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A No-Frills Approach to Migrating from Pro/INTRALINK 3.4 to Windchill 8.0

Steven LaPha Jr.
United Space Alliance, LLC.
United Space Alliance, LLC.

• Our Mission: Provide safe, high-quality, best-value space operations, services and technologies to our customers.

• Capabilities:
  – Engineering Design
  – Space Flight Mission Operations
  – Space Systems Ground Operations & Processing
  – Space Systems Integrated Logistics
  – Space Systems Flight Software
  – Space Systems Integration & Program Management

• Locations:
  – Texas: Johnson Space Center, Florida: Kennedy Space Center, Alabama: Marshall Space Flight Center
Introduction

USA SRB

Structures Subsystem
- Forward Skirt
- Fuselage, Fin, and Forward Separation Ring

Electrical & Instrumentation Subsystem
- Forward IEA, Rate Gyros,
- C-Band Controller,
- Batteries, Cables, DAC, EDAS
- AFD, Distributor, Couplers, Antennas

Thermal Protection Subsystem
- MCC-1
- BTA
- RT-405/405A
- Insta-Foam

Structures Subsystem
- Alt Skirt Assembly & Thermal Curtain
- ET Attach Ring and ET/SDI Attach Struts
- Alt Systems Tunnel Cables

Separation Subsystem
- Alt Booster Separation Motors (4)

Thrust Vector Control Subsystem
- 10 Major LRUs
- Electrical Cables

Range Safety Subsystem
- Forward Systems Tunnel Cables and Linear Shaped Charge
- Alt IEA

Igniter Assembly
- Igniter, Safe & Arm Pressure Transducers

Loaded Segments
- Case Propellant Liner Insulation
- O-rings and J-seals
- Joint Heaters
- Pen and Retainers

Joints
- Stiffener stubs
- Associated Hardware

Nozzle Assembly
- Flex Bearing
- Nozzle
- Nozzle Extension
- Nozzle Severeance Hardware/LSI

ATK RSRM

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Introduction

Assembly and Test
- TPS application
- Mechanical assembly
- Electrical assembly
- Test

New Hardware
Offline Assembly

Hydroblazing

Retrieval
Disassembly
Refurbishment
- Component removal
- Corrosion removal

SRB Stack
ET and Orbiter Integration
Launch

Unique to
Reusable
Hardware

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Introduction

**TODAY**
- Current STS

**TOMORROW**
- ARES I
  - Crew Launch Vehicle
  - CEV/Cargo
  - ~60K lb
  - 1st Stage: 5-Segment RSRM
  - 2nd Stage: J2-X

**FUTURE**
- ARES V
  - Cargo
  - Launch Vehicle
  - ~286K lb Payload
  - 5-Segment Boosters
  - 5 - RS-68 Core
  - Stretched ET
  - J2-X Upper Stage
Migration Setup

Intralink Development ➔ Test Migrations ➔ Windchill Development

Intralink Production ➔ Migration ➔ Windchill Production
The Situation

- June, 2008 – Final Deciding Meeting
  - Manually migrate vs. Intralink migration tool
  - 40,000 Files
- October 1, 2008 – Intralink server obsolete

- Training availability – None
- Time available to procure outside company – Not enough
- Replacement server – Not an option
  - Remaining options: Self migrate
Additional Factors

• PTC Migration Data Questionnaire – Low complexity
  — Good candidate for customer-led or services-led

• Backup plan in case of failure
  • Manual migration

• Computer Engineer on staff
"Failure is not an option."

—Apollo 13 Movie
—Based on a quote by Gene Kranz
Windchill Setup

• For purposes of this presentation:
  — I:\ - Intralink             W:\ - Windchill
• Installation will not be covered
  — Pre-Copy option used
• No Windchill part creation
• No user-based attributes
• Primarily Pro/E files
• Few family tables
Different revision schemes

- Create three StateBasedVersioning.xml files in
  W:\...\loadFiles\pdmlink
  - Pre-migration (setup)
  - During migration (flat)
  - Post-migration (final)
- Remove any duplicate scheme values
- `java wt.series.LoadFileBasedSeries <pre-migration>`
- `enumCustomize`
- Add new revision scheme type
- Recompile: Ant -f makejar.xml
- Selectable in the lifecycle
Filed Based Versioning

