

ID	Exa-Platform Template 3/19/2018	Mandatory? (Y ¹ or N ²)	Need for Initial Migration (Y or N)	Comments
Middleware				
1	Fusion Middleware products will be 12cR2 or higher.	Y	Y	AppDev: Yes
2	Applications will be required to run on cluster (i.e. more than one managed server per environment).	Y	N	AppDev: Which ones do not currently meet this – need to follow-up on specifics. Design review response: Hosting team will follow up with us. Infrastructure: OVS2, DataHub-JMS, and MERITS Batch
3	All applications will be configured with JDK 8 update 131 or later. This version will freeze as of 6/1/2017 in favor of a scheduled approach.	Y	Y	AppDev: Won't you change this before we even get to touch the environment? Need to develop and manage a Java Management protocol jointly. Follow up at design review how does this correlate to the Linux 6 requirement. Design review response: Can we agree to JDK 8 131 for June 1, and agree to come to a joint decision on how to manage updates to Java in the environment later? Infrastructure: <i>(This version changes rapidly and critical updates to Java will need to be addressed promptly i.e. more frequently than quarterly).</i>
4	Applications will be able to deploy multiple copies using different context-roots on a single domain, if applicable.	N	N	Appdev: No for initial deployment, we agree to set as a long-term goal. Reasoning – seems like a

¹ Items noted as “Yes” in the Mandatory column must always be met.

² Items noted as “No” in the Mandatory column, generally must be met too, but in rare cases may warrant an exception. Failure to comply with these requirements will require a mandatory-meeting to discuss the exception and compliance.

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				<p>discretionary requirement which could prevent success in making 12/18 goal for all applications.</p> <p>Design Review response: Keep communication open. This is highly desirable. May become a factor in the operational billing later.</p> <p>Infrastructure: Until this is address application teams can have a maximum of 3 active environments.</p>
5	<p>If your application requires Session State Replication, Oracle requires that all objects be serializable. See the following document for full detail:</p> <p>https://docs.oracle.com/cd/E15523_01/web.1111/e13709/over.htm#CLUST206</p>	N	N	<p>AppDev: Why – can we follow up on specific pain points?</p> <p>Design Review Response: EIS Specific Issue, unserialized objects cause errors in logs making problem identification difficult.</p> <p>Infrastructure: No this should not be an issue for MAIRIS. Currently only one system uses this configuration due to session state issues. All other systems have not had this as a requirement.</p>
6	All URLs defined will be required to use SSL.	Y	Y	<p>AppDev: Yes</p>
7	All SSL communication will use SHA2, TLS 1.2 and ECDHE Ciphers.	Y	Y	<p>AppDev: Yes – subject to waivers.</p> <p>Infrastructure: (The published URL is an all or nothing modification. Setting Y to mandatory for that reason)</p>
8	<p>Applications are required to use the Load Balancer's addressing; no bypassing (by way of direct-URLs) of the LB will be allowed for security scanning or end-user application access. We've discussed with the security team and they feel the issue is not with the tool but with the individual applications.</p> <p>Please see: Direct URL Memorandum of Understanding</p>	Y	N	<p>AppDev: Problematic for troubleshooting and validation of inconsistent end user functionality. Leaning toward no, but we should talk more.</p> <p>Design Review response: This is a real pain point, due to applications having not following</p>

