

Upgrading to Release 11i – Lessons Learned

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Abstract

Now that the long-awaited Release 11i is available, it's time to upgrade ... again! We'll share proven strategies to help make your upgrade project succeed, including project planning, resource planning, technical architecture considerations, customization/interface impact, and education. Join us for "Real World" lessons we've learned performing upgrades with our clients.

Summary

Every upgrade project is different. Just as the Oracle Applications provide a number of ways for an enterprise to leverage their flexibility, those same opportunities can provide a challenge when it comes time to upgrade to the next release. A variety of other factors can contribute to challenges in upgrading your Applications. In any environment, changes in maintenance approaches over time result in environments that need significant preparation before an upgrade can be undertaken. An initial high-level system review is critical to a successful upgrade.

Regardless of the readiness of your environment and your business community to undertake an upgrade project, proper planning, preparation, and participation is key to success. Commitment to scope is also paramount. Attempting the introduction of new features and new modules can negatively impact reaching the paramount goal of upgrading your Oracle Applications to Release 11i.

This paper provides an overview for initiating and successfully completing your Oracle Applications upgrade project. First, we cover the phases involved in a successful upgrade project. Next, a brief review of typical upgrade issues is included. The last section of this paper covers the major components of a pre-upgrade system review. This will introduce the Oracle Applications user to many of the areas of the Oracle environment that can impact the success of an Oracle Applications upgrade project.

Upgrade Methodology Phases

System Review and Project Planning

This phase of the project includes an initial high-level system review to assess the current readiness of the proposed test and production server platforms and their ability to support the upgraded Applications environment. Identifiable resource shortcomings and system deficiencies are documented. The establishment of a proven and repeatable baseline prior to the test and production upgrades is critical for project success. The items covered in the system review include evaluating the hardware, software, available resources, enhancements and interfaces, current and proposed environments, and preliminary project planning.

System Stabilization

The System Stabilization phase ensures that the upgrade project starts correctly by using a stable baseline with adequate hardware resources. The objective is to minimize propagating current system issues to the upgraded test environment. The stabilization phase allows for the prioritization of critical items to repair and allotting the time needed for the repairs, the acquisition and installation of the hardware necessary for the test upgrade, the establishment of a reliable baseline for future test upgrades, if necessary, as well as for the production upgrade.

Test Upgrade and Support

This phase of the project includes the installation of the Oracle Certified bundle release of the RDBMS, Tools and Applications including all appropriate patches as well as the execution of the test upgrade against a current copy of the production database. Pre- and post-upgrade steps are completed. Issues encountered are documented for support of additional test upgrades as well as for the production upgrade. Specific items covered in this phase include validating the hardware and software installation and configuration including all required patches, rebuilding the database to optimize performance as well as resizing all critical database objects, performing all pre- and post-upgrade steps, gathering timing statistics and installing all existing enhancements and interfaces. This phase is also where any undocumented enhancements will typically be discovered and support training opportunities for the future exposed.

Application Testing

Application Testing involves testing the new and updated functions of the Applications to ensure a fit with the current business processes as well as to identify new features or functions that may replace existing enhancements or customizations. This phase specifically evaluates all existing and promised functionality as well as validates sizing and the correct patch application. This is also, normally, the first chance the users get to work with the new interface and navigation features of the new release. Implementation of new features and new modules that do not replace existing customizations should be postponed until after the upgrade.

Enhancement and Interface Development and Remediation

This phase of the project addresses the modification of any enhancements (customizations) or interfaces to the Applications based on the altered structures and schemas in the upgraded Applications. The items to be addressed include the new Application database structures and functionality, the significantly enhanced new developer toolkit and testing of all continuing interfaces and enhancements. Like new features and new modules, new enhancements should be introduced after the upgrade project is complete.

Training

The Training phase of the project includes training the users on changes to the user interface and changes functionality, as well as training technical and functional support personnel on changes in the Release 11i environment. The new navigation and functionality features need to be covered extensively with “Super Users” and then propagated to the rest of the user community.

System Integration Testing

System Integration Testing includes testing the new and revised functions of the Applications in conjunction with the redeveloped enhancements and interfaces to ensure a fit with the current business processes and to confirm acceptable results. This phase is dedicated to the testing of all cross-module functionality as well as any new and improved business processes. Some performance and stress testing may also be performed at this point with the appropriate tools and resources.