• StateBasedVersioning.xml used during migration must be a flat file based versioning file with only Intralink scheme
• Migrator only accepts file based versioning, single scheme

```xml
<?xml version="1.0" encoding="UTF-8"?>
<scheme>
  <series name="StateBased">
    <value>A</value>
    <value>B</value> ...
  </series>
</scheme>
```

• See also PTC TPI134560
# State Based Versioning

<table>
<thead>
<tr>
<th>Pre-Migration Setup</th>
<th>During Migration</th>
<th>After Migration</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;seed name=&quot;NUMERIC&quot;&gt;</code></td>
<td><code>&lt;series name=&quot;StateBased&quot;&gt;</code></td>
<td><code>&lt;seed name=&quot;NUMERIC&quot;&gt;</code></td>
</tr>
<tr>
<td>....</td>
<td></td>
<td>....</td>
</tr>
<tr>
<td><code>&lt;seed name=&quot;ASME&quot;&gt;</code></td>
<td><code>&lt;value&gt; PRE &lt;/value&gt;</code></td>
<td><code>&lt;seed name=&quot;MIGRA&quot;&gt;</code></td>
</tr>
<tr>
<td><code>&lt;value&gt;-&lt;/value&gt;</code></td>
<td><code>&lt;value&gt; - &lt;/value&gt;</code></td>
<td><code>&lt;value&gt; PRE &lt;/value&gt;</code></td>
</tr>
<tr>
<td><code>&lt;seed name=&quot;MILSTD&quot;&gt;</code></td>
<td><code>&lt;value&gt; A &lt;/value&gt;</code></td>
<td><code>&lt;value&gt; A &lt;/value&gt;</code></td>
</tr>
<tr>
<td><code>&lt;value&gt; B &lt;/value&gt;</code></td>
<td><code>&lt;value&gt; B &lt;/value&gt;</code></td>
<td><code>&lt;value&gt; B &lt;/value&gt;</code></td>
</tr>
<tr>
<td>....</td>
<td><code>&lt;value&gt; YY &lt;/value&gt;</code></td>
<td><code>&lt;value&gt; YY &lt;/value&gt;</code></td>
</tr>
<tr>
<td><code>&lt;value&gt; Y &lt;/value&gt;</code></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
System Preparations

• Create lifecycles using new revision scheme
  – Make sure lifecycles are enabled
• Create workflows if necessary
  – Out of the box vs. customized
• Verify permissions
  – Do new lifecycle states need new permissions?
• Setup object initialization rules (OIR)
  – wt.series.HarvardSeries.StateBased
• Create products and libraries
  – Subfolders will be created by Migrator tool
Test Organizer

- Create Test Organizer
  - Site>Utilities> Business Administration>Attribute Definition Manager
  - Name: TestOrganizer
Preparations

Intralink Server

• Backup Intralink data

• On Intralink Server
  – I:...datatserver\intralink\tools\bin
    • Locking of Intralink
    • healing_before_migration.tcl
    • Set_common_name.sql (optional as needed)

• **Manually** copy files to Windchill server (pre-copy option)
  – Move all data files from Intralink data server To Windchill server directory
Preparations

Windchill Server

• Backup Oracle database
  – DOS>exp system/<PW>@<user> file=<File location/name>.dmp owner=<data owner> log=exp.log
  – See also PTC TPI132658

• Backup Site.xconf file
Migration.properties

- W:\ILMigration\codebase\com\ptc\migration\migration.properties
- Set up during install, but will need to modify
- ilmigpassword=migchangeme?
- nonDefaultLDAP=
- doFileTransfer=False/True
- truncateILLargeColumns=false
- TruncateUDAValue=false
- LinkToExistingPart=false
Windchill Mapping
– Migration begins here, almost...