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				<p>agreed protocol before. Instance specific URLs have been hard coded to applications and shared with agency end users causing maintenance window problems and apparent outages that were not expected based on load balancer coverage.</p> <p>Infrastructure: Please see the MOU (to the left).</p>
9	<p>If an application has a hardcoded connection to a database, i.e. JDBC connections, we will not troubleshoot issues. We will instead ask that you migrate to WebLogic-data-source prior to assisting with any JDBC connection issues.</p>	N	N	<p>AppDev: How many of these happen each month? Most of our batch processes do not use Weblogic. Having the DBA time divest responsibility for troubleshooting connection issues is problematic. We agree we need to be equally responsible for this on the client side, but we need some access to troubleshooting and database monitoring information here. It's not feasible to convert everything to Weblogic data sources. We will use LDAP whenever possible.</p> <p>Infrastructure: We need the developers to provide the insight to the connections and provide debugging information to the logs.</p>
10	<p>Timestamps in logs within an application's code... (i.e. to assist in troubleshooting) AND error-free logs. These two items will significantly assist in troubleshooting.</p>	N	N	<p>AppDev: At face value this does not seem achievable in the timeline. Perhaps you can give us a set of examples to review logs that are problematic from a hosting perspective.</p> <p>This seems like standards that are the purview of the applications area to set.</p> <p>Infrastructure: EIS as a prime example (missing timestamps and has lots of errors in its logs), however most</p>

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				<p>applications have errors in their logs that are not being reviewed or addressed before the issue occurs.</p> <p>We agree that all the issues noted in these logs aren't immediately able to be resolved. However, we'd like to ensure that logs are configured correctly (such as timestamping) and that there are procedures in place to periodically review the errors contained in the logs. As errors are discovered we, the infrastructure team, will also open footprints tickets.</p>
11	Build metadata/deployment descriptors that include the application version.	N	N	<p>AppDev: We do not expect to achieve this for deployment to the new environment. Vendors may push back, would need to have contract amendments to enforce. May not have bandwidth to address custom coded applications. Was not in expected budget.</p> <p>Infrastructure: We believe this is a low-hanging fruit item and should be easy to implement. We are trying to reduce the risk of incorrect deployments based upon confusion about which app-version.</p>
12	Applications must utilize self-service access to logs, forms and reports via a "Jump Box" (i.e. A small vServer that is available to allow the development teams upload and compile forms, reports, review logs, and upload ear/war files for deployment etc.).	Y	Y	<p>AppDev: Yes – but assume that is at no additional cost.</p> <p>Design review Response: Storage of logs is charged; no charge for the jump box.</p> <p>Infrastructure: Confirmed – Storage of managed-server.out logs is charged; no charge for the jump box.</p>
13	Standard logging is 30 days.	N	N	AppDev:

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				<p>Assuming this is Manager Server Logs only: Yes for online log access. Need to archive logs for how long...</p> <p>Infrastructure: Application Level Logging must be handled by app teams.</p>
14	<p>Oracle recommends min/max data sources to be the same. This will need to be implemented sometime after FY20/21 (i.e. after the new billing model is implemented).</p>	N	N	<p>AppDev: Technically this seems feasible, but we need to understand how this will drive the Oracle Billing because of the concurrent connections parameter in the rate. This cannot have a negative impact on the budgets.</p> <p>Infrastructure: This will not affect billing - period; To be addressed after the new billing model is implemented (e.g. FY2020)</p>
15	<p>Service-Accounts: are utilized to connect to databases from the application servers. These must comply with the following security policies:</p> <ul style="list-style-type: none"> • Security Policy: Section 5.15 • “The Database Account Operating Procedure” <p>These Service-Accounts will be given a restricted level of permissions. Developers and end-users will not be allowed to use these Service-Accounts.</p>	N	N	<p>AppDev: How will you functionally manage the permissions of the developer accounts that have to create objects in multiple schemas?</p> <ul style="list-style-type: none"> • Update 1/23/2018: • See the: “The Database Account Operating Procedure” <p>The implications here are wide ranging. Massive budget and resource implications for this requirement.</p> <p>Infrastructure: This is a security-risk that must be addressed. We’ll work with AppDev to correct. Service Accounts will be created with only permissions to be able to run the application. Developers should be coding with schema.object_name, if calling multiple schemas.</p>