Production Upgrade and Support

This phase of the project includes performing the production upgrade with minimal impact on the user community. Thorough project team testing during all the phases outlined above can help to minimize potentially adverse impact during the upgrade. All pre- and post-upgrade steps are performed as well as post-upgrade support as needed. The specific items to be performed during this phase are validating upgrade timings, scheduling the appropriate window for the production upgrade and performing any corrective actions discovered during the system integration testing. The amount of post-upgrade support can usually be directly correlated based on the amount of testing and number of resources dedicated to the previous phases in the project. The less time spent testing, the more post-production support, the higher the likelihood of upgrade and post-upgrade issues.

Typical Upgrade Issues

There are a number of areas that can impact the success of your upgrade project if not addressed in a proactive or timely manner. The following are ones that we've regularly encountered.

Hardware

Adequate hardware is essential. A look at the number of new production "families" and new modules in Release 11i should be the first indicator of the overall growth in the product. If you are currently experiencing performance issues, you can expect them to increase after an upgrade as Oracle expands the number and capabilities of the Oracle Applications products.

Network/Connectivity

Adequate connectivity and network capacity should be addressed before it becomes an issue.

Client Configuration

Appropriate configuration for the PC is also essential. Although there are published minimums for desktop configuration, the additional minor investment for increased memory and faster CPU is well worth it, especially for "Super Users" running other desktop resource intensive applications.

Software

A certified software configuration is critical to successfully completing the upgrade from a technical standpoint as well as to receiving support from Oracle WorldWide Support. Monitoring the release of new patches and managing their introduction during the course of the upgrade project adds another complexity to the upgrade effort.

Resources

Assigning sufficient personnel to the project is also essential. Part-time resources assigned to the project must have sufficient time to devote to their assigned tasks and activities. Again, a detailed, well thought out project plan and the commitment of the appropriate resources mitigates risk of a poor outcome to your upgrade project.

Enhancements and Interfaces

The extent of enhancements and interfaces directly impact the duration of the project as well as the effort required to complete the project. In addition, the degree to which development has adhered to the AOL development standards provided by Oracle and the accuracy of documentation contribute to the success and the level of effort involved in this area.

Environment Stability

Eliminating or limiting the other initiatives underway during the course of the upgrade project is another critical area. Production support must go on, but on-going changes in the production environment reduce the value of the lessons learned in the test upgrades and greatly increase the risk of "new" issues arising during the production upgrade itself as well as during the post-upgrade support period.

User Training

When the upgrade is a "technical" success, but the users struggle to use the new release, the impact to normal operations can be disastrous. Failure to appreciate the importance of re-training the user community has been one of the primary causes of upgrade projects to ultimately be considered failures. With the introduction of a new technology stack with Release 11i and the considerable changes in the underlying architecture, adequate training of the technical and support staff should also not be minimized.

User Interface

The change in the user interface impact business operations until users reach their "comfort zone" with the new interface. Again, the best approach to mitigating the impact is to invest in appropriate and adequate user training up front.

Functionality

Changes in functionality as Oracle continues to improve their products may force changes in business processes. Sufficient testing of the application modules and adequate system testing coupled with change management through the organization reduce issues here.

Secondarily, attempting to implement new functionality within the context of the upgrade project itself can introduce issues into the project. Deferring implementation of new features AND new modules to a post-upgrade initiative is advisable. Manage the scope of the upgrade project to limit the variables that could impact the success of the project.

Web Application Server Configuration

The 11i release and the new technology stack create many new challenges for the Applications technical and support staff. Invest in significant training for the technical and support staff to prevent and address potential issues if necessary.

The System Review Report

This following section of this paper indicates the typical content of a System Review report performed and prepared in preparation for an upgrade.

System Review Objectives

Purpose

The purpose of conducting a high-level system review as part of supporting an upgrade effort is primarily to determine the readiness of the technical infrastructure to successfully complete the database, tools and applications upgrade and continue to support the business use of the upgraded environment. **The upgraded applications require more CPU, memory, and disk space as Oracle continues to enhance the Oracle Applications and place increased burdens on system resources.** Identification of potential performance improvements early in the project will aid in attaining acceptable performance of the upgraded Applications.

With current releases of the RDBMS, Tools, and Applications, certain aspects of the server architecture must be configured as dictated by Oracle to successfully complete the upgrade. The directory structures supporting the Oracle RDBMS and Oracle Applications are reviewed as part of this initiative to ensure compliance with Oracle's Optimal Flexible Architecture (Release 11i specific) and to avoid a failed upgrade due to an inappropriate installation and/or environment.

Oracle also requires that a "**CERTIFIED**" release be installed. Certified means that the Oracle Applications have been tested using a specific Operating System (O/S), Oracle RDBMS and Tools and Web Server versions. A list of Oracle certified releases for the target platform is included in the System Review report.

