

PTC® Live Global

R10 PTC Windchill Upgrade and OS Swap Over the Weekend - Is it a Nightmare?

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- Introductions
- Objectives
- Expectations
- Challenges
- Solutions
- Cloning Activities
- Upgrade Activities
- Recommendations
- Q&A?

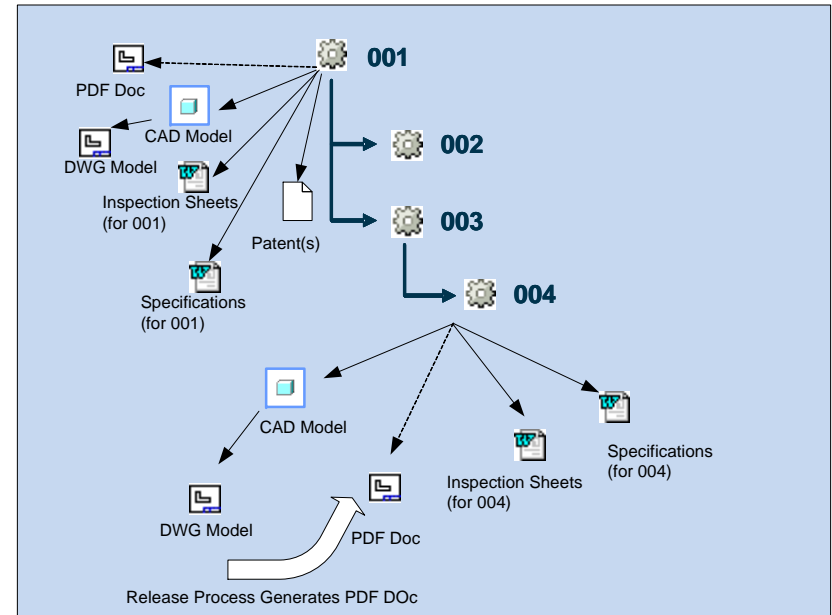


Business & Technology Integrators

- **Professional Services Organization Focusing**
 - PLM Solutions (PTC Windchill, Oracle Agile & SAP PLM)
 - System Administration, Performance Tuning
 - Interfaces to ERP Systems
 - Legacy Data Migration
 - Applications validation and Testing
 - Process Assessment and Streamlining the Process
 - PLM solutions upgrade
 - Education and Training
- **High Quality, Cost Effective Services for 12+ Years**
- **PLM Implementation Partners for**
 - Robots Manufacturers
 - Medical Devices Manufacturers
 - Construction Equipments Manufacturers
 - Security Devices Manufacturers



- R9.1 M040 Windchill
 - PDMLink and Projectlink
 - For managing
 - WTParts,
 - CAD Models and Drawings
 - WTDocuments
 - Promotion Requests for initial release
 - ECRs, ECNs and Implementation Plans
 - Workers
 - CAD models and 2D CAD PDFs
 - Light weight custom office worker
 - Creo Elements Pro 5.0 M150
- Oracle
 - 10g



- **CAD Viewables**

- CAD Models and CAD Drawings are published based on Check-In events
- At the end of the ECN Release process, Approver name, date and ECN number are propagated to WTPart and CAD Drawing meta data
- CAD Models and CAD Drawings are published when CAD Documents state set to Prototype Released and Released
- At the end of the Prototype Release and Release, Drawing viewables in PDF format are downloaded to a network shared folder.