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16	<p>Web PLSQL applications will be required to move from Oracle Web Servers and the use of mod plsqli to Oracle Application Servers via RESTful Web Services. The use of mod plsqli has been deprecated by Oracle and no longer available. There may be some modifications required for the applications to support this new direction, further validation will be required.</p> <p>https://docs.oracle.com/middleware/1221/wls/RESTF/intro-restful-service.htm#RESTF111</p> <p>As of 8/8: default pages do not work correctly with RESTful Web Services (known bug with Oracle). Basic Authentication is not supported and an enhancement request has been submitted to Oracle. Document Upload feature is currently not supported but planned by Oracle in a future release.</p>	Y	N	<p>AppDev: Public Safety (At minimum) needs to work with middleware team to understand how to comply with this. We would use Public Safeties experience to make a determination.</p> <p>CHRI UCR TAMS DOL Appeals Website ITBA</p> <p>Infrastructure: So long as Public-Safety will not object to FIPS 140-2 testing then this plan will work.</p>
17	<p>All application must test their failover for both database and middleware (i.e. Mandatory Failover as part of application deployment certification moving to production). A minimum of yearly test thereafter.</p>	Y	N	<p>AppDev: Not all applications have the same availability requirements. We recognize that many systems will require this anyway given PII/PHI. Our major concern is how will you fail over NFS shares and pointers to them? Our estimates for implementation is 5-15% of the project cost for 60% of the existing applications (the ones not yet tested), and then 5-15% of the annual budget? What is the cost of not being able to fail over all applications? Is there ROI for this requirement.</p> <p>Infrastructure: NFS replication can be utilized for NFS Share failover. Exa-failover is an all or nothing exercise. There should be no cost here other than the resource-time-allocated to test.</p>
18	<p>Patch Bundles (MW, OS, and DB) will be applied quarterly, these will include Java updates and severe or critical updates will be addressed more frequently than quarterly if needed.</p>	Y	N	<p>AppDev: Yes - Java needs to be managed separately, concern about Oracle Forms applications.</p>

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				Infrastructure: We agree.
19	Due to constraints of the Oracle Forms and Reports products we are unable to modify their context roots. This prevents us from hosting both the current and new versions with the same URL. To resolve this conflict these products will be required to use a new URL.	Y	Y	AppDev: Yes - look forward to working with you on this. Infrastructure: Thank you.
20	A migration to a new URL it would eliminate this risk and complexity of the migration. <i>During the initial configuration steps of the Load Balancer an issue was discovered that will increase the risk of outages to the legacy environment.</i>	N	Y	AppDev: No, this would cause too much pain and suffering on our user communities. Design review response: Historically this has caused outages due to complications. The hosting team recognizes the end user challenge. Does it help that they only expect URL changes once every 18 months? [due to oracle upgrades] App Response We would prefer to not change URLs for upgrades Infrastructure: If both OTDs are shut-down it LB sites will break.
21	All host to host names must use Fully Qualified Domain Names (FQDN).	Y	N	AppDev: Yes Infrastructure: Thank you
22	Server-to-server "call pointers" must be corrected to utilize the correct network to ensure the applications take advantage of the exadata-exalogic InfiniBand connections in order to reduce network congestion. <i>(Network calls inside of the same EXA pair. Some modifications of code may be required to take advantage of this internal fabric. For example, if a call today originates from the client and a secondary component is called from that application the origination of the call may need to be moved from the client to the middleware to ensure it's traversing the fabric.) A cookbook will be created and provided after initial deployment of the applications has been completed.</i>	Y	N	AppDev: Our object is to deploy and certify in the new environment. Performance enhancements will need to come at a later date. We will want to do this. But do not see it as a requirement. Please provide examples of this type of configuration. Infrastructure: Updated language to clarify the requirement.

