How to Minimize Downtime and Optimize Your SAP ERP Upgrade Project

Rajesh Gupta
Deloitte
In This Session

- Learn how to reduce the business downtime using upgrade optimization tools and SAP Solution Manager
- Get details of an SAP ERP upgrade system architecture, upgrade, and Unicode migration
- Gain effective ways to minimize downtime, such as choosing the right strategy and using as many parallel upgrade processes as possible
- Gather tips for how to tune different components to make your upgrade as efficient as possible
- Hear critical issues the project manager, architect, and Basis administrator should be aware of before upgrading, migrating, and supporting the ERP instance
What We’ll Cover

- SAP ERP roadmap and overview
- SAP enhancement packages
- SAP upgrade roadmap, project approach, and impact
- Influencing factor to upgrade project
- Key for success
- Approach to reduce business downtime
- Ways to optimize the upgrade
- Lessons learned
- Wrap-up
Introduction

- SAP ERP upgrades have undergone a paradigm shift from where they started. There have been a lot of changes in the way SAP ERP upgrades are performed.
  - Upgrading is a technical process performed on specific application features
  - General arguments for an upgrade are driven mainly by business and technology enhancements
- Minimizing the business downtime is an important part of planning and executing SAP ERP upgrade projects
# SAP ERP and R/3 — Roadmap and Overview

<table>
<thead>
<tr>
<th>Product</th>
<th>Basis Release</th>
<th>Unrestricted Available</th>
<th>Mainstream Maintenance Ends</th>
<th>Extended Maintenance Ends</th>
<th>Upgrade to SAP ERP 6 EHP7</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAP R/3 4.0B</td>
<td>SAP Basis 4.0B</td>
<td>In cust.-spec. maintenance</td>
<td>12-31-2003</td>
<td>12-31-2006 *</td>
<td>Yes</td>
</tr>
<tr>
<td>SAP R/3 4.5B</td>
<td>SAP Basis 4.5B</td>
<td>In cust.-spec. maintenance</td>
<td>12-31-2003</td>
<td>12-31-2006 *</td>
<td>Yes</td>
</tr>
<tr>
<td>SAP R/3 4.6B</td>
<td>SAP Basis 4.5B</td>
<td>In cust.-spec. maintenance</td>
<td>12-31-2003</td>
<td>12-31-2006 *</td>
<td>Yes</td>
</tr>
<tr>
<td>SAP R/3 4.6C</td>
<td>SAP Basis 4.6D &amp; 610</td>
<td>In cust.-spec. maintenance</td>
<td>12-31-2003</td>
<td>03-31-2013 *</td>
<td>Yes</td>
</tr>
<tr>
<td>SAP R/3 Enterprise (R/3 4.7)</td>
<td>SAP Basis 620 &amp; 630</td>
<td>In cust.-spec. maintenance</td>
<td>03-31-2009</td>
<td>03-31-2013 *</td>
<td>Yes</td>
</tr>
<tr>
<td>SAP ERP2004 (ECC5)</td>
<td>SAP Basis 640</td>
<td>In cust.-spec. maintenance</td>
<td>03-31-2010</td>
<td>12-31-2013*</td>
<td>Yes</td>
</tr>
</tbody>
</table>

*End of mainstream maintenance

Direct upgrade to ERP 6.0 EHP7 is possible as of SAP R/3 4.0B

* Requires login credentials to the SAP Service Marketplace

Source: SAP Product Availability Matrix [http://service.sap.com/pam *]
SAP ERP and R/3 — Release and Maintenance Strategy

Source: SAP Master Guide

Additional extended maintenance period for SAP R/3 4.6C from January 2011 to March 2013
- For SAP Enterprise Support customers, extended maintenance for SAP R/3 4.6C is included in SAP Enterprise Support during this period.
- An additional fee of 6% per year applies for customers subscribing to other support models.

This strategy is also valid for add-on applications and SAP enhancement packages based on the releases listed above.