- **Custom Solutions**

- WTPart and CAD Drawing meta data updates for approver signature and date
- Publishing CAD upon the state set to Prototype Released/Released
- Downloading CAD Drawing PDF to a shared folder upon state set to Prototype Released/Released

- **Light weight customizations**
 - WTPart Centric Customized Release Process
 - Downloading 2D CAD Drawing PDF upon release
 - Downloading office documents PDF upon release
 - Deployed Apache Open Office for PDFs conversion
 - ECN Resulting Documents Report
 - WEB Services interface for gathering information from Windchill
- **Followed PTC Recommended Approach**
 - Managed a site specific xconf files
 - Site specific xconf file had the reference in OOTB Site.xconf
 - wtCustom folder is managed for custom RB files

- **Servers**
 - Windchill server and Oracle DB server on Windows 2008
 - Windchill and Oracle servers locally managed by Windchill Administrator
 - Replication Servers
 - 4 Replication Servers across the globe
 - 2 Windows 2003 Rel 2
 - 2 Red Hat Linux V5
- **Windchill Core Team**
 - Application Owner
 - One Windchill Administrators
 - Business and CAD Administrators in each location
- **Portal for logging and tracking calls**

Windchill Source Environment

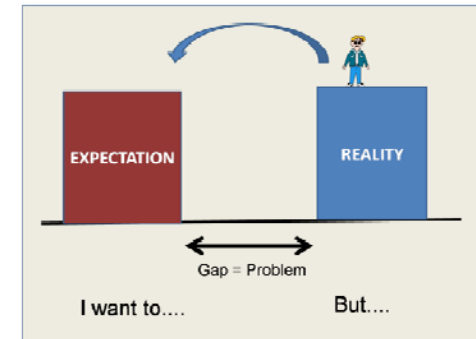
- 33GB database export dump size
- 2.3 TB of vault data

DOCTYPE	Part Number (Master)	Part Number (Revision)	Part Number (Revision + Iteration)
CAD COMPONENT	166,734	185,444	390,481
CAD ASSEMBLY	69,627	97,380	243,941
CAD DRAWING	60,077	85,984	154,806
WTDocument	33,018	33,817	44,831
WTPart	86,625	124,830	241,075

- **Windchill Environment OS Change**
 - Hardware change from Windows 2008 – RH Linux 5.0
 - Alignment with Other Volvo business sectors
 - Global Hardware maintenance
 - Robust 24/7 support
 - New Master Replication Server
 - Performance improvement
- **Applications Upgrade**
 - Windchill R10.0 M040
 - New Framework for rendering information
 - Overall performance improvements
 - Alignment with other Volvo business sectors
 - Oracle Upgrade



- **Windchill Offline**
 - R9.1 M040 Production Server offline by Friday Evening
 - R10.0 M040 Production Server UP by Saturday Late Night
 - R10.0 Validation and Readiness Assessment by Extended Team
 - R10.0 Production Server Go Live By Sunday Afternoon
- **Open Issues Expectations**
 - 0 - Blocking
 - 0 – Critical
 - 1 – Major
 - 4 – Minor
- **End Users Training**
 - 2 Weeks before Go-Live week end



- **VCE Manager**
 - Application and Business Owner
 - Single Point Contact to Stakeholders

- **Solutions Architect**
 - Overall solutions framework

- **Upgrade Consultant**
 - Rehearsal upgrades

- **Windchill Administrator**
 - Application Installation, Export and Import

- **Validation Team**
 - Core WC features

- **Extended Validation Team**
 - Extended CAD, WTPart, Doc interactions

- **PTC Technical Support**

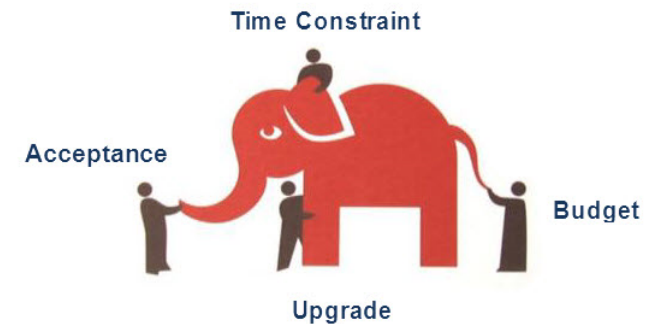


- **Hardware**
 - Windchill Apps and Oracle Server Windows to Redhat Linux 5.0
 - Identical Production and QA Environment
 - Managed in NA
 - Upgraded CPU and Memory
- **PDMLink & ProjectLink**
 - R10.0 M040
 - Creo Elements Pro 5.0 M150 (CAD Worker & Clients)
 - CAD Adapter Windows 2008 R2 64bit, Creo 1.0 M030
 - Productview Creo 1.0 M030
 - PTC Desktop and Office Integration