In addition, areas of security risk are identified which can adversely affect the success of the upgrade, as well as other systems projects. These include the startup and shutdown scripts, database and application cleanup processes and procedures, as well as backup and recovery procedures. Other areas reviewed are users, developers, and other individuals' access to the system components including password settings, file permissions, profile and environment definitions.

Enhancements (customizations) typically have the most impact on the success of the upgrade itself. A review of the current approach to developing and implementing customizations and enhancements to the Oracle Applications

provides a basis for issue resolution in the execution of the pre- and post-upgrade steps of the upgrade and in the final system integration testing prior to the production upgrade.

The choice of user interfaces that were available with Oracle Applications Release 10.7 also adds to the complexity of the overall infrastructure changes. Release 10.7 supported character (using Forms 2.4), Oracle Applications Display Manager (OADM), SmartClient and NCA (although not all at the same instance). However, Release 11.x only supports the Web (NCA) interface. The efforts required to transition from any of the Release 10.7 interfaces (including 10.7 NCA) or the Release 11.0 NCA interface to the Web interface in Release 11i will add significantly to planning technical and the **training** phases of the upgrade project. Training cannot be minimized at this point.

This review does not address the client and network needs in any detail. Multi-Tier client-server architecture also places significant demands on the personnel tasked with maintaining and supporting the Oracle Applications. The correct implementation of Web (NCA) greatly reduces the maintenance on the client desktops.

Activities

The activities completed as part of a pre-upgrade system review typically include:

- Review the project plan
- Review operating system kernel parameters
- Review the system configuration, security, and access
- Review the Optimal Flexible Architecture (OFA) guidelines and setup
- Review the installation of the Oracle Database Objects and Software
- Review the installation of the Oracle Application Objects and Software
- Review Application customizations and setup
- Review Application Concurrent Managers setup and configuration
- Review SQL*Net configuration
- Review database startup and shutdown scripts and cleanup procedures
- Review application startup and shutdown scripts and cleanup procedures
- Discuss and review 24x7 availability and batch processing impact
- Examine the current backup strategy and make recommendations where needed for optimal database recovery and availability including the advantages and disadvantages of database exports
- Review the current hardware configuration and make recommendations where needed for optimal database recovery, availability, and performance

Project Summary

Current Environment

Proposed Environment

Client Project and Systems Overview

Proposed Project(s)

Systems Specifications

Applications Specifications

Primary Contacts

Client Information

CSA Information

Current Risks Summary

There are issues that should be addressed immediately in the current production environment. The current and immediate risks observed for the systems in their current state are as follows:

General Remarks/Findings

Remarks

Findings

The Oracle Applications environment must remain designated a 24-hour by 7 days per week environment. With the use of batch processing provided and leveraged by the Applications, extended processing at night or on the weekends cannot be avoided. There are also significant performance advantages in using the late hours to process long-running or high volume jobs to avoid adversely impacting on-line transaction processing during the day. The Applications, by virtue of their 24x7 nature, require on-call and immediate support as well as a reliable backup strategy that will support the environment.

The most complex and time-consuming issue in implementing web (NCA) is stabilizing the Oracle Web Application software. Using experienced personnel for the initial configuration will greatly reduce the setup time for the NCA environment and web-deployed applications.

Any Applications that are fully installed in production, but not being utilized, as well as all shared installed Applications, may require the execution of pre-and post-upgrade tasks as part of the upgrade. The Oracle Applications Upgrade Manual sections for each of the fully installed and all other Applications should be reviewed to determine if any of the tasks are relevant. **All sections in the Upgrade Manual should be reviewed during the test upgrade.**

The upgrade to Release 11i will, by default, install additional concurrent managers. A number of these can be “disabled” by changing the allowed number of processes to 0. The concurrent managers will need to be re-assessed after the upgrade at which point the target processes, workshifts, specialization rules, sleep seconds, and buffers configured appropriately. The Concurrent Managers should be configured to effectively balance OLTP and batch processing.

Individuals responsible for Application System Administration should have the System Administrator responsibility assigned and should perform tasks under their individual username. **The System Administrator Account should not be used for day-to-day activity. The System Administrator responsibility should be the only responsibility assigned to the user SYSADMIN.**

Immediate Future Considerations

Release 11i is Year 2000 compliant for the Oracle Applications. However, substantial patching is required. Updates are posted regularly on Oracle's MetaLink site. On-going examination of MetaLink patches during the project is critical to a successful upgrade.

The only fully supported, certified, user interface at this time is Web (NCA). The NCA interface is implemented using the Oracle J-Initiator and requires the installation of two versions of Oracle Web Application Server and a higher release of the Developer 2000 toolset. The use of the J-Initiator is significantly different from the Appletviewer available in earlier releases.