* Overall payment is SAP support fee plus additional fee (percentage of the maintenance base) per year.
Enhancement Package 7 for SAP ERP 6.0 is based on SAP NetWeaver® 7.4

EHP7 for SAP ERP 6.0 consists of the following software components:

- SAP Basis Release 740
- SAP Gateway Foundation
- SAP WEB UIF 747
- SAP AP 7.00 (includes IPC)
- SAP_BS.Foundation 747
- MDG Foundation 747
- MDG_APL 617
What We’ll Cover

- SAP ERP roadmap and overview
- SAP enhancement packages
- SAP upgrade roadmap, project approach, and impact
- Influencing factor to upgrade project
- Key for success
- Approach to reduce business downtime
- Ways to optimize the upgrade
- Lessons learned
- Wrap-up
**Enhancement Packs**

- SAP enhancement packages include functional enhancements, industry-specific enhancements, and UI simplifications, along with Enterprise Services.
- With the introduction of Enhancement Packs and the evolution of how successive Enhancement Packs are applied, SAP has established a successful method of applying new functionality and fixes.
- As it relates to your upgrade, Enhancement Packs need to be reviewed to determine what components of an Enhancement Pack should be installed and activated based on business requirements.
Enhancement Package 7 for SAP ERP 6.0

- The business functions you plan to use dictate what software components need to be installed on the existing system instances.
- Upgrading to EHP7 updates the application-related software components and the Basis (SAP NetWeaver) components.
- SAP_UI and SAP_GWIND are CPU-intensive processes that add load on the hardware. CPU sizing activity needs to consider this.
How to Handle Enhancement Packs with Upgrade

- Determine if you should bind your enhancement packs with your upgrade or upgrade then apply the EHP
- Identify any impacts with add-ons to determine your upgrade approach
  - Does an add-on have to be upgraded before an EHP?
  - Does the EHP impact another component in the landscape?
- Install and activate only the Enhancement Pack components you need to reduce your outage window
- If this is purely a technical upgrade, install the components you think you will need without necessarily activating the component
  - By installing the Enhancement Pack during the upgrade, it will reduce the amount of downtime required in the future
- Incorporate regression testing for Enhancement Packs to coincide with upgrade testing, paying specific attention to the impacted areas
What We’ll Cover

• SAP ERP roadmap and overview
• SAP enhancement packages

• SAP upgrade roadmap, project approach, and impact

• Influencing factor to upgrade project
• Key for success
• Approach to reduce business downtime
• Ways to optimize the upgrade
• Lessons learned
• Wrap-up
Why Customers Undertake SAP Upgrade Projects

- Upgrading is a technical process performed on specific application features
- Here is the Value Proposition for an SAP Upgrade:
  - Close functional gaps in existing environment and provide opportunities to have a measurable business impact in the areas of operational excellence and business strategy
  - Benefit from the latest technology: Enablement of new and optimized business processes and scenarios based on new ERP core functionalities
  - Reduce interfaces and costs: The new release protects your IT investment and mitigates risk, ensuring sustainability and reducing TCO
  - Manage ongoing maintenance issues and costs
Upgrade Tools

- **Upgrade Dependency Analyzer**
  - Upgrade Dependency Analyzer is a high-level planning tool for upgrades; it does not cover all dependencies that are relevant for planning an upgrade: [https://service.sap.com/uda](https://service.sap.com/uda) *

- **SAP Upgrade Roadmap with SAP Solution Manager**
  - SAP Upgrade Roadmap with SAP Solution Manager provides tailored access to specific upgrade information and project tracking capabilities

- **Solution Browser**
  - Helps you discover new functionality across different SAP application releases and respective SAP enhancement packages: [www.sapsolutionbrowser.com/](http://www.sapsolutionbrowser.com/)

- **Solution Manager Pulse Check**
  - It is a free self-service which will help to identify the capabilities to innovate business processes and optimally manage the entire solution landscape: [https://service.sap.com/solmanpulsecheck](https://service.sap.com/solmanpulsecheck) *

* Requires login credentials to the SAP Service Marketplace
SAP Upgrade — Sample Approach

- Example: Landscape approach is a preferred method for upgrading

1. Create Sandbox ECC with a copy of production upgrading to EHP7
2. Create Development ECC with a copy of production upgrading to EHP7
3. Create QA with a copy from Production upgrading to EHP7
4. In-place production upgrade to EHP7

