Successful Strategies for Rapidly Upgrading PTC Windchill 9.1 to Windchill 10.1 on a Light Budget

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- 1999- Summer: NASA-JSC Directors Grant for Virtual Simulation
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Introduction

- The Frugal Times
- Historical Upgrade Process
- Planning for Possible Constraints
- PTC Compatibility Matrix
- In-Place Upgrade Process
- Pre-Upgrade Activities
- Upgrade Activities
- Post Upgrade Activities
- Results of the Upgrade
- Tips for an Upgrade On a Shoestring Budget
- Questions
• Economic uncertainty
  – Economy
  – Continuing Resolution
  – Shift to commercial space flight

• Budget restraints
  – Personnel reductions
  – Environment reductions
  – New equipment guidelines

• Still need to maintain corporate operations
  – Operations for Johnson Space Center
  – Managing engineering data for International Space Station flights
  – Operations for general research
  – Managing engineering data for Multi Purpose Crew Vehicle (MPCV)
  – Staying current with software and hardware
• Purchase/ obtain new servers for the upgraded environments
• Establish additional network and storage resources
• Establish the new system environments
• Integrate Active Directory (AD) authentication with webserver
• Load Windchill and integration custom code
• Run WinDU reports and repair data if needed
• Load systems with production data
• Regression test systems
• Train users
• Perform many runs against the database
• Release system to users

(8.0 to 9.1 took 15 months to complete)
Planning for Possible Constraints

Things to Consider:

• Age of the current hardware
  – Speed and capability of the current servers to support new software
  – When is the refresh planned

• Technological Changes
  – Traditional racked servers?
  – Virtual servers local?
  – Virtual servers remote?
  – Cloud services?

• Budget challenges
  – Reduced services
  – Reduced personnel
  – Customer initiated paradigm shift

• User Environment
  – Constantly changing with no control of the changes and their timing

• Corporate events
  – Management tasks
  – Contracts changing
  – Personnel changes
  – Environmental changes
  – Policy changes

• Software compatibility between:
  – Current and upgraded PDMLink system
  – CAD software and PDMLink
  – Web browser and CAD software
  – Workstation OS and web browser

• Critical software release dates
  – Contracts using the system
  – Major events with projects
  – User training
  – PTC release dates
## PTC Compatibility Matrix

### Quick View

<table>
<thead>
<tr>
<th>PDMLink 9.1 M50 Current</th>
<th>PDMLink 9.1 M50 Transition</th>
<th>PDMLink 10.1 M30 Upgraded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solaris OS 10 03/05</td>
<td>Solaris OS 10 08/11</td>
<td>Solaris OS 10 08/11</td>
</tr>
<tr>
<td>Java 1.6.0_18</td>
<td>Java 1.6.0_33</td>
<td>Java 1.6.0_33</td>
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<tr>
<td>Oracle 10.2.0.4</td>
<td>Oracle 11.2.0.3</td>
<td>Oracle 11.2.0.3</td>
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<tr>
<td>DS 1.2</td>
<td>DS 1.3</td>
<td>DS 1.3</td>
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<tr>
<td>Tomcat 6.0.20</td>
<td>Tomcat 6.0.20</td>
<td>Integrated in Method Server</td>
</tr>
<tr>
<td>Apache 2.2.15</td>
<td>Apache 2.2.21</td>
<td>Apache 2.2.21</td>
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<tr>
<td>CAD Workers WF4</td>
<td>CAD Workers WF5</td>
<td>CAD Workers Creo 2</td>
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</tbody>
</table>

