

# Standards Based CADD Data Integration with GIS

## A Florida Department of Transportation Example

### 2009 SERUG Conference

Hyatt Regency Riverfront

Ballroom 1

1:00pm – 2:30pm

Jacksonville, Florida

April 28, 2009

Welcome to all SERUG 2009 Attendees



# Standards Based CADD Data Integration with GIS

## A Florida Department of Transportation Example

### Introduction of the Project Team



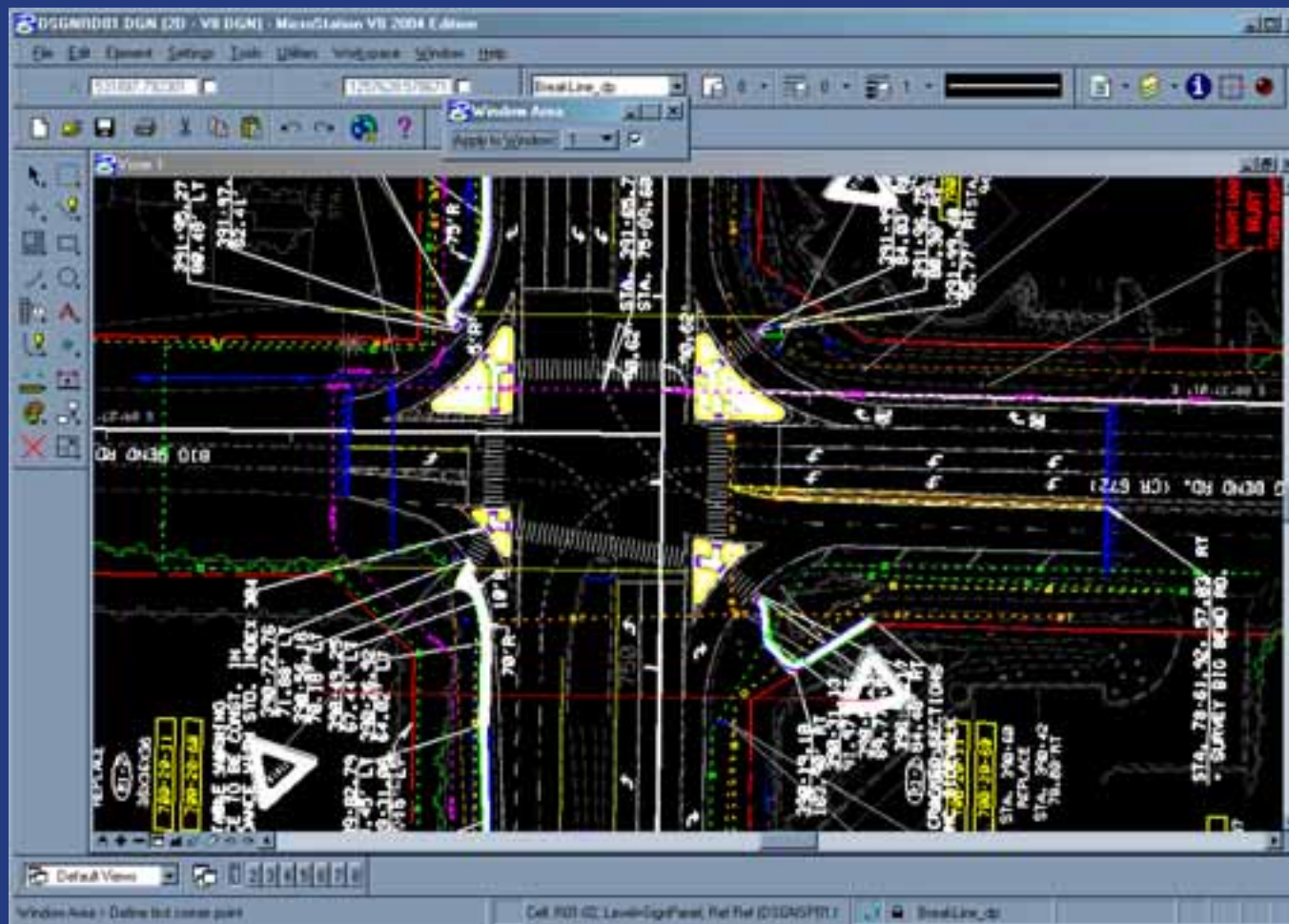