- 3rd Party Modules
 - Oracle 11.2.0.3
 - JDK 1.6.0 31-b04
 - Internet Explorer 8.0
 - Chrome plug-in enabled

- WinDU tasks on the source system and fix all the issues
 - Performed on the production server
 - One week before Upgrade week end
- Export Oracle DB and LDAP
- Sync the vaults for R10 environment
- Setup target system
- Deploy customizations
- Import LDAP and Oracle DB
- Run the Upgrade Manager
- Execute Final Upgrade tasks
- Validate Upgraded solution

- **Unsupported Upgrade Process**
 - PTC Recommends Upgrade on the same platform
 - TS can not support upgrade issues across the platforms
- **Windchill Offline Time Constraint**
 - Network band width for transferring the files
 - 1 Master and 5 Replication Servers installation
 - 6 CAD Workers configurations
 - Porting customizations
- **End Users Validation and Acceptance**
 - Core validation team needs to validate and approve the data integrity
 - Team is dispersed across the globe
- **Budget**
 - Failure is not an option....



- **Unsupported Upgrade Process**
 - Clone R9.1 Windows production data into R9.1 RH
 - Validate the cloned system
 - Perform the upgrade on the cloned system
- **Time Constraint**
 - Establish the validated, repeatable upgrade process
 - Perform all the installation activities before upgrade week end
 - Import the CAD workers configurations
- **End User Validation and Acceptance**
 - Engage the core and extended team from the day one.
 - Offer Rehearsal upgraded R10.0 Production environment for extended period
 - Weekly, daily meetings
- **Budget**
 - Retire few legacy reports
 - Well established and documented upgrade process

- R10.0 Environments
 - R10.0 QA
 - R10.0 Production
- Rehearsals Plan
 - Upgrade Dry Run - 1
 - Meta Data Upgrade – 2
 - On R10.0 QA
 - Meta Data along with Vault Content Upgrades – 3
 - 1, 2 and 3 rd rehearsal upgrades On R10.0 QA
 - 4 on R10.0 Production – Made available till the upgrade week end
 - 5 and 6 on R10.0 QA

