14 and plugged it into a CDB with DST v31, that's fine. But if your PDB was DST v34 and your CDB only had v31 installed, that wouldn't work.
Do the cloud providers like AWS use these tools for their RDS offering of Oracle, when major upgrades are needed?	AutoUpgrade is certainly available to cloud providers. I will honestly say that I don't know for sure whether they are using it yet.

Question	Answer
Any chance that we will see a GUI version of AutoUpgrade like DBUA?	We are integrating with Enterprise Manager to provide a multi-database upgrade GUI
What's the minimum Oracle client version for Oracle 19c	You should maintain client software just as you do the database itself. MOS note 207303.1 outlines client/database version compatibility. Client 12.2 and higher is Supported with 19c - (11.2 and 12.1 are supported for customers with Extended Support)
Apex is part of database. AutoUpgrade will upgrade apex as well?	Since Database 18c, APEX needs to be upgraded using the APEX upgrade scripts. This is because the version of APEX is not tightly coupled to the version of the database. For example, Database 19c requires a minimum APEX version of 18.2, and can run APEX 19 or even 20.1. Database 11.2.0.4 can also use APEX 20.1. So, it is best to upgrade APEX prior to your database upgrade.
On a RAC cluster with DB size of 10TB. Can we still use AutoUpgrade to move from NON CDB to CDB with no Copy method and does Oracle Support it? What's the disadvantage or Risk of doing this migration with No Copy option.	<p>Yes, you could use AutoUpgrade in this case. And, using NOCOPY is much faster and requires less disk space than COPY (in this case, you would save 10TB of disk space by specifying NOCOPY).</p> <p>The main risk of migrating from non-CDB to PDB (via any method) using the NOCOPY option is that, if the conversion to a PDB fails somehow, you would have to restore the database from backup.</p>
Does Golden Gate also needs to be upgraded?	<p>Oracle GoldenGate has its own set of certifications with various database versions. Please see the supported configurations here. https://www.oracle.com/middleware/technologies/fusion-certification.html</p> <p>Whether you need to upgrade will depend on the version of GoldenGate that you are already running.</p>
Is it possible to restore (in 19c) previous db rman backup of different version say 11g, taken before upgrade to 19c?	Yes, you can do this – it is a common way of migrating to a new server for the upgrade. After restoring and recovering the backup, you would then open the database in upgrade mode and upgrade

Question	Answer
	it. Only then could you actually use the database under 10c.
Why not have the option to turn off/on audit in the AutoUpgrade config maybe?	You could do this by using the ability to add or delete init parameters, but for during the upgrade and after the upgrade. For example, set AUDIT_TRAIL=NONE during the upgrade and AUDIT_TRAIL=DB after, or something like that.
Not question but more sharing for everyone. In-place upgrade from 11.4 to 19c took 23 minutes on Exadata after removing all unused components. plus 15 min to update timezone.	Note that, unlike database upgrade, Timezone (DST) updates will depend very much on the data volume and the amount of TIMESTAMP WITH TIMEZONE datatypes in use.
What is the recommended way to remove a component? We are moving from RAC to single instance and need to remove RAC from the components.	Each component is treated differently depending on its requirements. Please see “Information On Installed Database Components and Schemas (Doc ID 472937.1)” That said, you don’t actually need to remove the RAC component – simply set cluster_database=FALSE.
do we need to create a 19C CDB before we upgrade a 12.2 non-cdb database to a pdb database	Yes. Neither AutoUpgrade nor DBUA will pre-create the CDB for you.
Is it possible upgrade database 11.2.0.3 to 19c?	The lowest version that can upgrade directly to 19c is 11.2.0.4. For 11.2.0.3 you would likely use data pump or transportable tablespaces. It would also be difficult to find an OS version that would support both 11.2.0.3 and 19c if you were upgrading on the same hardware.
Can we close the auto upgrade console while upgrade is still going on?	If you start with the console, you need to keep it up while the upgrades are running. However, you can start AutoUpgrade with the –noconsole option to have it run in the background. In this case you can later attach to it and use the console with the -console option.
If we upgrade to 19c, is it possible to restore RMAN backup of previous version?	Because RMAN is a physical backup, restoring the backup would result in a database of that previous version. In order to use the backup you would have to open the database in upgrade mode and upgrade to 19c. Oracle always recommends that you backup your