Current productive DEV and QA environments can be redeployed after Go-Live
Enhancement Package 7 Requirement — Tool

- The enhancement package installation requires the following tool:
  - SAP Solution Manager (mandatory)
    - You require at least one of the following versions of SAP Solution Manager:
      - Solution Manager 7.0 EHP1, SPS23 or higher
      - SAP Solution Manager 7.1, SPS05 or higher
  
- Ensure that the system landscape in SAP Solution Manager (SMSY) is correctly defined and up to date

- SAP highly recommends installing Landscape Verification 1.0 SP1 for SAP Solution Manager which helps you to maintain, verify, and correct system landscape data in SMSY
Upgrade Project Approach

- Technical upgrade
  - Focus on pure technology upgrade
  - Retain functionality used
  - Review usage of custom developments
- Functional upgrade
  - New functionality to be implemented as part of the upgrade, modification clearing
  - Focus on reduction of system complexity
- Strategic Enhancements
  - Focus on functionality extension and improvement
  - Enablement of new and optimized business processes and scenarios

Source: SAP
### Why Various Strategies Might Be Appropriate

<table>
<thead>
<tr>
<th><strong>Technical Upgrade with Delivered Functional Changes</strong></th>
<th><strong>Technical and Functional</strong></th>
<th><strong>Technical, Functional, and New Components</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Drivers</td>
<td>Drivers</td>
<td>Drivers</td>
</tr>
<tr>
<td>✓ SAP support is expiring “soon”</td>
<td>✓ Replace enhancements and work-arounds with newly available functionality</td>
<td>✓ Implement “grand vision”</td>
</tr>
<tr>
<td>✓ Limited resources required for upgrade</td>
<td>✓ Leverage new SAP functionality to meet additional business requirements</td>
<td>✓ Industry-driven new business requirements</td>
</tr>
<tr>
<td>✓ Low risk of failure</td>
<td>✓ Gain efficiencies by consolidating the upgrade and functionality improvements into a single project</td>
<td>✓ Combine initiatives into a single funding request</td>
</tr>
<tr>
<td>✓ Limited funding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>✓ Provide the minimum platform for future projects</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Upgrade Estimates (Months)

- **Low (~ 2.5 mths)**
- **Medium (~ 4 months)**
- **High (~ 8 months)**

**Level of Complexity**

- **Low (~ 2.5 mths)**
- **Medium (~ 4 months)**
- **High (~ 8 months)**
High Level — Impact of Upgrade

- Hardware → Change in hardware (upgrade/patches/vendor)
- Operating System → Minimum version and patch level
- Database → Change in database (upgrade/patches/vendor)
- Front end → SAPGUI/IE compatibility
- End user → New screens
- Backup → Validate the backup/restore/DR strategy
- New transaction → For example: ST03N, DBA
### Hardware Requirement for Unicode Conversion or Combined Upgrade and Unicode Conversion

<table>
<thead>
<tr>
<th>Component</th>
<th>Average Increase</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPU</strong></td>
<td>+10 ... 30%</td>
<td>Depends on transaction mix, MDMP, or single code page. Modern processors showed 10% increase, older processors up to 30%</td>
</tr>
<tr>
<td><strong>RAM</strong></td>
<td>+40 ... 50%</td>
<td>Reason: Application servers are based on UTF-16. Almost no change due to efficient compression.</td>
</tr>
<tr>
<td><strong>Database size</strong></td>
<td>+10%</td>
<td>+10% is the observed maximum for larger systems (DB size &gt; 200), smaller systems might grow more. UTF-16: +20 ... 60%</td>
</tr>
<tr>
<td><strong>Network load</strong></td>
<td>~ 0%</td>
<td></td>
</tr>
</tbody>
</table>
Impact of Upgrade — Technology

- Hardware requirements of the new release
  - Server, network, front end, storage
- Sizing and system configuration for the new release
  - Going Live – Functional upgrade check
- Planning of technical upgrade process
  - Operating system, database, and SAP ERP
- Planning a back-up strategy
  - During the technical upgrade
  - After release upgrade
- Execution of technical upgrade
  - Development, quality assurance, and productive systems
  - Training systems
- Activities after upgrade
  - Performance analysis, support
Impact of Upgrade — Technology (cont.)