Ian Watson, GISP  
Jeff Engerski, GISP

Tom Kelly PLS, CPM, MCP, GISP



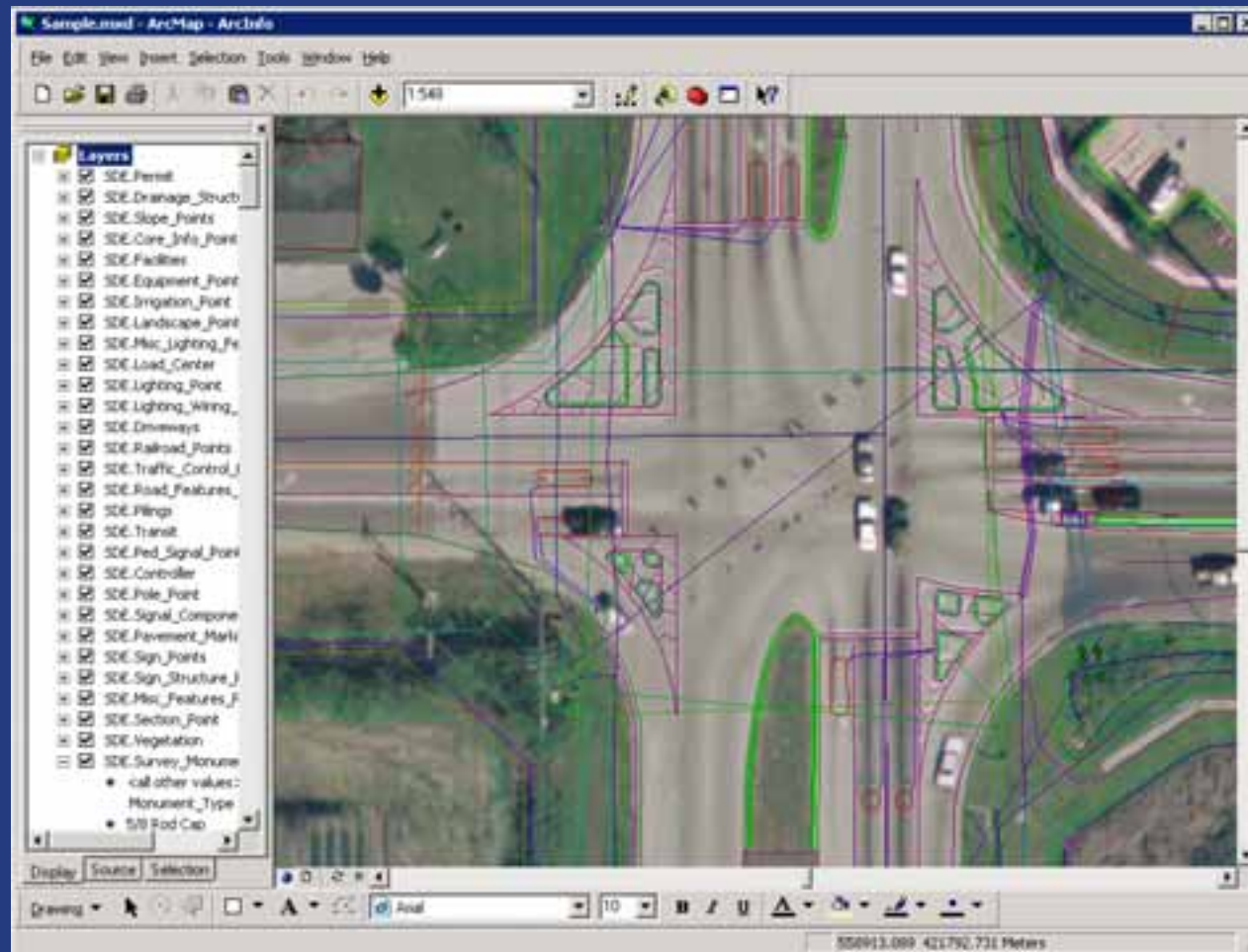
# Standards Based CADD Data Integration with GIS

## A Florida Department of Transportation Example



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## A Florida Department of Transportation Example

### Objectives

Example implementation of an Automated; CADD to GIS data conversion.