Question	Answer
	database immediately before and after upgrading.
If we are in 11.2.0.3 then we cannot upgrade directly to 19c, it will needs a jump upgrade, what is the recommended version to jump from 11.2.0.3 to? And why	There is no particular version recommended for a double-hop upgrade from 11.2.0.3. Any of 11.2.0.4, 12.1.0.2, 12.2.0.1 or 18c would work. That said, I would upgrade to a supported version so that any issues you might have with the interim version could be addressed. If you have extended support for 11.2.0.4 or 12.1.0.2 then those would be fine, but if not then I would choose 12.2.0.1 or 18c as the intermediate version.
Can you confirm that 20c (and beyond) databases have to be multi-tenant, please.	Yes, after 19c we will be going to CDB-only architecture
Is there a patching tool like AutoUpgrade to patch multiple databases at the same time or automate patching?	Either Fleet Patching and Provisioning (FPP, formerly known as Rapid Home Provisioning), which comes with any RAC license, or the Lifecycle Management Pack from Enterprise Manager, can automate patching for multiple databases.
SQL plan management depends upon index as well, and SQL plan, for one SQL query generates 16 best quick execution plans, what in 19c SQL plan manager will do with SQL query and indexes?	I'm not sure I understand the question completely. There can be multiple plans in the baseline if conditions can vary widely, such as when bind variables have vastly different degrees of selectivity, or if statistics change and older plans don't get aged out of the baseline due to the retention period. SPM works just fine with indexes.
Does SPA need license or it comes free?	SPA is part of Real Application Testing, an extra license.
In single instance database environment with File system, 1TB Database size, can we have a better performance after upgrading to oracle 19c? Do you have any tips for single instance environment? (Lorensius, Jakarta)	Sure, that's what this talk is about -- how to ensure that you have that good performance. Use SPM to prevent regressions, diag & tuning, and so on.
Does it require diagnostic and tuning licensing options to be able to use these testing tools - SQL Perf Analyzer(SPA), SQL Plan Mgmt (SPM), AWR ?	SPA is Real Application Testing. AWR is Diagnostics pack. SPM is a free feature.
What if RAC SE, no D & T pack? Any suggestion?	I would look at Statspack

Question	Answer
Do we have an option to skip gathering dictionary stat with autoupgrade.jar? If I want to do it manually before a day, is it smart enough to skip?	AutoUpgrade won't gather stats if dictionary stats are recently gathered (within 7 days, I think). You also have the option to disable particular fixups, if you like
Can we only capture SQL plan baseline for SQLs running for longer than 1 minutes? Not all of them.	I would use a SQL Tuning Set to select the plans you want in the baseline, for the reasons we just discussed.
We have 9 databases on a rac cluster. The biggest one is about 7TB. What would be the best way to migrate them?	IF you are migrating to new hardware with the same OS architecture, use data guard. That will get your migration done with the least possible downtime, and can be scripted for physical standby quite easily
Can we use SQL profile and SQL plan baseline together for the same SQL statement?	Yes, you can. Maria Colgan gives a good overview of the interaction between the two here: https://blogs.oracle.com/optimizer/what-is-the-difference-between-sql-profiles-and-sql-plan-baselines
And is AWR managed by Diag and Tuning and available only in EE?	Yes, Diag & Tuning are EE only, not SE2
Is there any complete doc for auto upgrade from 11gr2 to 19.7.0 for standalone, rac, pdb,cdb databases?	Yes, chapter 3 of the Database Upgrade Guide is all about AutoUpgrade.
I understand that 19c SE does not support RAC. Did u say that it still supports RAC-one?	It is similar to RAC One Node. Please see https://blogs.oracle.com/maa/standard-edition-high-availability-officially-released for the announcement.
This question is only for Mike.. I see only latest hands on whereas I wanted to explore some of older 12.2.0.1 hands on. Are they still in the blog?	Sorry, we only host the latest HOL at any given time. They are actually hosted on oracle.com, but linked via the blog as well. But I would hope that you aren't going to 12.2.0.1 at this point -- 19c is the right upgrade target.
How can we do AWR difference if we do upgrade to 19C using expdp/impdp (not inplace upgrade)	You can export AWR data using the awrextr.sql script in rdbms/admin, and bring them to the new system
Can you post the link of previous 12.2.0.1 HOL please if possible?	We no longer have the 12.2.0.1 HOL available.
Most of these are for EE and how can SE check on the performance once upgrade?	You are correct that EM packs aren't available. Probably your best tool in SE will be statspack, which is still around though not as easy to use nor as comprehensive as AWR.