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23	<p>A list new features and items that have been deprecated in middleware 12.2; Please see: New features: https://docs.oracle.com/middleware/12212/wls/NOTES/whatsnew.htm#NOTES107 Deprecated features: https://docs.oracle.com/middleware/12212/wls/NOTES/whatsnew.htm#GUID-1E508E2E-3033-4F07-B25D-AAC538614E7B</p>	N	N	
24	<p>A list new features and items that have been deprecated in Java Development Kit (JDK) 8; Please see: New Features: http://www.oracle.com/technetwork/java/javase/8-whats-new-2157071.html Incompatibilities: http://www.oracle.com/technetwork/java/javase/8-compatibility-guide-2156366.html#A999387 Deprecated APIs: http://www.oracle.com/technetwork/java/javase/8-compatibility-guide-2156366.html#A1000033</p>	N	N	
25	<p>A list new features and items that have been deprecated in Oracle Forms/Reports 12.2; Please see: New features:</p> <ul style="list-style-type: none"> • http://www.oracle.com/technetwork/developer-tools/forms/documentation/oracleforms-12210-newfeatures-2906037.pdf • http://docs.oracle.com/middleware/12211/formsandreports/build-reports/orbr_graph002.htm#RSBDR2286 • http://docs.oracle.com/middleware/12211/formsandreports/use-reports/pbr_tune001.htm#RSPUB23737 <p>Deprecated Features: http://www.oracle.com/technetwork/developer-tools/forms/documentation/faq-for-upgraders-3176010.pdf Q: Have any features been deprecated in Forms 12c? A: Between version 11 and 12, no features have been deprecated or de-supported. Refer to the "Upgrading Oracle Forms 6i to Oracle Forms 12c" document in the Documentation Library for details. https://docs.oracle.com/middleware/12211/formsandreports</p>	N	N	
26	<p>A list new features and items that have been deprecated in OHS (Web PLSQL Applications)12.2; Please see:</p>	N	N	

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	New features: https://docs.oracle.com/middleware/1221/webtier/administer-ohs/whats_new.htm#HSADM1172 Deprecated: mod_plsql in favor of Rest Data Services: https://docs.oracle.com/middleware/1221/webtier/administer-ohs/whats_new.htm#CHDBGAAH			
27	Currently the requirement for application hosting is a minimum of one application deployment in pre-production if deployed to production. In the new 12.2 environment, we will also require that if the application is deployed to the internet a pre-production site will also need to be published.	N	N	
28	We plan to move forward with the Incapsula product. This is an offering provided by the network team in which it will provide DDoS protection. This implementation involves a modification of the DNS. It's a relatively low risk change and has been very successful to date. Please note this is only an internet application offering. We hope to move forward with this work in a few weeks starting in pre-production. We will provide an RFC to track the process.	Y	N	Infrastructure Team: There is no additional licensing costs associated with the use of Incapsula.
29	We currently support TCPS aka Encryption in Flight for database connections when created via a WebLogic data source. If the JDBC connection is created inside the application and EIF is required, we will provide a centralized Oracle Wallet for the EIF certificate. This method allows the application to read the wallet without a password and is the most secure option currently known. This method will require the oraclepki.jar to be used and added to the application code. Other methods will not be supported.	N	N	
30	Applications will be required to pass a username/password via a secure/encrypted cookie to run Oracle Reports. We are currently researching the use of Oracle Access Manager (OAM) with Oracle Reports.	Y	Y	New as of 8/6/2017
31	All images for Java applications must be packed inside of the WAR and/or EAR file(s).	Y		New as of 8/6/2017
UNIX				
31	Oracle Linux 6 OS or higher is supported.		Y	AppDev: Yes
32	On vServers and Exadata nodes the default user umask will be set to 027.		N	