- **Determine software requirements**
  - SAP industry solutions
  - SAP country-specific versions
  - Third-party products or add-ons
  - Interfaces between SAP ERP and non-SAP software
  - Operating system and database
  - Communication protocols
  - ESOA applications
  - New GL

- **UNICODE**
  - UNICODE if more than one code page is required
What We’ll Cover

• SAP ERP roadmap and overview
• SAP enhancement packages
• SAP upgrade roadmap, project approach, and impact
  • Influencing factor to upgrade project
• Key for success
• Approach to reduce business downtime
• Ways to optimize the upgrade
• Lessons learned
• Wrap-up
Factors Affecting Upgrade Strategy

- Import of Substitution Set in Production Operation
- Size of Certain Tables
- Archive Mode of Database
- Permitted Downtime Window
- Database Backup

Upgrade Strategy
Influencing Factors for Project Duration

- **Strategy**
  - Technical upgrade vs. upgrade with new functionality

- **Modifications**
  - Number of modifications which could be returned to SAP standard
  - Number and complexity of modifications needed in the new release

- **Documentation**
  - Level and quality of documentation of business processes, custom programs, and modifications along with documentation for testing

- **Last, but not least ...**
  - Hardware requirements
  - Security adjustments
  - Range of testing and training
  - Customer or partner skills in upgrade projects
Factors influencing complexity and risk:

- Technical complexity
  - ERP modifications (custom code)
  - Interfaces and third-party applications
  - Upgrade strategy
- Downtime cutover requirements
- Resources (constraints, skill levels)
- Stability of current environment
- SAP ERP functionality changes
- Level of knowledge in user community
- Organization changes/other initiatives
- Testing approach and resources
- Training requirements for end users
- Testing environment availability

Project complexity

- Low
- Medium
- High

Upgrade Estimates (Months)

- **HIGH (7-10)**
- **MEDIUM (4-6)**
- **LOW (3-4)**

LEVEL OF COMPLEXITY
Factors Affecting Upgrade Runtime and Downtime

- Upgrade Runtime & Downtime
  - Database
  - Hard Disk Configuration
  - Hardware/Operating System
  - Upgrade Strategy and Reaction Time
  - Numbers of Modifications
  - Number of Data Structure Conversions
  - Productive Applications/Add-Ons or IS
  - Number of Installed Languages
  - Number of Clients
  - Number of Installed Applications/Add-Ons or IS

Planned and Unplanned Downtime

**Unplanned Downtime**
- Technology failure
  - HW/OS failure – 20%
- Application failure – 40%
- Human Error – 40%

**Planned Downtime**
- System and Infrastructure maintenance
- Upgrade, patches, and transport
- Backup
Third-Party Tool and Add-On — Evaluation and Execution

- In order to appropriately incorporate third-party and add-on impacts, the following process should be followed:
  - Identify and investigate all third-party tools and add-ons to come up with a comprehensive list early
  - Work with third-party tool vendors and SAP to ensure their products work with ECC 6.0. An upgrade of the tool may be required in addition to the SAP upgrade; test to confirm.
  - Figure out the sequence of upgrade activities to ensure that any changes made to the add-on product do no impact the upgrade timeline. This activity is critical when planning your outage window.
  - Have the right resources focusing on the impacted areas to ensure a smooth upgrade process
Third-Party Tools and Add-Ons

- More and more third-party tools and add-ons impact the ability to upgrade to ECC 6.0 successfully.
- While the integration of components is more seamless than ever, the complexity of the integration and the changing landscape has made it more challenging for upgrades.
- Careful attention to the building blocks of the existing system will pay off during the upgrade.
Modifications, Customizations, and Corrections

Customizing
Setting of system parameters
( obligatory or optional )

Customizing
Development
Enhancements

SAP Standard

Development
Own applications

Adv. Corrections
SW changes in regard to a later upgrade

Modifications
Changes to the SAP software
( try to minimize, because of intensive maintenance )