Question	Answer
<p>With Linux based OS now being more common, is it recommended to migrate away from Solaris SPARC-based hardware to a Linux platform (different endian migration)? Thanks.</p>	<p>Oracle Database runs well on all its supported platforms. The OS platform decision is more down to the expertise you have in managing the platform, as well as application considerations if any.</p>
<p>Just a suggestion, maybe the AWR snapshot should have a version column/field to differentiate between Oracle Versions</p>	<p>Each AWR report does have the release information in it. If you are asking for this to be in the DBA_HIST_SNAPSHOT view then you are correct that the release information is not in that view.</p>
<p>Any example of heterogeneous migration/upgrade?</p>	<p>We don't have heterogeneous migration as part of this video series. Techniques such as data pump expdp/impdp and transportable tablespaces with incremental backups are covered in the slides and (in the case of Full Transportable Export/Import) videos on the upgrade blog, https://mikedietchde.com/</p>
<p>Hello, I wonder whether there are any document that relates to upgrading the grid software to 19c on a Solaris super cluster platform?</p>	<p>The Solaris GI install & upgrade guide is here: https://docs.oracle.com/en/database/oracle/oracle-database/19/cwsol/index.html and the Supercluster information center on MOS is here: "Information Center: SuperCluster (Doc ID 1424503.2)"</p>
<p>How many CDB can be created on a single host?</p>	<p>There is no limit of CDBs on a host - but there are practical limits defined by the amount of memory, cpu etc.</p>
<p>Sorry my question I put earlier.. I wonder whether there are any document that relates to upgrading the grid software to 19c on EXADATA running on a Solaris super cluster platform.</p>	<p>I'm not a SuperCluster expert, but I might start with this even though it's about patching, because patching and upgrade for GI is similar: SuperCluster - Patching Best Practices For The Quarterly Full Stack Download Patch (Doc ID 1569461.1)</p>
<p>Can we change rac non cdb,pdb databases to cdb,pdb databases?</p>	<p>Yes, CDBs work well in a RAC. You can have a PDB available on all or a subset of nodes, etc. AutoUpgrade will handle this as well.</p>
<p>Can you have multiple PDBs which have different character set in the same CDB</p>	<p>Yes, this will be covered later in the session. The short version is this is supported from 12.2.0.1 onwards and the CDB must be AL32UTF8</p>

Question	Answer
Do you recommend multiple user PDBs on one CDB to be used for different purposes i.e. Dev/UAT/Prod? Would it have an effect on the prod performance as resources are shared across PDBs?	I would likely not combine dev/uat/prod in one container, simply because the SLAs for those PDBs would likely be very different. And things like Data Guard are at the container level, not the PDB level.
How do you connect to the same service name on different PDBs?	Each PDB is available via service name. I'm not sure what you mean by same service on different PDBs -- would you have the same service on multiple non-CDBs?
Will the TWO_TASK and ORACLE_PDB_SID use together or conflicting each other?	Choose one or the other
Do we install features such a Oracle Text, java vm and java packages on CDB level or PDB level. We installed Oracle Text on the CDB level, and there were invalid objects in the PDB related to Oracle Text, which were fixed after installing the Oracle Text in the PDB.	The only component that should be installed locally in a PDB is APEX. All others should be installed in the CDB\$ROOT. In your situation, the invalid components in the PDB should not be fixed by installing Text in the PDB, but by diagnosing the problem and fixing using the common component in the root.
How to remove RAC component (which says OPTION OFF) after migration?	There is no need to remove the RAC component. Just set CLUSTER_DATABASE=FALSE and you're fine
If we don't have APEX in CDB root, how can a PDB have it?	You can (and should) install APEX directly in the PDB as a local component
What is the important purpose of using pdb's, cdb's, what are the features of it use?	This session is covering some of the features that you will gain by migrating to the Multitenant (CDB/PDB) architecture. Bear in mind that Database 19c is the final version of Oracle that will support the non-CDB architecture. Also remember that in 19c, you may have 3 PDBs without requiring the Multitenant license
Is there an option in AutoUpgrade to copy Datafiles from Source Server to Target Server?	No, AutoUpgrade doesn't copy to new servers. We expect EM or FPP will do that when we integrate with them.
Can Apex 19.x/20.x run in non-CDB? or does it need to be multi-tenant	Yes, APEX 19/20 can still be installed and works in the non-CDB architecture.