Reference: Windchill90M080SoftwareMatrices081909.pdf
# PTC Compatibility Matrix

## DDMS Environments

03/18/2013

<table>
<thead>
<tr>
<th>Jsc-ird-ddms5 (Master)</th>
<th>Jsc-ird-ddms6 (Slave)</th>
<th>Jsc-ird-ddms7 (Slave)</th>
<th>Jsc-ird-ddms8 (Slave)</th>
<th>Jsc-ird-ddms9 (Slave)</th>
<th>Jsc-ird-ddms10 (Slave)</th>
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<tbody>
<tr>
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<td>Processors 2 @ 1.5ghz</td>
<td>Processors 2 @ 1.5ghz</td>
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<td>Memory 16gb</td>
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<tr>
<td>NFS Mounts</td>
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<table>
<thead>
<tr>
<th>Jsc-ird-ddms11 (Master)</th>
<th>Jsc-ird-ddms12 (Slave)</th>
<th>Jsc-ird-ddms13 (Slave)</th>
<th>Jsc-ird-ddms14 (Slave)</th>
<th>Jsc-ird-ddms15 (Slave)</th>
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<tbody>
<tr>
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<table>
<thead>
<tr>
<th>Jsc-ia-ddmsm1</th>
<th>Jsc-ia-ddmsm2</th>
<th>Jsc-ia-ddmsm3</th>
<th>jsc-irw01a</th>
<th>jsc-irw01b</th>
<th>jsc-irw01c</th>
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<tbody>
<tr>
<td>Dell 2950</td>
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<td>Fast Production</td>
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<tr>
<th>jsc-ora01a</th>
<th>jsc-ora01b</th>
<th>jsc-ora01c</th>
<th>Fly-DM System</th>
<th>NetApp FAS 3040A</th>
<th>COPAN 200TX</th>
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<tbody>
<tr>
<td>Sun Fire 860</td>
<td>Sun SPARC Enterprise M6000</td>
<td>Sun SPARC Enterprise M5000</td>
<td>NetApp FAS 3040A</td>
<td>COPAN 200TX Recovery 24 to 72 hours</td>
<td>StorageTek L1400 Recovery 72 hours</td>
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<tr>
<td>Processors 8 @ 1.2ghz</td>
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<td>Processors 4 @ 2.1ghz</td>
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<td>Fiber Connection</td>
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</tbody>
</table>

**FlexLM grp.**

**Fast Indexing**

**Visualization**

**Windchill**

**Databases and Storage**

**NFS Mounts**

**Fiber**

**Network**
In Place Upgrade Process

All activities performed in all existing environments

• Pre-upgrade Activities
  – Run WinDU reports to insure data transferability
  – Upgrade server
  – Upgrade Windchill components
  – Upgrade database
  – Build migration installation

• Upgrade Activities
  – Move migration installation
  – Run migration tool
  – Upgrade Apache
  – Test upgrade

• Post Upgrade Activities
  – Establish keyword index
  – Bulk publish viewables
  – Rerun WinDU reports
Pre-Upgrade Activities

All performed in place on existing environments

- Run WinDU reports
  - To insure data integrity for migration
  - Roughly 14 million objects including Apollo, Shuttle, Station to Multi Purpose Crew Vehicle (MPVC) or Orion

- Upgrade server
  - Solaris upgrade from version 10 03/05 to Solaris 10 08/11
  - Upgrade file system to ZFS for file system and volume management, snapshots and clones, continuous integrity checking and automatic repair
  - Java upgrade from 1.6.0_18 to 1.6.0_27 for compatibility and security

- Upgrade Database
  - From Oracle 10.2.0.4 to 11.2.0.3+

- Build Migration Installation
  - To be used for the upgrade manager
  - Testing the upgraded customizations

- Directory Service (DS) Upgrade
  - From 1.2 to 2.3

- PSM Install
  - Monitor usage before and during rollout
  - Tuning of the new system

- MCAD Workers Upgrade
  - From WF4 to Creo2

- Customizations Upgrade
  - From 9.1 M50 to 10.1 M30
  - Minimize moving forward customizations
Upgrade Activities

- **Move 10.1 System**
  - Move to the master servers file system for speed
  - Can be done on a live system
  - Live system is stopped once to test migration system
  - Test functionality

- **Apache Upgrade to 2.2.21**
  - Place in environment
  - Test for functionality

- **Run Upgrade Manager**
  - Backup database and code base
  - Redirect resources between 9.1 and 10.1 PDMLink
  - Run upgrade
  - Test upgraded system
Post Upgrade Activities

• Viewable Regeneration
  – Bulk publish all the CAD objects in the system

• Indexing Generation
  – Reindex the system with SOL (new indexing software)
    • Documents first
    • Larger files second
    • Zip and last

• WinDU Reports for 10.1
  – Run to insure data integrity after upgrade
  – Create a baseline for future loads

• Resource Return
  – Return virtuals used for upgrade
  – Return storage copies used for upgrade
Results of The Upgrade

- System outage started on **Thursday April 4th at 5:00pm**
  - Ended on **xxxx**

- Backups ran from **xxx to xxx**

- Upgrade Manager ran from **xxx to xxx**

- Regeneration of Viewables
  - ran from **xxx to xxx**

- Regeneration of Keyword Index Status
  - **xxx**

- WinDU Reports for 10.1 results
  - **xxx**
Tips for An Upgrade On A Shoestring Budget

• Upgrade current system components in place avoiding the purchase of new hardware

• Migration environment can be a virtual machine zoned on one of the existing servers

• Transferring the migration environment to the same server as the environment to be upgraded eliminates all the network slowness

• The only extra resource needed was the storage for the production database and for the data to be placed against the staging environment for a one to one comparison run against the production environment.

• Coordinate the upgrade with everyone from the users to management to avoid scheduling pitfalls and software incompatibilities

• To use the updated DS with 9.1, you will have to obtain a “fix” from PTC
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