Enhancements
Use of prepared user exits or BAdIs for software enhancements

Source: SAP
Modifications, Customizations, and IDocs

- The older an SAP environment is, the higher the probability that a modification to core SAP code has been done.
- Careful consideration needs to be applied for custom code to ensure all customizations and changes to code are evaluated and remediated via SPAU/SPDD and manual code fixes.
- If new standard functionality replaces a user enhancement from the previous version, this should be evaluated to determine the impact to the business.
- Usage of IDocs should be carefully considered to identify potential issues.
What We’ll Cover

• SAP ERP roadmap and overview
• SAP enhancement packages
• SAP upgrade roadmap, project approach, and impact
• Influencing factor to upgrade project
  • Key for success
• Approach to reduce business downtime
• Ways to optimize the upgrade
• Lessons learned
• Wrap-up
Key for Success — Looking Beyond Core SAP

- While SAP tends to dominate any questions about an upgrade, in reality the larger challenges within a technical upgrade may likely not be with SAP, but in the handling of:
  - Infrastructure and data
  - System freeze
  - Resources (full or part-time)
  - Testing tools and results reporting
  - Training and support requirements
  - Embedded solutions
  - Third-party products (certified and not certified)
  - Interfaces
  - Security
Key for Success — Infrastructure and Data

• Infrastructure
  ♦ Hardware to support the system copies
  ♦ Ability to replicate PRD to QAS to provide testing
  ♦ Environment for both performance and cutover testing

• Data
  ♦ In order to test the solution, the availability of good test data is a requirement multiple times during the upgrade
Key for Success — System Freeze

- From the first day that the new landscape is created there will be a need to manually keep the transports that are moving to production in sync with those being done for the upgrade.
  - Soft Freeze – At the start of the project (when the copy of the development system is completed) communicate that only the highest priority changes will be done until the upgrade is complete.
  - Hard Freeze – Make sure no further changes can be made to production at the start of the last system test cycle.

- Communication and support of these freezes by the business are crucial for project success.
Key for Success — Testing

- Testing is one of the key success factors in an upgrade
- Identify the process to be used along with the resources to perform:
  - Unit and scenario testing
  - Integration (regression, User Acceptance, ...)
  - Performance (transaction, batch, and interface)
  - Security
  - Reporting
  - Cutover (timings)
  - Technical system
Key for Success — Training, Security, and Support

- Important components that sometimes get overlooked:
  - Training
    - Core team (new system capabilities)
    - End-user updates, online materials, and new capabilities
  - Support
    - New Transactions, reports
    - Screen changes, required fields
  - Security
    - New authorization objects
    - New organizational-level field authorization values
What We’ll Cover

• SAP ERP roadmap and overview
• SAP enhancement packages
• SAP upgrade roadmap, project approach, and impact
• Influencing factor to upgrade project
• Key for success
  • Approach to reduce business downtime
• Ways to optimize the upgrade
• Lessons learned
• Wrap-up
Approach to Reduce Business Downtime

- Near-Zero Downtime method (nZDT/nZDM)
- Container copy – Migration Workbench
- Combined upgrade and Unicode
Near-Zero Downtime Provision

- The Near-Zero Downtime method for SUM helps minimize downtime related to SAP software updates.
- nZDM offering started with SUM 1.0 SP7.
- No separate license fees for using the downtime minimization capabilities of SUM.
- Minimum impact to productive operations due to upgrade.
- Business downtime as low as possible.

Source: SAP
Near-Zero Downtime Method (nZDT)

- **Pros**
  - nZDT considerably reduces the business downtime
  - Table conversions are executed on the clone during the uptime
  - The switch to the new software and the generation (SGEN) executed during the uptime
  - Import of the customer’s transports and third-party add-ons in the uptime
  - Achievable business downtime is 8-16 hours depending on the necessary validation in the downtime
Near-Zero Downtime Method (nZDT) (cont.)