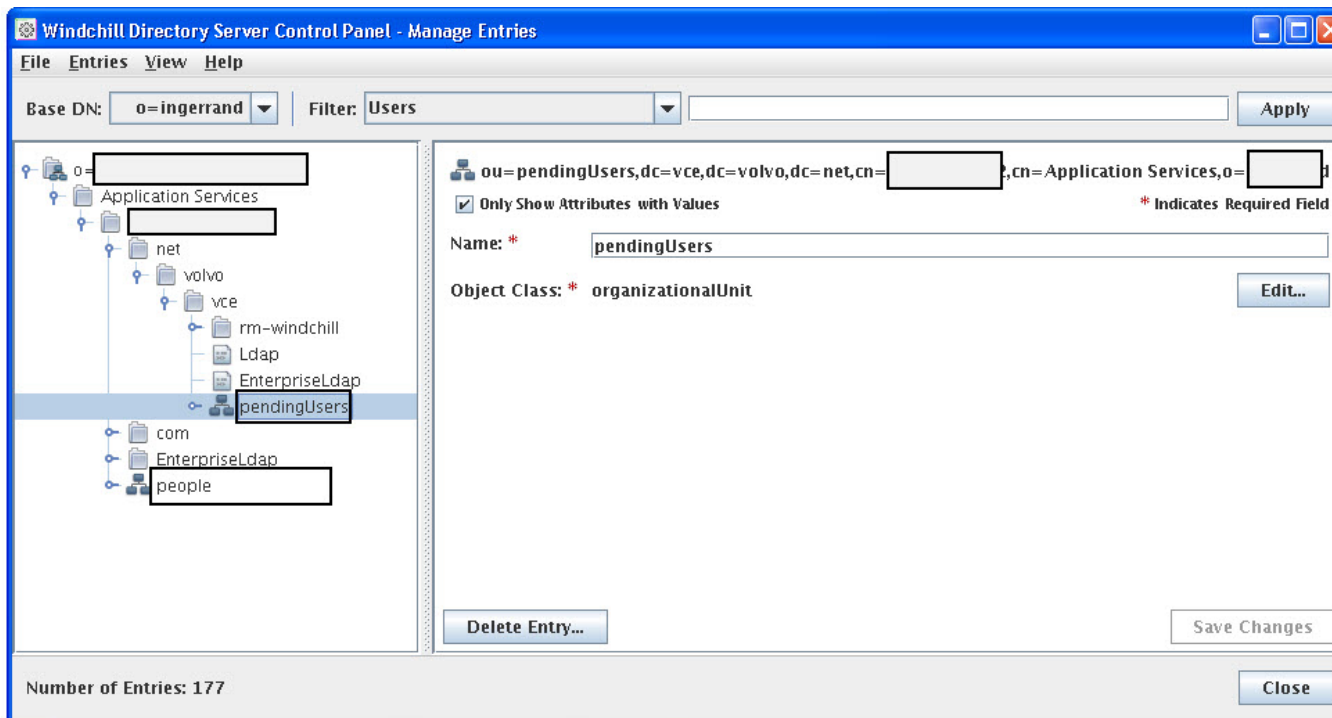
- VCE Performed Training Need Analysis
 - Role Based Training
- PTC University Precision LMS Subscription
- Localized Custom Training by PTC
- PTC Provided Laptops for OOTB Training
- VCE users used Rehearsal upgraded R10 Production for custom training

DATA Extract from R9 Windows Production

- Delete All content replication schedules that are not active
- Check the following queues for no objects
 - replQueue
 - wt.router.1.*, wt.router.2.*, wt.router.3.*, wt.router.4.*, wt.router.5.*, wt.router.6.*, wt.router.7.*
 - RevaultingQueue, ReplicationTaskQueue
 - Shut down all of the file server sites (9.x).
- Stop WC method and server manager, Stop tomcat, Windchill DS
- Export Oracle database dump
- Transfer the Oracle database dump
 - WINRAR the db dump file
 - Rsync to R10 DB
 - Extract the file using winrar
- Take the LDAP Export
 - ou=People, ou=Pending User

DATA Extract from R9 Windows Production

- LDAP Export – Node structure is maintained
 - Source LDAP ou=people and ou=pendingUsers are exported



DATA Extract from R9 Windows Production

- Vaults: Un-mounting the Windows path and Mounting Linux Path
- Developed a command line tool

Re-mapped from Windows OS like e:\wc_vault\ir_03*

Show only existing mounts Show all possible mounts

Host	Folder	Vault	Seq Number	Path	Enabled	Read Only	Mount s
	ir_0365	ir_mastervault	374	\\wc_vault\ir_0365	+	-	Valid
	ir_0364	ir_mastervault	373	\\wc_vault\ir_0364	+	-	Valid
	ir_0363	ir_mastervault	372	\\wc_vault\ir_0363	+	-	Valid
	ir_0362	ir_mastervault	371	\\wc_vault\ir_0362	+	-	Valid
	ir_0361	ir_mastervault	370	\\wc_vault\ir_0361	+	-	Valid
	ir_0360	ir_mastervault	369	\\wc_vault\ir_0360	+	-	Valid
	ir_0359	ir_mastervault	368	\\wc_vault\ir_0359	+	+	Valid
	ir_0358	ir_mastervault	367	\\wc_vault\ir_0358	+	+	Valid

