

## Plant Model Migration to Smart 3D

### Data Migration and Transformation Summary

This TecSurge Service delivers fully intelligent Intergraph Smart 3D (including SmartPlant 3D) plant models by migrating source data from other plant modelling systems such as Intergraph PDS, CADWorx, AVEVA PDMS/E3D, Autodesk Plant3D and Bentley OpenPlant.

TecSurge uses a combination of state-of-the-art proprietary automation, specialised expertise, and a well-organised, scalable technical team to set industry benchmarks for quality and schedule, while remaining highly cost competitive with alternatives.

Our service provides comprehensive coverage of all aspects and disciplines of the plant design application, including specifications and catalogues, multi-discipline models and orthographic and isometric drawings.

### Differentiators

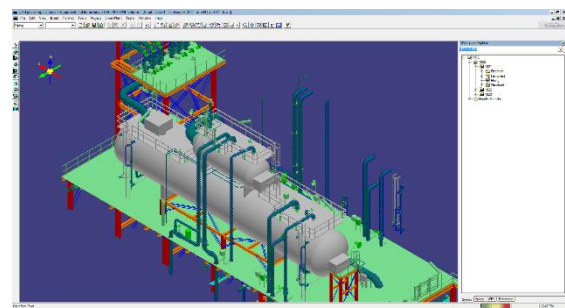
- Proprietary automation technology produces reliable and predictable results
- Comprehensive offering addressing both automated and manual components
- Flexible and scalable to meet varying client scenarios and schedules
- Automated verification and quality control

### Deliverables

The primary deliverable from this service is a Smart 3D backup containing the migrated catalogue, model, drawings and reports. The migration can target SmartPlant 3D 2011 R2 or later, and data can be provided in either Microsoft SQL Server or Oracle database format. Where required, data can be merged into another existing database using Model Data Reuse (MDR) functionality.



Source PDS model



Target S3D model

In addition to this primary deliverable, secondary deliverables such as quality and project management reports are prepared and provided to the client as part of the service.

Due to the complexity and high level of detail involved, the target level of fidelity of the migrated model is subject to many factors which are determined based on discussion with the client. Typically, a trade-off is made between time/cost and fidelity, however the scenario driving the migration requirement is possibly the most important factor.

For some scenarios, the source model has been developed to only a preliminary stage (e.g. basic engineering), and will be substantially reworked in Smart 3D after migration. In such a case, a minimal amount of manual retouching may be justified, and certain elements may not even exist in the source model (e.g. pipe supports or drawings).



In other scenarios, the source model represents an as-built status, complete with all physical elements and deliverables such as drawings, and must be migrated to a target model with as close to full fidelity as is technically possible.

## Work Process

### *Specifications and catalogues*

The migration work process begins with the conversion of the source specifications and catalogues to the target environment. In some cases, compatible target catalogues are already available, but TecSurge highly recommends a thorough comparison be performed in order to eliminate problems due to mismatches or dimensional inconsistencies.

Piping specifications are converted following the process described in the Piping Specification Conversion service, while those for other disciplines follow a very similar but usually simpler conversion and checking process.

Specification and catalogue conversion is typically scheduled such that data is made available progressively, according to its relative priority with respect to the model migration component. For example, commonly used 150-pound, carbon-steel piping specifications may be converted and delivered much earlier in the project schedule than limited-use exotic material specifications or vendor piping systems.

### *Model*

In parallel with the specification and catalogue conversion, the source model is processed into a neutral form used as the input to the migration automation software. The specifics of this processing vary depending upon the source system; the Material Data Publisher (MDP) software is used with PDS, while TecSurge proprietary PML macros are used with a PDMS source model.

When specification and catalogue data is released for use and the source model has been processed, the model migration process commences according to the project schedule. Typically, equipment and structural migration can be completed earlier, with piping dominating the overall migration effort due to its complexity and linkages to the other disciplines.