- **Cons**
  - nZDT requires a significant customer-specific effort
  - Additional hardware is required for the clone
  - Recording of changes results in a performance impact on heavily used systems
  - Additional testing cycles in the nZDT project have to be considered
  - Customer’s individual table classification
Near-Zero Downtime Maintenance

Current standard procedure:

- Uptime
  - Create new Repository in SHD
- Business Downtime
  - Repository switch
  - Table adjustment
  - Main import
  - XPRAS, AIM execution
  - Import of Customer specific Transports & Add-ons
  - Load Generation (SGEN)
  - Test & Validation
- Uptime

“Downtime-Optimized” procedure using nzDM-capabilities of SUM:

- Uptime
  - Create new Repository in SHD
  - Clone Application Tables affected by Upgrade
- Reduction of Business Downtime
  - Table adjustment
  - Main import
  - XPRAS, AIM execution 1 in SHD (SHD enabled XPRAS)
  - Customer specific Add-ons
  - Customer Transports in SHD
  - Load Generation (SGEN)
  - Final Delta Replication
  - On-line delta replay
  - XPRAS, AIM execution 2
- Business Downtime
- Uptime

- Source: SAP

- Introduction of “Record and Replay” technique for business transactions based on database trigger technology
- All steps run automatically in the background
- Additional hardware requirements due to shadow-technique, additional 80-350 GB DB space
Container Copy — Migration Workbench

System A / Client 001

DDIC

FUNCTION READ_DATA.

Data

4711 Johnnie W
1881 Jim Beam

Sender

System B / Client 001

DDIC

FUNCTION WRITE_DATA.

Data

0001 Johnnie W
0002 Jim Beam

Receiver

MWB

Program Generator

CONVERT_DATA

1a

2

3a

4a

3b

4b

1b

3c

Source: SAP
Combined Upgrade and Unicode Conversion (CU and UC)

PRODUCTION TIME

Upgrade

SAP R/3 4.6C MDMP Preparation

SAP ECC 6.0 non-Unicode

SAP BASIS 4.6C/D

SAP BASİS 7.00

DOWNTIME

Conversion

SAP ECC 6.0 Unicode Process Finish

SAP BASIS 7.00

Source: SAP
What We’ll Cover

- SAP ERP roadmap and overview
- SAP enhancement packages
- SAP upgrade roadmap, project approach, and impact
- Influencing factor to upgrade project
- Key for success
- Approach to reduce business downtime
  - Ways to optimize the upgrade
- Lessons learned
- Wrap-up
Ways to Optimize the Upgrade

- Consider using incremental table conversion (ICNV) — a method for online restructuring and reorganization of database tables.
- You can reduce downtime during the upgrade by performing table conversions incrementally; that is, during production operation and before you start the upgrade.
- Early ICNV is only available during downtime minimized approach.
- Reduction of upgrade downtime:
  - Large tables are now converted during uptime.
- Easy handling:
  - Early ICNV fully integrated into upgrade process.
- Configurable conversion process:
  - Exclusion times and progress prediction.
• Reduced downtime during upgrade. The vast majority of data can be migrated during uptime.
• Simpler conversion back to SAP standard for modified tables
• Only very few data records, which have been changed recently, must be migrated when the system has been stopped for production use
Ways to Optimize the Upgrade

- **Consider using striped disks**
  - Using striped disks can reduce the bottleneck problem caused by multiple importers competing for I/O resources
  - Note that this is a general approach to solving I/O bottleneck problems and is not specific to the SAP system

- **Monitor the upgrade continuously**
  - From Release 4.0, you can remotely (therefore, continuously) monitor the upgrade using the Upgrade Assistant
  - This allows you to avoid unnecessary downtime because you can react immediately if the upgrade program stops for any reason
Ways to Optimize the Upgrade (cont.)

- Increase the number of parallel background processes for import
  - On multi-processor machines with sufficient main storage, you can reduce downtime by specifying up to four import processes to run in parallel

- Set import destination time
  - If you are using the downtime-minimized strategy, you have the option of setting an import destination time at the beginning of the upgrade
    - This enables you to optimize the extra system load due to the upgrade by “stretching” the import time for the new repository

- Create a database backup after upgrade
  - Always create a complete backup immediately after a successful upgrade if transaction logging has been turned off during the upgrade
Ways to Optimize the Upgrade (cont.)