- Standardization is “KEY” or Preplanning your way into a successful implementation.
- Migration tools and the “How to” of migration.
- Automation process.
- Post process information “How to keep an eye on SKYNET”.
- Future Considerations
- Questions and Answers.

# Standards Based CADD Data Integration with GIS

## A Florida Department of Transportation Example

Standardization is “KEY”

Preplanning your way into a successful implementation

File Type	Description	Level Name	By-Level Color	By-Level Line Style	By-Level Weight
Borders & Sheets	Adhoc Points Placed by SheetInfo	AdhocPoint_dp	0	4	0
Borders & Sheets	Construction Cloud	Cloud_dp	7	0	2
Borders & Sheets	Dimension Lines, Corresponding Terminators, Equation Lines	DimLines_dp	0	0	1
Borders & Sheets	Grid Lines Major in Profile and Cross Section	GridMaj_dp	3	0	1
Borders & Sheets	Grid Lines Minor in Profile and Cross Section	GridMin_dp	0	0	0
Borders & Sheets	Grid Lines Minor Sub 2 in Cross Section Sheets	GridMinG_dp	20	0	0
Borders & Sheets	Grid Lines Minor Sub in Cross Section Sheets	GridMinSub_dp	20	0	0
Borders & Sheets	Leader Line and terminator with Text	LeaderLine_dp	0	0	1
Borders & Sheets	Match Lines with Text, Arrows for Station Notations	MatchLines_dp	1	0	2
Borders & Sheets	North Arrows	NorthArw_dp	0	0	2
Borders & Sheets	Pay Item Number Label Elements	Payitem_dp	4	0	2
Borders & Sheets	Plot Border	PlotBorder_dp	3	0	0

# Standards Based CADD Data Integration with GIS

## A Florida Department of Transportation Example

Migration Tools and the “How To” of Migration

Decide on a software platform for migration.

ESRI Data Interoperability Extension.

Extract, Transform, and Load “ETL” Model

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## A Florida Department of Transportation Example

### Migration Tools and the “How To” of Migration

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Decide how the transfer of data is going to proceed.

Migrate from Microstation Design Files to an interim Personal Geodatabase and then finally into the District Enterprise Geodatabase.



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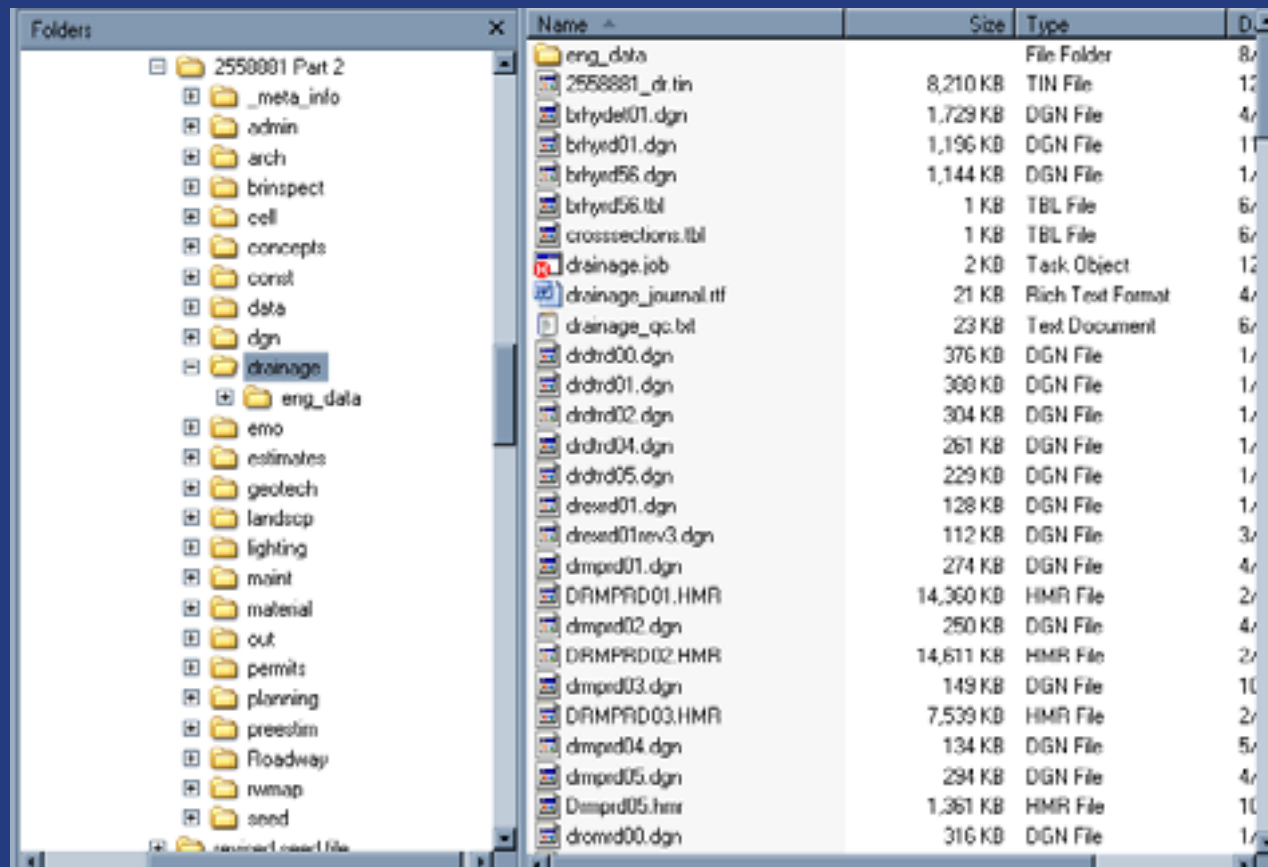
Migrate from Microstation Design Files to an interim Personal Geodatabase and then finally into the District Enterprise Geodatabase.