Illdataloader Mapping
• W:\...ILMigration\bin
• Step 1: Run Illdataloader Mapping
  [1] – This will test your connections to Intralink
  [2] – This will test your connections to Intralink and download the data you need
• Common Errors: Misspelling the migration password, Intralink not being locked down, security permissions
• Step 2: [6] – Download All data (mapping files)
Windchill Mapping

• Mapping files
  - W:\...ILMigration\loadFiles\ilwcmigration
• Appcreator.properties – Don’t touch
• Filevaults.properties – Setup file
• Docrules.properties – Setup file
• Ibamap.properties – Attribute mapping
• Epm_folder_rsrl_map.properties – File mapping
• Pitdmapping.properties – Type mapping
• Usermap.properties – User mapping
Mapping Files
Filevaults.properties – Setup file

- FILEVAULT.<Intralink server>:i:\...\vault=defaultcachevault

- LOCAL_PRECOPY_PATH.<Intralink server>:i:\...\vault=<Windchill server>:W:\...\precopy
Docrules.properties – Setup file

• EPMDOC_NUMBER
  – NAME_WITH_EXTENSION
  – AUTO_NUMBERING
    EPMDOC_NUMBER=NAME_WITH_EXTENSION
• WTDOC_NUMBER
  – NAME_WITH_EXTENSION
  – AUTO_NUMBERING
    WTDOC_NUMBER=NAME_WITH_EXTENSION

• Intralink ____________________________ Windchill
• PTC Common Name = Name
• Filename = Filename
• Filename = Number
  – Script to modify Intralink available from PTC: Set_common_name.sql

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Ibamp.properties – Attribute mapping

• <Pro/INTRALINK Attribute Name> =
  • <Windchill Attribute Name>
Epm_folder_rsrl_map.properties – File mapping Simple Version

- RS.BEGIN.70.<Intralink lifecycle>
  - RS.DEF.BEGIN.<Intralink lifecycle>
    - <Intralink lifecycle>=<WC lifecycle>
    - <Intralink lifecycle>.1.<Intralink LC State>=<WC LC state>
    - <Intralink lifecycle>.2. <Intralink LC State>=<WC LC state>
  - RS.DEF.END. <Intralink lifecycle>
    ###############
    REPOSITORY=<WC Product/Library>
    - Root Folder/<Intralink folder>=/<WC folder>
    - Root Folder/<Intralink folder>=/<WC folder>
  - RS.END.70. <Intralink lifecycle>
Epm_folder_rsrl_map.properties – File mapping (Advanced version)

• Separate products

... Root Folder/<Intralink folder>=/<WC folder>
Repository = <WC Product/Library>
Root Folder/<Intralink folder>=/<WC folder>
...
Epm_folder_rsrl_map.properties – File mapping (Advanced version)

• Separate lifecycles

... 
   Root Folder/<Intralink folder>=/<WC folder>
# 
RS.DEF.BEGIN.Root Folder Release Scheme
Root Folder Release Scheme=<WC Life Cycle>
Root Folder Release Scheme.1.<Intralink LC State>=<WC LC State>
RS.DEF.END.Root Folder Release Scheme
# 
REPOSITORY=<WC Product/Library>
   Root Folder/<Intralink folder>=/<WC folder>
...

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Important Tips

- Folder mapping is case sensitive and space sensitive.

- Lifecycle states are defined by their system name when mapping, no spaces, all upper case
  - Under Review = UNDERREVIEW

- Can only change lifecycle on new parts, or upon revision.
Pitdmapping.properties – Type mapping

AnsysOut=0/@OTHER/@OTHER/@NULL/@NULL
AssemMembInfo=0/@PROE/@OTHER/@NULL/@PROE_UGC
Assembly=0/@PROE/@CADASSEMBLY/@NULL/@PROE_UGC
BendOrder=0/@PROE/@OTHER/@NULL/@PROE_UGC
BumpMapTexture=0/@OTHER/@OTHER/@NULL/@NULL

... If only migrating Pro/E files, can ignore.
Otherwise:
# for EPMDocument:
pitypedefname=0/@AuthoringApplication/@EPMDocumentType/@SubType/@Category
Usermap.properties – User mapping

- SmithJ = smithj
- If using Windchill provided LDAP
  - Will create users automatically for you, and duplicate if spelling/domain is different
- If mapping to company controlled LDAP
  - Must map to each specific user and map to LDAP (spelling/capitalization)
  - TAN 141054
- Mapped all files to “Admin”
  - Not suggested for Owner controlled permissions
Mapping continued