- Accept automatic modification adjustments for SAP objects in your live system
  - When you upgrade your live or quality assurance system, you can accept modification adjustments that have been made in your development system and that are available as a modification adjustment transport request
    - This avoids the manual effort of performing this process with transactions SPDD and SPAU

- Rehearse the upgrade in an appropriate test system
  - Whichever upgrade you are performing, the best recommendation of all is to rehearse it using a test system
  - The test system ought to have the same release and extent of modifications as the production system
  - This also gives you the advantage outlined in the next recommendation
Ways to Optimize the Upgrade (cont.)

• **Proper housekeeping – Database**
  - Prevent Basis table growth
  - Before running the upgrade, update the database statistics ensuring that all database statistics are up-to-date by executing the following commands:
    - `brconnect -u / -c -f stats -t oradict_stats`
    - `brconnect -u / -c -f stats -t system_stats`
    - `brconnect -c -u / -f stats -t all -f collect -p 4`

• **Backup of important tables**
  - Special backup of table T512W (Wage Type Valuation) before the upgrade and restore once the upgrade activity is complete
Ways to Optimize the Upgrade (cont.)

- **Proper housekeeping – Operating System**
  - Vendor-specific activities
  - Make sure all operating system requirements have been met as per the vendor guidelines
- **Vendor-independent operating system activities**
  - Back up of the operating system
  - Allocate sufficient space for the following:
    - Software Update Manager directory
    - Download directory
    - DIR_TRANS directory
    - Shadow system
Ways to Optimize the Upgrade (cont.)

- **Proper housekeeping – Application Level**
  - The tp.exe and R3trans.exe are patched to the latest level prior to starting the upgrade
  - The SPAM/SAINT patch level is at the latest level with regard to the source ERP version
  - Used the latest SUM tool and make sure all the SUM tool prerequisites are met
  - All the transports are released
    - If not, then make sure of the following:
      - *No object is in repair mode using Transaction SE03*
      - *Objects are not locked*
Ways to Optimize the Upgrade (cont.)

- **Proper housekeeping – Application Level (cont.)**
  - SPAU/SPDD activities are completed
  - Background Jobs, operation modes are suspended
  - All inbound and outbound queues are cleared
  - All SAP security-related tasks have been dealt with
  - Modify the memory-related profile parameters before the upgrade

> Note: Only user DDIC should be allowed to access the application during the upgrade process
Upgrade Projects — Best Practice in General

- Better Planning – Look at the bigger picture
- Communicate to all related parties
- Practice, practice, and more practice to avoid surprises
- Plan for full end-to-end regression and stress testing
- Train core team and developers on the new system
- Don’t forget about the changes required for security, even if no new transaction codes are used
- When certification of third-party applications is not possible, plan testing to confirm
- Have weekly team meetings to thrash out the bottlenecks. Never overdo meetings. If possible, have a standup meeting.
- Ensure on-shore and off-shore work toward the success of the project, and it should never become onshore vs. offshore
What We’ll Cover

- SAP ERP roadmap and overview
- SAP enhancement packages
- SAP upgrade roadmap, project approach, and impact
- Influencing factor to upgrade project
- Key for success
- Approach to reduce business downtime
- Ways to optimize the upgrade
  - Lessons learned
- Wrap-up
Lessons Learned — Organizational Aspects

- Make early adjustments in the upgrade project system
  - Technical upgrade procedure
  - Modification adjustment
  - Test of customer developments in new release
  - Upgrade customizing
  - Check functionality of processes in new release
  - Test core business processes
- Reduce dual maintenance period
  - Do additional work in the upgrade project system before the upgrade of the system landscape
  - Reduce time window between upgrade of DEV and PRD
- Involvement and commitment
  - Estimate and acquire commitment for the resources
  - Early involvement of key users and management commitment are key success factors
Lessons Learned — Functional Aspects

- **Good housekeeping drives efficiency of the upgrade**
  - Archiving, cleansing of unused custom code, and SAP modifications
  - Document table changes thoroughly and their usage in custom programs
- **The older the release, the more money spent on training**
  - Significant for customers starting with 4.6C and below (enjoy transactions, tree structures, ...)
- **Industry add-ons**
  - Customers with Industry add-ons should review the specific upgrade guides
- **Tackle custom developments as early as possible**
  - The faster the development team can have access, the faster business process issues can get resolved
- **Modification adjustments and testing are key cost drivers**
  - The better the documentation and existing test procedures, the easier and less time-consuming those project tasks will be
Lessons Learned — Technical Aspects