Question	Answer
<p>If I have multiple PDBS - one per developer - but the application tier connects using a service name, how does each developers app tier connect to the same service name but in their own PDB?</p>	<p>How would you do that with multiple non-CDBs? I would think it would be the same? Each PDB will need a service of its own - ie a service name cannot point to multiple PDBs. Each PDB also gets a "default" service which should not be used for application connections - you should create at least one user defined service per PDB so you can configure features like Application Continuity</p>
<p>I want my developers to be able to create PDBs as required but not give them sysdba/elevated privs - is this possible?</p>	<p>Yes, using lockdown profiles and common users that would be very possible. We will get to lockdown profiles later in the talk.</p>
<p>Do we have a one node RAC in Oracle 19c? Could we also upgrade from standalone 12c to 19c one node RAC directly?</p>	<p>RAC One Node does exist. You could upgrade directly from 12c to 19c, but enabling RAC would likely need more than just adding cluster_database in the post-upgrade init file</p>
<p>When will be possible create a PDB with a charset different from cdb\$root? I know that I can plug a pdb with a different charset but actually I can't create a new with a different charset... Why that limitation when creating new pdbs?</p>	<p>This will be covered later in the session, but to allow different charsets, the CDB needs to have charset AL32UTF8 (and be version 12.2 or higher)</p>
<p>Should I change TNSnames.ora and application connection string after converting non-CDB to PDB? (Lorensius , Jakarta)</p>	<p>The PDB gets a new default service name of the PDB name, so if you keep the same name you don't need to update TNSnames or connection string. But if you change the PDB name then you would.</p>
<p>With the conversion from non-CDB to PDB do you end up with a somewhat emptied out SYSTEM tablespace in the PDB, if it is clearing down the dictionary a bit and linking out to the CDB? Is there ever a case where space recovery is then suggested?</p>	<p>Good question. I'm not sure that space recovery is really possible in the SYSTEM tablespace</p>
<p>Is database link and datapump available to SE2?</p>	<p>Yes. Data Pump has restrictions in SE2 (no compression, no encryption, no transportable, no PARALLEL) but dblinks work</p>
<p>Can we install another CDB on a different server, unplug the DB and plug it into the newly created CDB, and then move it back after upgrade?</p>	<p>Sure, as long as the original CDB is upgraded as well, or as long as you create a new CDB on the original server</p>

Question	Answer
Is catpcat.sql equivalent to catalog and catproc scripts? Could you explain the pubpbd script ?	Yes I guess catpcat.sql is equivalent to catalog.sql and catproc.sql, but uses parallelism to run them. I'm honestly not familiar with pubpbd.sql
For creating the database manually, we create the parameter file for the PDBs but should we create a parameter file for the CDB, or would there be a standard template that can be used?	I would also use a CUSTOM database in DBCA, or create it custom yourself. In our view the standard templates are a "one size fits none" case when it comes to production databases.
There seems to be an interchangeable meaning between CDB___ and PDB___.	The term "container" is somewhat overloaded - ie both the CDB and PDB are containers - but CDB means the Root Container and PDB is the Pluggable database(s) that get plugged into the CDB.
If I have few database version 12..2.x and 18.3.x, can I still use the autoupgrade.jar method?	Yes you can. Source databases 11.2.0.4, 12.1.0.2, 12.2.0.1, and 18 all work with AUtoupgrade. DTarget versions 12.2.0.1, 18 and 19 (but of course we recommend 19)
cdb\$root and pdb\$seed, are they the same?	No, the CDB\$ROOT is the CDB (also called the root container). PDB\$SEED is the shell PDB that is included to allow creation of new PDBs from a "template". The PDB\$SEED is plugged into the CDB (CDB\$ROOT)
Do you have the steps of how to open unpluggable database as normal database?	Mike will talk about fallback...in short, there is no conversion back from PDB to non-CDB short of data pump or transportable tablespaces.
How can I see the list of lock down profile set?	There is a view dba_lockdown_profiles. https://blogs.oracle.com/multitenant/a-simple-guide-to-lockdown-profiles
If you have development and test databases on one server - do you recommend having a separate CDB for the different workloads (i.e. one CDB for dev and another for Test)	Yes, I would recommend that. You will likely have different needs for patching, for example, between dev and test, and patching is done at the container level.
In regard to Mike Lockdown profile, normally only sys/system user can do the alter system command inside the PDB level. What is the reason to implement the LOCKDOWN please?	That alter system lockdown was just one example of what you can do. Lockdown profiles are extremely flexible. For example, in our cloud PDB services we use lockdown profiles to prevent the generation of trace files by unprivileged users.
How to create a new pdb with a different charset from cdb\$root?	Your CDB\$ROOT must be 12.2 or higher and its charset must be AL32UTF8. You can then choose to