Within each discipline, a series of phases of activities are performed:

1. Automation is applied to migrate the source data to the target (this automation may in itself involve several steps, such as firstly migrating graphical elements, and then separately migrating additional attribute and property data)
2. Manual retouching is performed to improve the fidelity of the migrated model (for example, the source system may not contain structural member connection relationship information, so this must be applied to the target manually)
3. Automated comparison and quality checking is utilised to review and correct any mismatches

### *Drawings*

Once model migration has been completed, drawing generation for piping isometrics and drawing migration for orthographics can begin, if required by the client.

The piping isometric generation module is typically configured to match the format and presentation of the source environment as closely as possible, and then isometrics generated in bulk and spot-checked against the source drawings to monitor quality. Depending upon client requirements, various additional elements of data may be incorporated into the model to support isometric drawing fidelity, including:

- Explicit drawing sheet split points
- Revision and title block information
- Process and line condition data
- Hold markers and other notes

Orthographic drawings sheets, styles, filters and rules are configured to match the drawing types from the source system, and then drawing



volumes and drawing details automatically migrated using TecSurge's proprietary automation tools.

Once the automated component of the drawing migration is completed, manual retouching is performed to apply drawing-specific filters, add and reposition dimensioning and labelling, and add additional 2D graphics and text to match the source drawings. Checking is performed by manual comparison of the resulting drawings against the originals.

### Technical Scope

Specification and catalogue migration

- Piping
- Structural
- Electrical

Multi-discipline physical model migration

- Equipment
- Piping (including pipe supports)
- Structural and civil
- Electrical (including equipment and cable trays)
- Instrumentation (including in-line and offline)
- Access, maintenance and other envelopes

Drawing migration

- Piping isometric regeneration
- Orthographic volumes and drawing migration
- As-built drawing embedding

Manual retouching

- Application of client modelling standards and procedures
- Conduit and duct banks
- Roads and paving
- Adjustments to label and dimension positions
- Additional annotation and dimensioning where required

Quality assurance

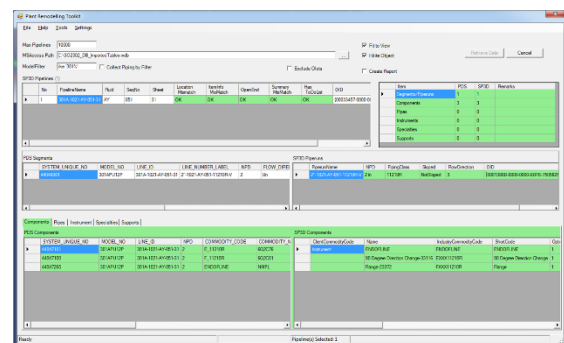
- Automated comparison of source and target
- Manual review and checking of deliverables
- To-do list management

### Quality Assurance

Due to the necessity to use manual retouching within some parts of the model migration process, and also to address fundamental differences between the source and target systems, TecSurge has developed a suite of quality assurance tools to ensure a high quality result. These tools perform a variety of comparisons between the source and target systems, verifying elements such as:

- Component end point locations and coordinates
- Property data
- Isometric bill of materials

Our quality tools allow designers to quickly identify potential migration errors, and zoom into affected elements in order to make any necessary adjustments. In some cases, well-known migration errors can be automatically corrected by specialised tool functions.



TecSurge proprietary quality assurance toolkit

In addition, TecSurge utilises a battery of standard comparison reports, ensuring completeness and accuracy of the migration overall, and supporting progress tracking of the project.

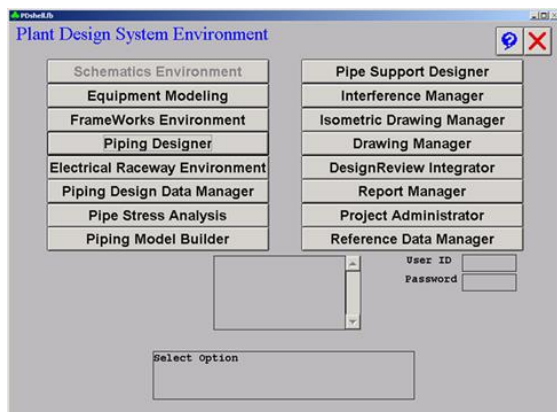
### Getting Started

In order to make a full and accurate estimate of the effort, TecSurge relies upon information provided in three different forms:

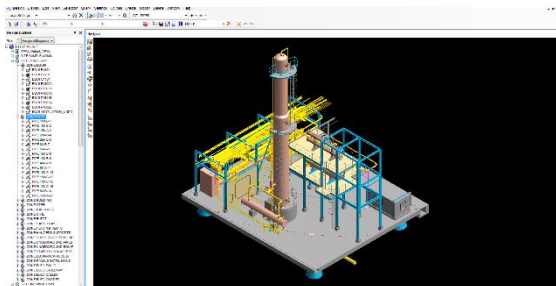
- Consultative discussion, regarding overall fidelity and scope requirements
- Detailed quantitative and scoping factors, captured in a questionnaire
- Access to the source specifications, model and drawing data



In cases where access to the source data is not available, less accurate estimates can still be prepared based on the information supplied in the first two forms. Where detailed source data can be provided, TecSurge will request a full backup of the source model and reference data in the application native format.



## PDS environment



PDMS environment

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### Piping Material Class Information

Piping Materials Class - ICB031										DESIGN PIPING COMMODITIES									
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Material Class: ICB031										R1A R2A R3A R4A R5A R6A R7A R8A R9A R10A R11A R12A R13A R14A R15A R16A R17A R18A R19A R20A R21A R22A R23A R24A R25A R26A R27A R28A R29A R30A R31A R32A R33A R34A R35A R36A R37A R38A R39A R40A R41A R42A R43A R44A R45A R46A R47A R48A R49A R50A R51A R52A R53A R54A R55A R56A R57A R58A R59A R60A R61A R62A R63A R64A R65A R66A R67A R68A R69A R70A R71A R72A R73A R74A R75A R76A R77A R78A R79A R80A R81A R82A R83A R84A R85A R86A R87A R88A R89A R90A R91A R92A R93A R94A R95A R96A R97A R98A R99A R100A R101A R102A R103A R104A R105A R106A R107A R108A R109A R110A R111A R112A R113A R114A R115A R116A R117A R118A R119A R120A R121A R122A R123A R124A R125A R126A R127A R128A R129A R130A R131A R132A R133A R134A R135A R136A R137A R138A R139A R140A R141A R142A R143A R144A R145A R146A R147A R148A R149A R150A R151A R152A R153A R154A R155A R156A R157A R158A R159A R160A R161A R162A R163A R164A R165A R166A R167A R168A R169A R170A R171A R172A R173A R174A R175A R176A R177A R178A R179A R180A R181A R182A R183A R184A R185A R186A R187A R188A R189A R190A R191A R192A R193A R194A R195A R196A R197A R198A R199A R200A R201A R202A R203A R204A R205A R206A R207A R208A R209A R210A R211A R212A R213A R214A R215A R216A R217A R218A R219A R220A R221A R222A R223A R224A R225A R226A R227A R228A R229A R230A R231A R232A R233A R234A R235A R236A R237A R238A R239A R240A R241A R242A R243A R244A R245A R246A R247A R248A R249A R250A R251A R252A R253A R254A R255A R256A R257A R258A R259A R260A R261A R262A R263A R264A R265A R266A R267A R268A R269A R270A R271A R272A R273A R274A R275A R276A R277A R278A R279A R280A R281A R282A R283A R284A R285A R286A R287A R288A R289A R290A R291A R292A R293A R294A R295A R296A R297A R298A R299A R300A R301A R302A R303A R304A R305A R306A R307A R308A R309A R310A R311A R312A R313A R314A R315A R316A R317A R318A R319A R320A R321A R322A R323A R324A R325A R326A R327A R328A R329A R330A R331A R332A R333A R334A R335A R336A R337A R338A R339A R340A R341A R342A R343A R344A R345A R346A R347A R348A R349A R350A R351A R352A R353A R354A R355A R356A R357A R358A R359A R360A R361A R362A R363A R364A R365A R366A R367A R368A R369A R370A R371A R372A R373A R374A R375A R376A R377A R378A R379A R380A R381A R382A R383A R384A R385A R386A R387A R388A R389A R390A R391A R392A R393A R394A R395A R396A R397A R398A R399A R400A R401A R402A R403A R404A R405A R406A R407A R408A R409A R410A R411A R412A R413A R414A R415A R416A R417A R418A R419A R420A R421A R422A R423A R424A R425A R426A R427A R428A R429A R430A R431A R432A