On R9 RH – Future R10 Windchill Server

- **Import the data dump**
 - Execute Functional index SQLs
 - Check the invalid packages and compile them
 - Execute gather schema status
 - Execute REHOST scripts
- **Import LDAP nodes**
 - Delete ou=People and ou=Pending Users nodes
 - Import ou=People and ou=Pending Users nodes from R9 Production
- **Move Customizations**
 - Custom RB files
 - site.xconf changes
 - Windchillconfigurator.xconf
 - auth.properties
- **Add dummy IP values for other replica sites**

On R9 RH – Future R10 Windchill Server

- Execute windu
 - Execute
 - Basic data validation checks
 - LDAP related
 - CAD Related
 - Upgrade Related
 - Issues and Solution

Issue	Solution
Validate Process to Template Reference	Custom tool for cleansing the data
MissingControlBranchDT	Wt.vc.MissingBranchCkeanser
DetectMissingWfATemplateForWorkItem	WINRU InvalidWorkflowTasksRepair
DanglingExportRecords	WINRU Dangling ExportRecorddelete
ValidateIterFolderMemberLink	WINRU Missing Folder Link Repair Tool

On R9 RH – Future R10 Windchill Server

- **Content Verify**
 - Execute Content Verify for validating vault contents
- **WC Features**
 - Check-In/Check-Out
 - Share to Workspace
 - Continue the workflow processes
- **Shared the results to TS**
- **R9.1 RH system is ready for upgrade**

- Network bottleneck

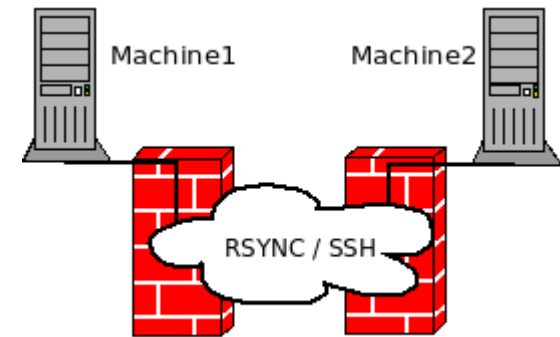
- Windchill servers location moved from Local to Corporate IT
 - It took 36 hours for transferring Oracle data dump.
 - Oracle data dump transferred to a network folder – 4 hours for 32GB
 - Export, transfer to network folder, transfer to R10 server, import – 8 Hours
 - Can not be accommodated during the go live week end.
 - Upgrade manager UI takes substantial amount of time
 - Plan for deploying necessary software on one of the CAD Workstations
 - An attempt to initiate the upgrade manager from a Linux box (PTC Reco)
 - After 6.00PM noticing a substantial network delay
 - Possible data transfer between VCE business units.

- RSYNC

- Vault content synchronization
- Oracle db dump
- Windchill DS backup

- Reference

- Download link
 - http://www.rsync.net/resources/binaries/cwRsync_3.1.0_Installer.zip
- Configuration
 - http://www.rsync.net/resources/howto/windows_rsync.html



On R9 RH – Future R10 Windchill Server

- **Upgrade Manager**

- Welcome
- Confirm Installed Properties
- Gather Database Properties
- Confirm Database to Upgrade
- Verify Supported Upgrade Path
- Gather Upgrade Properties
- Initialize Upgrade
- Configure Database and Ldap
- Serialized Data Integrity Scan
- Verify Pre Conditions
 - Keys and Indexes missing: SQLs documented
- Upgrade Database Schema
- Execute Standalone Migrators
- Validate Standalone Migrators
- Add Database Constraints
- Update Container Templates
 - Method server was up and running gracefully

On R9 RH – Future R10 Windchill Server

- **Upgrade Manager**

- Execute Server Migrators
 - ECAD Undo Checkout – Hanging
 - Stop the upgrade manager, Executed gather schema and continued
- Load New Data
- Execute Server Migrators with New Data
- Finalize Upgrade
- Summary

- **R10 Upgrade Manager**

- Substantial improvements
- Error messages are more meaningful
- Healing scripts for fixing most of the issues
- Excellent PTC TS