De-support dates for Release 10.7 NCA and desupport dates for Release 10.7 SC are pending. Without Order Entry installed, Release 10.7 NCA is currently slated to be desupported as of June 30, 2001. With Order Entry installed and utilized, Release 10.7 NCA is to be desupported as of December 31, 2001. The character interface for Release 10.7 was desupported on December 31, 1998 with limited transition support extended through December 31, 2000 or June 30, 2001 (Oracle MetaLink published dates vary). OADM (Oracle's Application Display Manager) was desupported on June 30, 1998 with limited transition support extended through June 30, 2001.

Release 11i has introduced a host of new features that will significantly impact your technical support as well as your business use of the Oracle Applications. Release 11i uses Version 8i of the RDBMS with Version 4.0 of the Applications Server. The Forms and Reports tools uses Developer 6i. Some of the functions and features promoted in this Release of the Applications include:

- Multiple Document Interface – all windows are displayed inside a single container window, with a single toolbar and menu attached to that window
- Flexible Date Format in Forms – allows dates in forms to be entered and viewed in the user's preferred format (instead of in the single format supported in the prior release, "DD-MON-RR".)
- Required fields indicated – required fields are indicated by a distinctive background color.
- List of Values (LOV) indicator – fields associated with LOVs are visually indicated.
- Interruptible query – a long query causes a window to open, allowing the user to abort the query.
- Right mouse pop-up menus – clicking the right mouse opens a menu that offers such choices as copy, paste, and help.
- Tool tips – bubble help is available for all iconic buttons, including those on the main toolbar, folder toolbar, and calendar.
- Improved Release Management - Application entities that can be moved from one installation to another include:
 - Users, Responsibilities, Function Security
 - Lookups, Profile Values
 - Workflow Definitions
 - Key FlexFields, Descriptive FlexFields, FlexField Value Sets, FlexField Values
 - Concurrent Program Definitions, Request Set Definitions, Request Groups
- Improved Patching Functionality and Management – AutoPatch, which includes:
 - Non-interactive configuration ability
 - Runs multiple drivers (file, database, and runtime file)
 - A patch summary file in addition to the patch history file.

Specific Recommendations

Summary

At a minimum, a stable and proven baseline should be established for the production and test environments. The more stable the environment, the more opportunity of success in the Applications upgrade and any additional systems initiatives planned.

Security/Risk Related

Performance/Stability Related

General/Standards Related

- Establish and follow a standard procedure to review and update Applications users responsibilities and end dates on a periodic basis. A quarterly review is typically acceptable. Two reports, the *Active Users and Their Active Responsibilities* report and the *Active Responsibilities and Their Active Users* report, can be set up in the Concurrent Manager to run at a specific interval to support this procedure. There are no standard reports available for inactive users and/or responsibilities. There are no standard processes for deactivating a user after a specified period of time without access; however, this is a common customization that can be added.
- Custom menus and responsibilities should be “owned” by one of the custom Applications to avoid loss or corruption during upgrade or patch application. Seeded menus and responsibilities should not be modified to avoid loss during upgrade or patch application.
- Custom reports and processes, including copying and customizing standard Oracle Applications components should be registered or “owned” by a custom Application to protect the enhancement during upgrades and patch application. There are a few known exceptions to this requirement.
- No alterations to the base table structures should be made. Alternative approaches using a custom table with a one to one relationship to the base table should be utilized if absolutely required.

Recommended Backup Strategies for Oracle Applications

In the Oracle Applications environment, backups should be redundant to provide adequate recovery paths. A safe, reliable backup strategy must include a weekly operating system (O/S) backup and database archive log mode must be enabled.

Physical

O/S backups can be either 'hot' (online) or 'cold' (off-line). The difference is in database availability. For cold backups, the database must be shutdown and is unavailable for use. For hot backups, the database is available for use during the entire backup. Hot backups increase the complexity of managing tape libraries and database recovery but increase the database availability to the maximum uptime. As user demands increase, database uptime requirements will increase significantly and the ability to successfully perform and manage hot backups will be required.

Logical

Logical database exports are still a viable **secondary** backup strategy but should never be the only recovery scheme in place for use with Oracle Applications. Because of the shared dependencies in the application products, imports by product should never be used without Oracle Worldwide Support's concurrence. Full exports should be performed with the consistent=y flag set. Only full imports of the database should be used in case of an O/S backup failure. Export files could be used to bring in specific database objects or data ONLY IF absolutely required. The use of an export/import strategy for significant performance improvement is not as critical with Version 8i as it was in earlier database versions.