Question	Answer
	have PDBs with different charsets plugged into that CDB
I create PDB use create command, and all datafiles are located under <path/A532DF04F2936BD4E0538364000A5B2F/datafile/o1_mf*>. Also find this funny name as a service under listener. What is the usage of this funny name?	Hmm... looks like maybe an OMF (Oracle Managed Files) situation?
Does Oracle E-Business Suite now support running under PDB's?	Yes, in fact for 19c EBS is certified ONLY in single tenant (CDB with 1 PDB)
What about PeopleSoft DBs, can they stay as non-CDB or they must be upgraded to CDB %2BPDB	I believe they can be either. But PSFT supported PDBs since 12.1.0.2.
Can you do TTS migration, ASM to non-ASM and vice versa?	Yes you can, but the copying of files means using the ASM copy commands.
Is there a way of retrieving encrypted passwords for Oracle roles, as we do for Oracle users?	dbms_metadata.get_ddl should be able to get the full DDL to create the role (including the encrypted password)
Is it a recommended approach to take a VM snapshot before upgrade and simply revert to snapshot in case upgrade fails?	It is recommended that you have a failback plan and that it is tested. Using a VM snapshot could indeed be a way of providing a failback in the event of a failed upgrade. You may also want to failback at some time after the upgrade which may mean that using a snapshot would result in data loss
How about upgrade to the Oracle Home on the standby database?	You should install the new version (ie upgraded) of the Oracle Software in a new ORACLE_HOME and then move the standby database to the new ORACLE_HOME
Is possible to take VM snap on Exadata X7-2	As far as I know the default Exadata filesystem doesn't do snapshots. You would need ACFS, I think.
Is the 19c upgrade occur automatically on the standby DB? What are the other steps required - if any?	you would need to 1) disable the broker if using it (just during the upgrade), 2) defer redo log shipping, 3) shutdown the standby and get it ready to start in the new 19c home. Then after the primary is upgraded, open the standby in managed recovery mode and the redo apply will upgrade it.
Can I have the link to download the 19c binaries?	https://edelivery.oracle.com is the best place to download all Oracle Software

Question	Answer
Is cloning a PDB across CDB -- Prod to DR site, a valid way of creating the data guard target before starting DG between Prod and DR?	You would need to have data guard already set up between the primary and standby CDB. When you do that, the CREATE PLUGGABLE DATABASE statement gets replicated, but if you plug a PDB into the primary, the data files won't get replicated. So, if you want to plug a PDB into the primary, you need to copy the files to the standby prior to issuing the CREATE PLUGGABLE DATABASE command.
Approximately, how long should and 12.1.0.2 (noncdb) database take to migrate to 19c multitenant database (db size being 150TB)	It really depends on the complexity of the dictionary, not the size of the database. A usual range would be 30-120 minutes including the noncdb_to_pdb conversion.
Any pointers/link on RAC upgrade?	For RAC/GI, always start with “ RAC and Oracle Clusterware Best Practices and Starter Kit (Platform Independent) (Doc ID 810394.1) ” Beyond that, The GI upgrade information is in the installation and upgrade manuals, which are platform specific. So, I would start with those, and then also always look at
I thought support/patching for 12.2.0.1 ended November 2020. Has it been extended until 2022 now?	Oracle has announced Limited Error Correction support (ie not premier or extended support) for 12.2.0.1. This ends March 31 2022. MOS note 161818.1 has more detail on this
Is Oracle Data guard included within 19c license cost? Or would we need to purchase / license it additionally and separately?	Data Guard is included in Enterprise Edition (since Oracle 8i). Active Data Guard, is a licensed option, and includes features such as Real Time Query, Automatic Block Media Recovery, Fast Incremental Backup on Standby, DML Redirect and others
Does the Multitenant license fee go away in 20c?	With Oracle 19c, you can create 3 PDBs (excluding the PDB\$SEED) per CDB without requiring the Multitenant Option. This has not changed in 20c. Oracle 12.1 - 18c allow only 1 PDB before requiring the Multitenant Option