VCE Performs Monthly Benchmark Study

- **Monthly Performance Benchmark studies**
- **Performed in each location**
- **15 Test Cases**
 - Creating a new Workspace
 - Searching for world car top level assembly
 - Add the copy of world car assembly to a workspace
 - Checkout the top level and required
 - Open the world car from ProE
 - Save from ProE
 - List from Workspace
 - Navigate to Details page
 - CAD Document Structure Report
 - Change table display
 - Modify attributes
 - Rename in PDMLink
 - Synchronize Workspace
 - Check in Modified

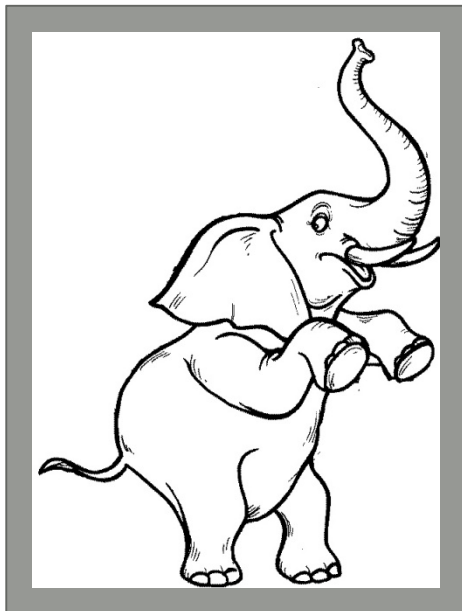
END USER ACCEPTANCE - STATUS

- R10.0 M040 User Acceptance Status

Category	Reported	Closed	Wait	WIP	Open	Description
Blocking						
Critical	9	8		1		Org-Id set from
Major	15	15		0	0	
Minor	8	6		2	0	

- **Environment platform swap**
 - R9.1 Windows Production cloned to R9.1 RH Linux
 - Multiple cloning rehearsals, validation of cloned system
 - Additional rehearsal upgrades for validating the upgrade process
- **Oracle data dump and vault contents transfer time**
 - WinRar compresses the oracle data file to < 3GB, takes 3-4 hours for file transfer.
 - Installed Linux-WinRar for uncompressing data file.
 - Takes 10 minutes for uncompressing the file.
 - Optimizing vault sync – By deploying RSync
- **Unmounting Win-vaults and Mounting Linux vault folders.**
 - It took 4 hours for two resources for unmounting/mounting as post upgrade activities.
 - A handy tool is developed which can do the above in minutes.
- **New UI, Performance, Data consistency checks**
 - Engaging end users by providing R10 rehearsed production environment for more than 4 weeks
 - What's new in R10.0 – Daily Emails
- **New Products, Product Launches**
 - VCE design project plans
 - Designers taking local backups of their CAD models, local workspaces, no check-outs
- **Managing Time Constraint**
 - All the replica server installations prior to upgrade week end.
 - CAD Worker configurations exported to a flat file

- UPGRADE
 - Combination of different components
 - And It is a enjoyable process.....



- **Work Instruction Document**
 - Step by Step process check list
 - Periodically execute WinDU and fix the issues
 - Perform most of the pre-upgrade activities before upgrade week end.
 - Initial vaults copying
 - Replication servers installation
 - CAD Workers configurations
- Engage the extended team from the day one
- Perform adequate number of rehearsals and iron out all the wrinkles
- Last Rehearsal should be a clean rehearsals and as per the work instructions
- **Establish conditions of satisfactions**
 - Performance
 - Test cases to be executed
- **Follow PTC recommended approach for configurations/customizations**
 - Site specific xconf
 - wtCustom folder for modified RB files
 - Workflow expressions in a wrapper class. Not with-in workflow expressions
 - Handy deployable package
- Provide rehearsal upgraded production/equivalent to end user community for extended time