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33	Host-Based-Firewalls will be implemented; All outgoing communication is allowed; Inbound communication will be restricted on a port basis.		N	
34	Secure and best-practice SUDO usage will be enforced. Users will be members of POSIX groups; the group affiliation will define the rights granted to the users. (i.e. Will use SUDO to enforce least-privileges) <i>Please see: SUDO Best Practices at SoM</i>		N	
35	All users will use and maintain their individual user account passwords when directly logging into the systems. Access to shared accounts (such as Oracle) will be granted via SUDO privileges. All Passwords will expire in accordance with security policy.		N	
36	All Oracle-Admin and OS-Admin Accounts will require 2-factor authentication.		N	
37	Service-Accounts and Active-Accounts are classified differently: <i>Please see: SOM Unix Account Types</i>		N	
38	Native OS file system vServer data is not persistent; all application-related configurations will reside on file shares only.		Y	AppDev: Yes.
39	Automated auditing will be performed to identify world write, read and execute permissions on files/folders (Aka 777). The infrastructure team will work with the owner to remediate. This is part of the State security policy and findings in countless audits.		N	
Database				
40	All databases must support encryption in flight (AES-256 or FIPS 140-2); SSL Certificates will still be required for FIPS 140-2. This is from the App Deploy Cert policy: (https://www.maine.gov/oit/sites/maine.gov/oit/files/inline-files/application-deployment-certification.pdf), Section V.B.5: "All personal, medical and financial data, in motion, must be encrypted end-to-end, both inside and outside the State firewall. All personal, medical, and financial data must be encrypted at rest in the Demilitarized Zone. Data hosted on servers inside the firewall are not subject to encryption, but data resident in portable computing devices must be encrypted at all times." (SOM will be using a three-year self-signed cert)	Y	N	
41	All databases will be configured with AES-256 encryption at rest.	Y	N	
42	All databases will be on Oracle 12cR2.	Y	Y	AppDev: Yes.
43	All Oracle Clients will be 12cR2.	Y	Y	

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	Please see the matrix of Client Interoperability .			
44	<p>To communicate via TLS1.2, the client must be 11.2, 12.1 or 12.2, however we were not able to find a certification matrix for TLS 1.2, therefore the 12.2 is the State of Maine's Oracle team recommendation.</p> <p>To communicate via TLS1.2, the client must be 12.1 or 12.2, however we were not able to find a certification matrix for TLS 1.2, therefore the 12.2 is the State of Maine's Oracle team recommendation</p>	Y	Y	<p>AppDev: Yes – Note: Windows 12.2 Client not yet available. ** May need waivers for some non-oracle windows based clients (Powerbuilder, GQL as examples) .</p> <p>Design review response: 12.2 client is available here: the 12.2 windows clients (64 and 32 bit) are available at version 12.2.0.1.0. Please see: http://www.oracle.com/tech/network/database/enterprise-edition/downloads/oracle12c-windows-3633015.html</p>
45	Oracle and application type schemas will not support invalid database objects.	Y	Y	
46	There will be no multi-tenancy containers at the DB level.	Y	N	
47	The default block-size of a DB will be a min of 8k on OLTP Databases and 16k on data warehouse databases.	N	N	
48	The default character-set will be AL32UTF8.	N	N	
49	<p>All Oracle DB-Passwords will be set to expire; Oracle password verification will be enforced; Passwords are required to have a minimum of 8 characters in length.</p> <p><i>Please see the SoM Modified 12C SCESM for guidance; Items in green apply to the Exa-Platform and this Template.</i></p>	Y	N	<p>AppDev: Need to talk about the set to expire. By policy we expect these to change regularly but if a password for a batch user expires at the wrong time this could cause cascading impacts. The current environment does not enforce this. Legacy applications could have as many 80 updates required to implement this.</p> <p>Infrastructure: Please see the SOM Security Policy.</p>
50	<p>Database Grants, Privileges, Parameters will be altered to enforce audit findings.</p> <p><i>Please see the SoM Modified 12C SCESM for guidance; Items in green apply to the Exa-Platform and this Template.</i></p>	Y	N	