• Assuming everything is set up perfectly, you are done with the hard part

• Rarely is it set up 100% correctly

• Ildataloader Mapping
    • [1] – User data
    • [2] – Folder and release scheme
    • [3] – User attributes
    • [4] – Reconcile all
Conflict Resolution

- Now to see where things went wrong
- Log Files  \( W:.../LMigration/loadXMLFiles/ilwcmigration/reports \)

Conflict Report: EPM Folder and ReleaseScheme/Level Mapping Conflicts

<table>
<thead>
<tr>
<th>Created On: Sat Oct 11 14:35:20 EDT 2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>From: Pro/INTRALINK 3.4F000</td>
</tr>
<tr>
<td>Description: This is a list of conflicts generated during user mapping.</td>
</tr>
</tbody>
</table>

Conflict Report: User Mapping Conflicts

User conflicts during Mapping

<table>
<thead>
<tr>
<th>Duplicate Conflicts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description: The following users were mapped to more than one Intralink user.</td>
</tr>
<tr>
<td>Resolution: Please verify that these duplicate entries are intentional.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conflicting Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>migrator</td>
</tr>
</tbody>
</table>

Reconcile and Repeat until everything is acceptable

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Loading Data

From Ildataloader Mapping
• [4] – Load admin data
• [5] – Map admin data

• After each step it is a good idea to check for any errors, any time you restart method server isolate logs to isolate problems (logs get pretty extensive depending on setting)
  – W:\..\logs
  – W:\...\ILMigration\logs\migration-client.log
Loading Data

From Illdataloader Mapping

• [7] – Pre-configuration of part creation
  - [1] – Download part data (check like mapping data)
  - [3] – Load part data
  - [4] – Map part data
  - [5] – Create migration rules
Errors

• If you run into an error you may need to reload the data and remap the data

• The only step you cannot duplicate is “Map all data”
  – Must delete migration site or step through 2,3,4,5

• wt.series.SeriesIncrementOutOfBoundsException: The series value has reached its maximum value: YY, series=StateBased
  - Make sure you have every revision of Intralink included

• The revision value is not valid within the series: Z, series=MilSpec
  - Use state based in OIR, or make sure it includes every revision

• java.lang.NullPointerException
  - ? This error varies
Windchill Migration

- Now begins actual migration
- Illdataloader DocResume
  - Conflict resolution with Illdataloader MergeObjects
    - Run>equality=yes
    - Source is master checked for all
    - Items placed based on revision
  - Renaming objects
    - File is created
- DocResume is where most problems will arise
Windchill Migration

• Illdataloade Document #
  — # = Number of threads/number of processors
• Illdataloade Link #
• Illdataloade FT #
• Illdataloade UDA #
• Illdataloade AsStored #
• Illdataloade Baseline #
• Illdataloade RenameHistory #
  • Illdataloade RTPForm #
Windchill Migration

• Ildataloade FileTransfer #
  — Longest running portion
• Ildataloade PostMigrationDataCheck

• If you choose Windchill part creation
• Ildataloade PartResume
• Ildataloade WTPart #
• Ildataloade BuildProcess #
• Ildataloade Baseline #
Idataloader PostMigrationDataCheck

- Creates report at
  \W:\...\ILMigration\logs\postmigrationdatacheck.log

===============================================================================
logs for function: fixNullAttrvalFamTabs
===============================================================================
No. of cells with no definition = 0
No. of integer/boolean/float cells = 0
No. of string cells = 0
No. of timestamp cells = 0
illaadata loader MigrationStatus – Report

- Creates report at W:\...\ILMigration\logs\migration-client.log

Status of Intralink Objects Migration...