R433A R434A R435A R436A R437A R438A R439A R440A R441A R442A R443A R444A R445A R446A R447A R448A R449A R450A R451A R452A R453A R454A R455A R456A R457A R458A R459A R460A R461A R462A R463A R464A R465A R466A R467A R468A R469A R470A R471A R472A R473A R474A R475A R476A R477A R478A R479A R480A R481A R482A R483A R484A R485A R486A R487A R488A R489A R490A R491A R492A R493A R494A R495A R496A R497A R498A R499A R500A R501A R502A R503A R504A R505A R506A R507A R508A R509A R510A R511A R512A R513A R514A R515A R516A R517A R518A R519A R520A R521A R522A R523A R524A R525A R526A R527A R528A R529A R530A R531A R532A R533A R534A R535A R536A R537A R538A R539A R540A R541A R542A R543A R544A R545A R546A R547A R548A R549A R550A R551A R552A R553A R554A R555A R556A R557A R558A R559A R560A R561A R562A R563A R564A R565A R566A R567A R568A R569A R570A R571A R572A R573A R574A R575A R576A R577A R578A R579A R580A R581A R582A R583A R584A R585A R586A R587A R588A R589A R590A R591A R592A R593A R594A R595A R596A R597A R598A R599A R600A R601A R602A R603A R604A R605A R606A R607A R608A R609A R610A R611A R612A R613A R614A R615A R616A R617A R618A R619A R620A R621A R622A R623A R624A R625A R626A R627A R628A R629A R630A R631A R632A R633A R634A R635A R636A R637A R638A R639A R640A R641A R642A R643A R644A R645A R646A R647A R648A R649A R650A R651A R652A R653A R654A R655A R656A R657A R658A R659A R660A R661A R662A R663A R664A R665A R666A R667A R668A R669A R670A R671A R672A R673A R674A R675A R676A R677A R678A R679A R680A R681A R682A R683A R684A R685A R686A R687A R688A R689A R690A R691A R692A R693A R694A R695A R696A R697A R698A R699A R700A R701A R702A R703A R704A R705A R706A R707A R708A R709A R710A R711A R712A R713A R714A R715A R716A R717A R718A R719A R720A R721A R722A R723A R724A R725A R726A R727A R728A R729A R730A R731A R732A R733A R734A R735A R736A R737A R738A R739A R740A R741A R742A R743A R744A R745A R746A R747A R748A R749A R750A R751A R752A R753A R754A R755A R756A R757A R758A R759A R760A R761A R762A R763A R764A R765A R766A R767A R768A R769A R770A R771A R772A R773A R774A R775A R776A R777A R778A R779A R780A R781A R782A R783A R784A R785A R786A R787A R788A R789A R790A R791A R792A R793A R794A R795A R796A R797A R798A R799A R800A R801A R802A R803A R804A R805A R806A R807A R808A R809A R810A R811A R812A R813A R814A									

### Piping Commodity information

The following high level questions have a significant impact on the time and cost of the migration project:

**Is specification and catalogue conversion required?** Why: specification and catalogue migration can be a significant effort in its own right, and can impact the critical path of the project.

**Should manual retouching be performed by TecSurge?** Why: manual retouching of the migrated module is by definition a manual effort, and therefore has a considerable impact on the number of resources and therefore cost.

**Are orthographic drawings to be included in the migration?** Why: orthographic or arrangement drawings often require significant manual retouching to match the originals, and this impacts the number of resources required.

**Are there specific schedule constraints (e.g. hard delivery deadline)?** Why: aggressive schedules can be met by TecSurge, however they may require additional resources and increase cost.

## Contact us

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