Q & A

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- create user schema_name identified by db_name
 - temporary tablespace TEMP
 - default tablespace USERS
 - quota unlimited on USERS
 - grant connect, resource to schema_name
 - grant create sequence, create view, query rewrite to schema_name
 - GRANT "PLUSTRACE" TO schema_name
 - Connect as system/manager@db_name
 - CREATE OR REPLACE DIRECTORY data_pump_dir AS 'D:\oracle\product\10.2.0\admin\qawind\dpdump/';
 - GRANT READ, WRITE ON DIRECTORY data_pump_dir TO schema_name;
 - expdp system/manager@db_name DIRECTORY=data_pump_dir DUMPFILE=WC91PROD_EXP.DMP SCHEMAS=SRC_schema_name EXCLUDE=STATISTICS
 - ./impdp user_name/password@db_name DIRECTORY=TEMP_DATA_PUMP_DIR DUMPFILE=WC91PROD_EXP.DMP REMAP_SCHEMA=WC91_Schema:WC10_Schema
 - Create Function based Index

- **Function based Index**

- CREATE UNIQUE INDEX "WTDOCUMENTS\$UNIQ0" ON "WTDOCUMENT" ("IDA3MASTERREFERENCE", "VERSIONIDA2VERSIONINFO", "ITERATIONIDA2ITERATIONINFO", "WIPPK"."GETNORMALIZEDWIPSTATE"("STATECHECKOUTINFO"), "ONEOFFVERSIONIDA2ONEOFFVERSI");
- CREATE UNIQUE INDEX "WTUNIT\$UNIQ0" ON "WTUNIT" ("IDA3MASTERREFERENCE", "VERSIONIDA2VERSIONINFO", "ITERATIONIDA2ITERATIONINFO", "WIPPK"."GETNORMALIZEDWIPSTATE"("STATECHECKOUTINFO"));
- CREATE UNIQUE INDEX "CONTROLBRANCH\$UNIQ0" ON "CONTROLBRANCH" ("IDA3B5", "VERSIONID", "ONEOFFVERSIONID", "VIEWID", "VARIATION1", "VARIATION2", UPPER("ADHOCSTRINGIDENTIFIER"), "WIPPK"."GETNORMALIZEDWIPSTATE"("WIPSTATE"), "SESSIONOWNER");
- CREATE UNIQUE INDEX "EPMSEPFAMILYTABLE\$UNIQ0" ON "EPMSEPFAMILYTABLE" ("IDA3MASTERREFERENCE", "VERSIONIDA2VERSIONINFO", "ITERATIONIDA2ITERATIONINFO", "WIPPK"."GETNORMALIZEDWIPSTATE"("STATECHECKOUTINFO"), "ONEOFFVERSIONIDA2ONEOFFVERSI");
- CREATE UNIQUE INDEX "PROXYDOCUMENT\$UNIQ0" ON "PROXYDOCUMENT" ("IDA3MASTERREFERENCE", "VERSIONIDA2VERSIONINFO", "ITERATIONIDA2ITERATIONINFO", "WIPPK"."GETNORMALIZEDWIPSTATE"("STATECHECKOUTINFO"), "ONEOFFVERSIONIDA2ONEOFFVERSI");
- CREATE UNIQUE INDEX "WTPART\$UNIQ0" ON "WTPART" ("IDA3MASTERREFERENCE", "VERSIONIDA2VERSIONINFO", "ITERATIONIDA2ITERATIONINFO", "WIPPK"."GETNORMALIZEDWIPSTATE"("STATECHECKOUTINFO"), "IDA3VIEW", "VARIATION1", "VARIATION2", "ONEOFFVERSIONIDA2ONEOFFVERSI");
- CREATE UNIQUE INDEX "AUTHORIZATIONAGREEMENTS\$UNIQUE" ON "AUTHORIZATIONAGREEMENT" ("IDA3MASTERREFERENCE", "VERSIONIDA2VERSIONINFO", "ITERATIONIDA2ITERATIONINFO", "WIPPK"."GETNORMALIZEDWIPSTATE"("STATECHECKOUTINFO"));