Question	Answer
<p>Standardisation of software installations can still be achieved via the OEM LifeCycle Pack and/or Rapid Home Provisioning. Why would we switch to Ansible and introduce yet another tool to be learnt and licensed?</p>	<p>You are correct that Enterprise Manager (EM) has similar features, though they are often seen as Oracle centric and are very powerful in that regard. Also EM is used for ongoing monitoring and management of Oracle. Ansible and Terraform are more and more commonly used, especially in cloud environments. Really it comes down to choice.</p>
<p>And which version of Docker are you going to certify with Oracle RDBMS?</p>	<p>MOS Note - 2216342.1 is the best place to check support of Oracle DB on Docker</p>
<p>Any good reference notes/links you can recommend on using Ansible for Oracle?</p>	<p>Check out https://github.com/oravirt/ansible-oracle. Not an Oracle created resource, but very useful for getting up to speed reasonably quickly with Ansible</p>
<p>Starting with Oracle Database 20c, an Oracle Database installation configures all Oracle Database homes in read-only mode by default</p>	<p>Read-Only Oracle Homes are used to decouple the configuration, logging and audit information of databases from the binaries that run the database. Doing so makes it easier for Oracle and customers to better manage the software without needing to be concerned about potential important configuration or logs being misplaced.</p> <p>Oracle has recommended that RUs & Patchsets be installed out of place (ie don't patch into an existing Oracle Home) for several years. Read Only Homes make enforcement of this and fallback to a previous Oracle Home is easier.</p>
<p>How is the performance of Oracle DB working within Docker? Is it recommended for Production?</p>	<p>The overhead of Docker is negligible, but you should take care when running Oracle in Docker as some features – such the DB Resource Manager – do not have integration with Docker and may not be fully aware of the runtime environments behavior – for example, Docker containers tend to expose all CPUs from the underlying host which in turn is used to set CPU_COUNT which is used to further derive other performance related parameters.</p>

Question	Answer
	<p>Should you use Docker for Production? It depends. Oracle supports running Oracle in Docker – see MOS note 2216342.1 – but our recommendation would be not to under most circumstances. Patching & High Availability are significantly different (or features like RAC not supported) that ongoing management of such a deployment is likely to create more challenges than Docker may appear to solve.</p>
<p>Any new OS added or removed with 20c release?</p>	<p>The full list of supported platforms that Oracle 20c will be made available on has not been finalised and made public yet. MOS Note 742060.1- Release Schedule of Current Database Releases – is the best place to track such information</p>
<p>How do you manage packaged apps and their certifications to run 19c? We have a bunch of 11d dbs</p>	<p>It depends very much on the application vendor whether they certify their app on Oracle 19c. Oracle has a program to help ISVs certify their applications – please reach out to your Account Manager and they should be able to help arrange a discussion between your ISV & the Program Manager.</p>
<p>Hi.. Want to do 19c upgrade sing manual method. Is there any doc id where I can find pre-checked and upgrade process?</p>	<p>The best place for all upgrade information – including manual upgrade – is the Database Upgrade Guide in the 19c documentation https://docs.oracle.com/en/database/oracle/oracle-database/19/upgrd/index.html</p>
<p>Can you please suggest on upgrade to Oracle GoldenGate 19c (inplace upgrade)</p>	<p>The use of GoldenGate for upgrades mostly depends on the downtime allowable for the database. The smaller the outage window, the more likely you will be to use GoldenGate.</p> <p>If you are currently using GoldenGate for data replication, you will need to upgrade GoldenGate to GoldenGate 19c to maintain compatibility.</p>
<p>When moving to container architecture, how do you decide how many pdbs per container and which pdbs to group together? Different strategies for DEV/TST/PRD? Is DB size a consideration? Or do you group by application?</p>	<p>There is no one recommended answer to this question. It depends on the workloads in question, security requirements, hardware platform, HA/DR requirements, business operations model and many more. Talk</p>

Question	Answer
	to your account manager and ask them to connect you with a database engineer
I was wondering if you had time to let us know of any planned upcoming enhancements to refreshable PDB's.... they are a marvellous feature for test/dev environments.	Unfortunately, we did not have time to cover many of the features of the Multitenant Architecture, but we're pleased to hear the you find the refreshable PDBs useful. We are looking at running more webinars soon – a greater deep dive into Multitenant is a good potential topic.