Break down the design of the FDOT file structure.

# Standards Based CADD Data Integration with GIS

## A Florida Department of Transportation Example

### Migration Tools and the “How To” of Migration



Folders	Name	Size	Type	D.
2550001 Part 2	eng_data		File Folder	8/
_meta_info	2550001_dr.tin	8,210 KB	TIN File	12/
admin	brhyed01.dgn	1,729 KB	DGN File	4/
arch	brhyed01.dgn	1,196 KB	DGN File	11/
brinspect	brhyed56.dgn	1,144 KB	DGN File	1/
cell	brhyed56.tbl	1 KB	TBL File	6/
concepts	crosssections.tbl	1 KB	TBL File	6/
const	drainage.job	2 KB	Task Object	12/
data	drainage_journal.rtf	21 KB	Rich Text Format	4/
dgn	drainage_qc.txt	23 KB	Text Document	6/
drainage	drdrd00.dgn	376 KB	DGN File	1/
eng_data	drdrd01.dgn	300 KB	DGN File	1/
emo	drdrd02.dgn	304 KB	DGN File	1/
estimates	drdrd04.dgn	261 KB	DGN File	1/
geotech	drdrd05.dgn	229 KB	DGN File	1/
landscp	drewd01.dgn	128 KB	DGN File	1/
lighting	drewd01rev3.dgn	112 KB	DGN File	3/
maint	dmped01.dgn	274 KB	DGN File	4/
material	DRMPRD01.HMR	14,360 KB	HMR File	2/
out	dmped02.dgn	250 KB	DGN File	4/
permits	DRMPRD02.HMR	14,611 KB	HMR File	2/
planning	dmped03.dgn	149 KB	DGN File	10/
preestim	DRMPRD03.HMR	7,539 KB	HMR File	2/
Roadway	dmped04.dgn	134 KB	DGN File	5/
rwap	dmped05.dgn	294 KB	DGN File	4/
seed	Dmped05.hmr	1,361 KB	HMR File	10/
revised road file	dromed00.dgn	316 KB	DGN File	1/

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## A Florida Department of Transportation Example

