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

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Biography

Dr. Charles A. (Chip) Shearrow

• 1991-June 2000: Ohio Northern University (Advanced Robotics and Automation)

• 1998- Summer: Proposal for the Design Data Management System

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


• January 19, 2011- Present: MEI Technologies at NASA-JSC (IRD Operations Supervisor, Senior Systems Engineer)

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Introduction

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- Planning for Possible Constraints
- PTC Compatibility Matrix
- In-Place Upgrade Process
- Pre-Upgrade Activities
- Upgrade Activities
- Post Upgrade Activities
- Results of the Upgrade
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- 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
Historical Upgrade Process

- 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>
</tr>
<tr>
<td>Oracle 10.2.0.4</td>
<td>Oracle 11.2.0.3</td>
<td>Oracle 11.2.0.3</td>
</tr>
<tr>
<td>DS 1.2</td>
<td>DS 1.3</td>
<td>DS 1.3</td>
</tr>
<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>
</tr>
<tr>
<td>CAD Workers WF4</td>
<td>CAD Workers WF5</td>
<td>CAD Workers Creo 2</td>
</tr>
</tbody>
</table>

Reference: [Windchill90M080SoftwareMatrices081909.pdf](#)
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
  - Tuneing 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 XXX

- 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
Tips for An Upgrade On A Shoestring

• Upgrade
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