• **Upgrade Strategy**
  - “Downtime minimized” method should be used
  - In order to get a realistic forecast about the expected downtime, a Sandbox upgrade with representative configuration and data sets is highly recommended

• **Distribution of new SAP GUI version** should be started early. Check impact and dependencies early with the help of the Product Availability Matrix and PCL.
  - E.g., on OS/DB compliance, availability of country versions, third-party products, ITS, and dependencies to other SAP products

• **Perform test upgrades over and over until you get it right**
  - A key for success mentioned by many customers

• **Verify sizing – Leverage SAP Going Live Functional Upgrade Check**
  - Consider the additional hardware requirements
Lessons Learned — ERP 6.0 EHP7 Technical Upgrade

• Make early adjustments in the upgrade system
  ♦ Technical upgrade requirements
  ♦ Third-party bolt-on compatibility
  ♦ Technical upgrade procedure
  ♦ Modification adjustments
  ♦ Test core business processes
  ♦ Reduce the time window between the upgrade of DEV and PRD systems

• During the upgrade to EHP7, we faced a few issues during different stages of the upgrade
  ♦ Issues with DB triggers set on the database tables

2EEDEA515 Table change not possible. There is a DB trigger on the table
2EEDEA471 Result  "DDC2L": Action: "ALT" Mode flag: "E" Return code: "0"
Lessons Learned — ERP 6.0 EHP7 Technical Upgrade (cont.)

- The upgrade tries to drop columns on a previously created table, but the operation fails as follows:

```
2EETP345 04:05:25: Retcode 1: SQL-error "15103-Cannot bind a default to a column created with or 2EETP345 tered to have a default value." in DDL statement for "ADMI_RUN"
2 ETP000  --------------- DB-ROLLBACK() ---------------
2EETP334 04:05:25: error in DDL, nametab for "ADMI_RUN" not activated
```

- The issue was resolved by SAP Note: 1574258 – DROP COLUMN on previously added table column fails

- A fix SQL script attached to the Note needs to be executed
What We’ll Cover

- SAP ERP roadmap and overview
- SAP enhancement packages
- SAP upgrade roadmap, project approach, and impact
- Influencing factor to upgrade project
- Key for success
- Approach to reduce business downtime
- Ways to optimize the upgrade
- Lessons learned
- Wrap-up
Where to Find More Information

- **SAP Notes**
  - 1737650 – EHP7 for SAP ERP 6.0 SP Stacks – Release & Information Note
  - 1816819 – Dual Stack support for Business Suite systems
  - 1678565 – Prerequisites, Terms and Conditions for nZDM/SUM
  - SAP help on SAP ERP 6.0 Enhancement Package 7
- [https://cookbook.saphana.com/erp](https://cookbook.saphana.com/erp)
  - Cookbook on how to implement the upgrade of SAP ERP on HANA
7 Key Points to Take Home

- Understand the complexity of the upgrade based on your upgrade scenario and try to keep the technical upgrade and functional upgrade as separate projects
- Plan ahead for the infrastructure that will be needed during the upgrade and post-upgrade
- Create a step-by-step upgrade playbook to be used for the cutover to production
- Test the solution thoroughly – Document results and keep an issues log for items to address
- Use the SAP Downtime Minimized or nZDM approach
- Don’t overlook the security changes
- Even a technical SAP upgrade involves a lot more than just ECC – Embedded solutions, third-party solutions, interfaces, and code remediation all need to occur
Your Turn!

Questions?

How to contact me:
Rajesh Gupta
rajgupta@deloitte.com
@DeloitteSAP

Please remember to complete your session evaluation
SAP, R/3, mySAP, mySAP.com, SAP NetWeaver®, Duet®, PartnerEdge, and other SAP products and services mentioned herein as well as their respective logos are trademarks or registered trademarks of SAP AG in Germany and in several other countries all over the world. All other product and service names mentioned are the trademarks of their respective companies. Wellesley Information Services is neither owned nor controlled by SAP.