<table>
<thead>
<tr>
<th>Number of Intralink Objects to be migrated</th>
<th>Number of PDMLink Objects actually migrated</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPMDocumentMaster</td>
<td>#</td>
</tr>
<tr>
<td>EPMDocument</td>
<td>#</td>
</tr>
<tr>
<td>WTDocumentMaster</td>
<td>#</td>
</tr>
<tr>
<td>WTDocument</td>
<td>#</td>
</tr>
<tr>
<td>MemberLink</td>
<td>#</td>
</tr>
<tr>
<td>ReferenceLink</td>
<td>#</td>
</tr>
<tr>
<td>Files</td>
<td>#</td>
</tr>
<tr>
<td>Baselines</td>
<td># (with Documents only) + # (with WTParts)</td>
</tr>
</tbody>
</table>

All DocumentMaster attributes were successfully migrated
All Document attributes were successfully migrated
All Link attributes were successfully migrated
No WTParts were created because you have not specified documents for which you want to create WTParts

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After Migration

• If you have to, resume Intralink service
• Upon migration completion lock down Intralink access
• Backup migration Site.xconf
• Restore original Site.xconf
After Migration

• Return first created Statebasedversioning.xml file with new revision scheme

• java wt.series.LoadFileBasedSeries
  "W:\...loadFiles\pdmlink\StateBasedVersioning.xml" -load
Additional Tips

• Try everything on developmental server even if you have an empty production server.
• If you recover from Oracle, make sure to repair it.
• System Configurator/Xconfmanager
  – Wt.series.integerSeries.min=0
• Preference Manager
  – /ProjectLink/PDMLinkFoldersAndContentsView = TRUE
• Make sure all users are trained as close as possible to the implementation
Helpful Documents

- Pro/Intralink 8.0 Data Migrator Administrators Guide
- TPI134560 - Filebased versioning scheme to a state-based versioning scheme, as part of post migration activities.
- TPI132621 - An alternate method of file transfer which transfers metadata only using "ildataloader FileTransfer <#>" while the files are copied through the O/S using the file "fileMap.csv".
- TPI132658 - A simple backup method to restore the blank PDMLink 8.0
- TPI137992 - ildataloader Document: (wt.series.seriesResource/0)wt.series.SeriesIncrementOutOfBoundsException
- TPI132067 - ildataloader DocResume: java.lang.NullPointerException
- TPI140777 - ildataloader Document :wt.series.SeriesIncrementInvalidException
So how did things go?

- 7/15/08  Planning meeting kickoff
- 7/15/08  Intralink cleanup – started
- 7/15/08  Initial mapping of data
- 7/27/08  Extraction of data
- 7/30/08  Extraction of data - (Make sure you lock Intralink)
- 8/10/08  Initial mapping of data – (Check migration password)
- 8/10/08  Metadata test migration
- 8/17/08  Metadata test migration – (Use a filebased series )

*Red Lines indicate unsuccessful attempts due to technical issues.*
So how did things go?

- 8/27/08 Test migration of data #1 - Tool/data validation
  - Does the data migrator tool work on my data?
- 8/31/08 Test migration of data #2 - Process validation
  - Can you migrate the data in the promised time window?
- 9/3/08 Test migration of data #2 - Process validation (revisions)
- 9/8/08 Test migration of data #2 - Process validation (revisions)
- 9/14/08 Test migration of data #2 - Process validation - (revisions)
- 9/25/08 Test migration of data #3 - Process validation
- 10/10/08 Intralink Goes Down (Friday morning)
- 10/10/08 Data migration #3 - Production
- 10/10-11/08 Final validation and preparations to go live
- 10/13/08 Windchill goes live (Monday morning)
# Final Results

<table>
<thead>
<tr>
<th>Number of Intralink Objects to be migrated</th>
<th>Number of PDMLink Objects actually migrated</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPMDocumentMaster</td>
<td>11540</td>
</tr>
<tr>
<td>EPMDocument</td>
<td>47046</td>
</tr>
<tr>
<td>WTDocumentMaster</td>
<td>1</td>
</tr>
<tr>
<td>WTDocument</td>
<td>3</td>
</tr>
<tr>
<td>MemberLink</td>
<td>442605</td>
</tr>
<tr>
<td>ReferenceLink</td>
<td>243080</td>
</tr>
<tr>
<td>Files</td>
<td>39351</td>
</tr>
<tr>
<td>Baselines</td>
<td>1</td>
</tr>
</tbody>
</table>

Total files that could not be migrated: 1

- Total time for final migration, about 8 hours.
- 8 Total migration runs
- 7 Tech support calls
Final days for the Intralink Server

Our IT representative celebrating one less resource to manage.

The last shutdown.
Questions?

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