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	Audit logs will be retained for a period of 7 years.			
51	Databases must set "sec_case_sensitive_logon=TRUE" (i.e. passwords are case-sensitive)	Y	N	Infrastructure: See the SOM Security Policy.
52	No DBA privileges allowed; Only "Application_DBA" privilege to Schema/Users.	Y	N	
53	Default listeners on Port Number 1521 is not allowed.	N	Y	AppDev: Yes.
54	Setting Huge Pages and allocation of memory to SGA and PGA as suggested by OEM/Memory Advisor or Performance Tuning.	Y	N	
55	"ANY" Privileges granted to SCHEMA/Users on EXADATA databases will not be allowed.	Y	N	
56	<p>Conversion of either a basic Blob or storage object to a Secure File object-type will be done during migration at the app dev team's request. (The CLOB/BLOB conversion is not because it's deprecated, it's because in 12cR2 the default changes to secure file.) Please see Oracle's guidance on managing LOBs in Oracle 12C here: http://docs.oracle.com/cd/E11882_01/appdev.112/e18294/adlob_smart.htm#ADLOB4444</p> <p>Please see matrix of databases that as of 4/6/2017 have Clobs/Lobs and/or secure files.</p>	N	N	
57	<p>CLOB storage of XMLType, also known as unstructured storage, is deprecated. Use binary XML storage of XMLType instead.</p> <p>Deprecated Features: https://docs.oracle.com/database/122/ADXDB/release-changes.htm#GUID-CE23F20F-C1C1-4B63-AE09-24AA88354BBC</p> <p>Desupported Items (7): https://docs.oracle.com/database/122/UPGRD/desupported-features-oracle-database-12c-r2.htm#UPGRD-GUID-685A0333-1051-4306-B84A-574DAFE799B2</p> <p>Items being deprecated (21): https://docs.oracle.com/database/122/UPGRD/deprecated-features-oracle-database-12c-r2.htm#UPGRD-GUID-C34B4093-97BE-4237-9BE4-F45450F23BA3</p>	N	N	New as of 5/23/2017
58	Database Naming Conventions must adhere to the following: PRODUCTION – Ending with PROD, PRD, PD or P; TEST - Ending with TEST or TST or T; DEV – Ending with DEV or DV or D or DEVL; If you have multiple	Y	N	

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	databases in one environment, you can suffix them with an A, B, C, etc; AND cannot exceed 8 characters in length/cannot include a number.			
59	Altering Index, monitoring Schema index – EXADATA require less index.	Y	N	
60	Schema owners should enable schema-index-monitoring. (To proactively delete unused indexes for performance)	Y	N	
61	LDAP entries will be the same as their database name.	Y	N	
62	By default TNS entries are not provided.	Y	N	
63	All databases will include schemas to collect billing information.	Y	N	
64	All databases will have block-change-tracking enabled by default.	Y	N	
65	A list of new features and items that have been deprecated in Oracle Database 12.2; Please see: https://docs.oracle.com/database/122/ Within the above link please refer to sections: “Learn about this release” → “New Features in Release 12.2” and “Deprecated, De-supported, and Changed Features”.	N	N	
66	All database links must be set up using a userid in the target database that has the least amount of privileges to complete the task for which the database link is being set up.	Y	N	New as of 4/28.
67	A list of all 12.2 database parameters can be found here: I:\Projects\Oracle Refresh\Questionaires\12.2RDBMS_Params	Y	N	New as of 4/28.
68	All databases will be set to a compatibility equal to the RDBMS version, which is currently 12.2.	Y	N	New as of 4/28.
69	UTIL_FILE_DIR will no longer be acceptable. References to UTIL_FILE_DIR must be changed to use Oracle Directories.	N	N	New as of 4/28.
70	All Production databases will be clustered.	Y	N	New as of 4/28.
71	The Pre-Production and Development databases will reside in the same clustered environment, but in different Oracle Homes.	Y	Y	New as of 4/28.
72	The Production and Pre-Production databases will be Data Guarded (unless they undergo routine refreshes, or app dev states that it is not needed for a particular database).	Y	N	New as of 4/28.
73	The Development databases will not be Data Guarded.	Y	N	New as of 4/28.
74	As we migrate databases from the RAC/Legacy environments to the new Exadata Platform, the database names will not remain the same.	Y	N	New as of 5/3.
75	Cross-Platform-Pointing is prohibited.	Y	Y	New as of 9/25.

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	(e.g. 12c Exalogic app to 11g RAC db OR 12c Exadata DB to 11g non-exalogic MW and vice versa)			