- CREATE UNIQUE INDEX "EPMDOCUMENT\$UNIQ0" ON "EPMDOCUMENT" ("IDA3MASTERREFERENCE", "VERSIONIDA2VERSIONINFO", "ITERATIONIDA2ITERATIONINFO", "WIPPK"."GETNORMALIZEDWIPSTATE"("STATECHECKOUTINFO"), "ONEOFFVERSIONIDA2ONEOFFVERSI");
- CREATE INDEX "EPMDOCUMENTMASTERS\$COMP1" ON "EPMDOCUMENTMASTER" ("WTREVERSEPK"."REVERSECHARS"(UPPER("NAME")));
- CREATE INDEX "EPMDOCUMENTMASTERS\$COMP2" ON "EPMDOCUMENTMASTER" ("WTREVERSEPK"."REVERSECHARS"(UPPER("CADNAME")));
- CREATE INDEX "EPMDOCUMENTMASTERS\$COMP3" ON "EPMDOCUMENTMASTER" ("WTREVERSEPK"."REVERSECHARS"("DOCUMENTNUMBER"));
- CREATE INDEX "PROJECTPLAN\$COMP1" ON "PROJECTPLAN" (UPPER("WTPK"."PREFIX"("NAME")));
- CREATE INDEX "STRINGVALUE\$COMP0" ON "STRINGVALUE" ("IDA3A4", "IDA3A6", "CLASSNAMEKEYA4", "WTPK"."PREFIX"("VALUE"));
- CREATE INDEX "STRINGVALUE\$COMP1" ON "STRINGVALUE" ("IDA3A6", "CLASSNAMEKEYA4", "WTPK"."PREFIX"("VALUE"), "IDA3A4");
- CREATE INDEX "STRINGVALUE\$COMP61040001" ON "STRINGVALUE" ("CLASSNAMEKEYA4", "IDA3A6", "WTPK"."PREFIX"("VALUE"), "IDA3A4");
- CREATE INDEX "UFIDMAPPING\$COMP0" ON "UFIDMAPPING" ("WTPK"."PREFIX400"("BIRTHUFID"));
- CREATE INDEX "UFIDMAPPING\$COMP1" ON "UFIDMAPPING" ("WTPK"."PREFIX400"("LOCALUFID"));
- CREATE INDEX "URLVALUE\$COMP0" ON "URLVALUE" ("IDA3A4", "IDA3A6", "CLASSNAMEKEYA4", "WTPK"."PREFIX"("VALUE"));
- CREATE INDEX "URLVALUE\$COMP1" ON "URLVALUE" ("IDA3A6", "CLASSNAMEKEYA4", "WTPK"."PREFIX"("VALUE"), "IDA3A4");
- CREATE INDEX "REMOTEOBJECTID\$COMPOSITE" ON "REMOTEOBJECTID" ("WTPK"."PREFIX400"("REMOTEOBJECTID"));
- CREATE UNIQUE INDEX "VARIANTSPEC\$UNIQUE" ON "VARIANTSPEC" ("IDA3MASTERREFERENCE", "VERSIONIDA2VERSIONINFO", "ITERATIONIDA2ITERATIONINFO", "WIPPK"."GETNORMALIZEDWIPSTATE"("STATECHECKOUTINFO"), "ONEOFFVERSIONIDA2ONEOFFVERSI");

- **Gather Statistics for schema level**

- EXEC DBMS_STATS.gather_schema_stats (ownname => 'schema_name', cascade => true, estimate_percent => dbms_stats.auto_sample_size, options => 'GATHER AUTO');

- **Find Invalid objects**

- SELECT 'alter package '||object_name||' compile '||' FROM user_objects WHERE object_type in ('PACKAGE', 'PACKAGE BODY') AND status = 'INVALID';

- **Fix for invalid objects**

- alter package BASELINEPK compile ;
- alter package EPMSUPPORTINGDATAPK compile ;
- alter package EPMWORKSPACEPK compile ;
- alter package CSMCOMPARELOBPK compile ;

Thank you