Backup strategies should also take advantage of commercial tape library systems instead of custom UNIX scripts for ease of use and manageability of tape sub-systems. Legato Networker, Veritas NetBackup, and Alexandria tape library systems are examples of commercially available tape library systems.

Applications Details

Customized Component Reports

- Updated Concurrent Programs - Summary
- Updated Concurrent Programs - Detail by Execution Method
- Updated Concurrent Programs - Detail by Application
- Customized Zooms
- Customized Menus
- Customized Responsibilities

Users and Concurrent Managers

- Applications Users
- Concurrent Manager Reports

Technical Details

Oracle Applications Certification Matrix

- Operating System, RDBMS, Tools, Applications, Patches

Operating Environment Reports

- Machine Name and Operating System Version
- Machine Environment Listing
- System Definition Listing
- /etc/profile File
- root Account \$HOME/.profile File
- Crontab Listing - /var/spool/cron/crontabs
- root Account Crontab File
- oracle Account Crontab File
- applmgr Account Crontab File
- / (root) File Listing
- /etc/group File
- /etc/passwd File
- /etc/passwd Root Users (0) Listing
- /etc/hosts File
- /etc/hosts.equiv File
- Disk Space Report
- SAR Report
- System Processes Listing
- Logged Users Listing
- System Backup File
- System Cleanup File
- System Message File

Oracle Account Environment Reports

- Database Software Home Directory (\$HOME) Listing
- oracle Account \$HOME/.profile File
- /usr/local/bin/profile Listing
- oratab File
- Database Software Environment Listing (env)
- Database Software Directory (\$ORACLE_HOME) Listing
- Database Installed Software File (unix.prd)
- \$ORACLE_HOME/dbs/configSID.ora File
- \$ORACLE_HOME/dbs/initSID.ora File

\$ORACLE_HOME/network/admin/listener.ora File
\$ORACLE_HOME/network/admin/tnsnames.ora File
Control File Backup Listing
Database Trace/Logs Cleanup File
Oracle Process Listing
Oracle Database Process Listing

Applmgr Account Environment Reports

Application Software Home Directory (\$HOME) Listing
\$HOME/.profile File
Applications Software Environment Listing
Application Software Directory (\$APPL_TOP) Listing
Application Environment File (APPLSYS.env)
\$APPLFULL Listing
\$APPLSHAR Listing
Database Installed Applications Report
\$FND_TOP Listing
\$FND_TOP/bin Listing
Updated Concurrent Programs Listing
Application Process Listing
Concurrent Manager Process Listing
Concurrent Requests Report
Concurrent Requests/Logs Cleanup File
Concurrent Manager Startup File
Concurrent Manager Shutdown File

Oracle Database Reports

System Global Area
Instance Parameter Values
Undocumented Instance Parameter Values
Database Freespace Summary
Database Rollback Segments
Tablespace Default Storage Parameter Summary
Segments within 50% of Max Extents
Packages Pinned at Startup
Database File Map
Database User Privileges

Changing Passwords

Applications passwords should be changed ONLY in accordance with the recommended procedures from Oracle. Please refer to the appropriate instructions for your Applications Release and user interface. Instructions are release specific and interface specific.

Sample Job Descriptions

UNIX System Administrator
Database Administrator
Applications System Administrator

Additional Information Sources

www.csac.com/oracle-sites.html
www.doug.org
www.oaug.org

About the Authors

Mr. Stouffer and Ms. Hoekstra have presented and moderated at local, regional, national, and international conferences for Oracle Applications users and support staff including DOUG, FWOUG, Atl-OAUG, and SROAUG meetings, SCOUG conferences, and numerous OAUG conferences held in North America, Europe and Australia. Mr. Stouffer has over 15 years experience with Oracle database administration including more than 10 years supporting Oracle Applications environments including installation, implementations, upgrades, and system reviews. Mr. Stouffer also taught the first Release 11 technical training offered by Oracle Education. Ms. Hoekstra has over 18 years experience with information technology and has been working with, implementing, upgrading, and supporting the Oracle Applications for more than 7 years.

Mr. Stouffer is an Applications DBA consultant and Ms. Hoekstra is a Director for Computer Systems Authority, a leading provider of Real World Solutions® for information systems and integration challenges. John, Alicia, and other CSA professionals provide unparalleled industry experience to the business world by using a comprehensive suite of services and tools that accelerate each solution and keep it focused on the customer's business objectives. With professionalism and attention to quality, CSA delivers the most comprehensive solutions available in a quick and efficient manner. This unique balance of business and technical expertise has earned CSA recognition with more than 230 domestic and international customers. <http://www.csac.com>.