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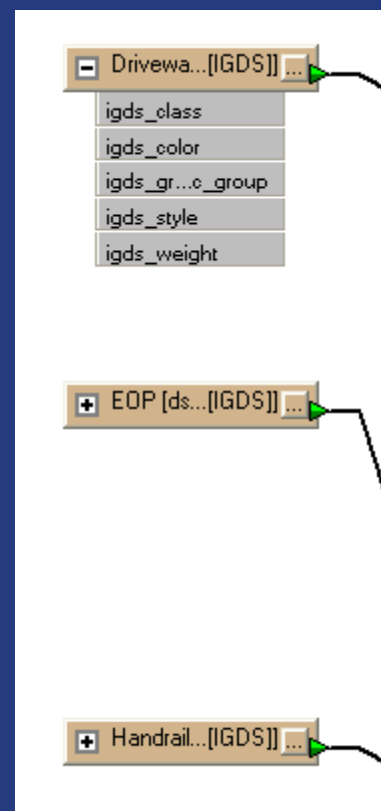
**Microstation Design Files and Layer Names.**

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### Migration Tools and the “How To” of Migration

drdtrd00.dgn	376 KB	DGN File	1/
drdtrd01.dgn	388 KB	DGN File	1/
drdtrd02.dgn	304 KB	DGN File	1/
drdtrd04.dgn	261 KB	DGN File	1/
drdtrd05.dgn	229 KB	DGN File	1/
drexrd01.dgn	128 KB	DGN File	1/
drexrd01rev3.dgn	112 KB	DGN File	3/
drmprd01.dgn	274 KB	DGN File	4/
DRMPRD01.HMR	14,360 KB	HMR File	2/
drmprd02.dgn	250 KB	DGN File	4/
DRMPRD02.HMR	14,611 KB	HMR File	2/
drmprd03.dgn	149 KB	DGN File	10/
DRMPRD03.HMR	7,539 KB	HMR File	2/
drmprd04.dgn	134 KB	DGN File	5/
drmprd05.dgn	294 KB	DGN File	4/
Drmprd05.hmr	1,361 KB	HMR File	10/
dromrd00.dgn	316 KB	DGN File	1/



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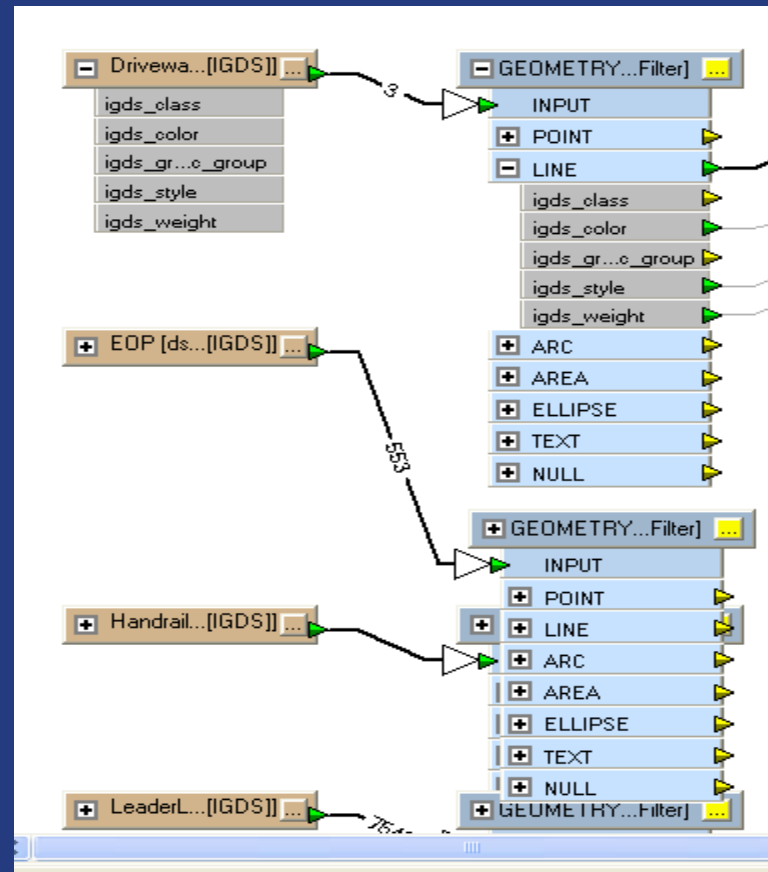
Microstation Design Files and Layer Names.

**Use the correct transformation tools.**

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## A Florida Department of Transportation Example

### Migration Tools and the “How To” of Migration



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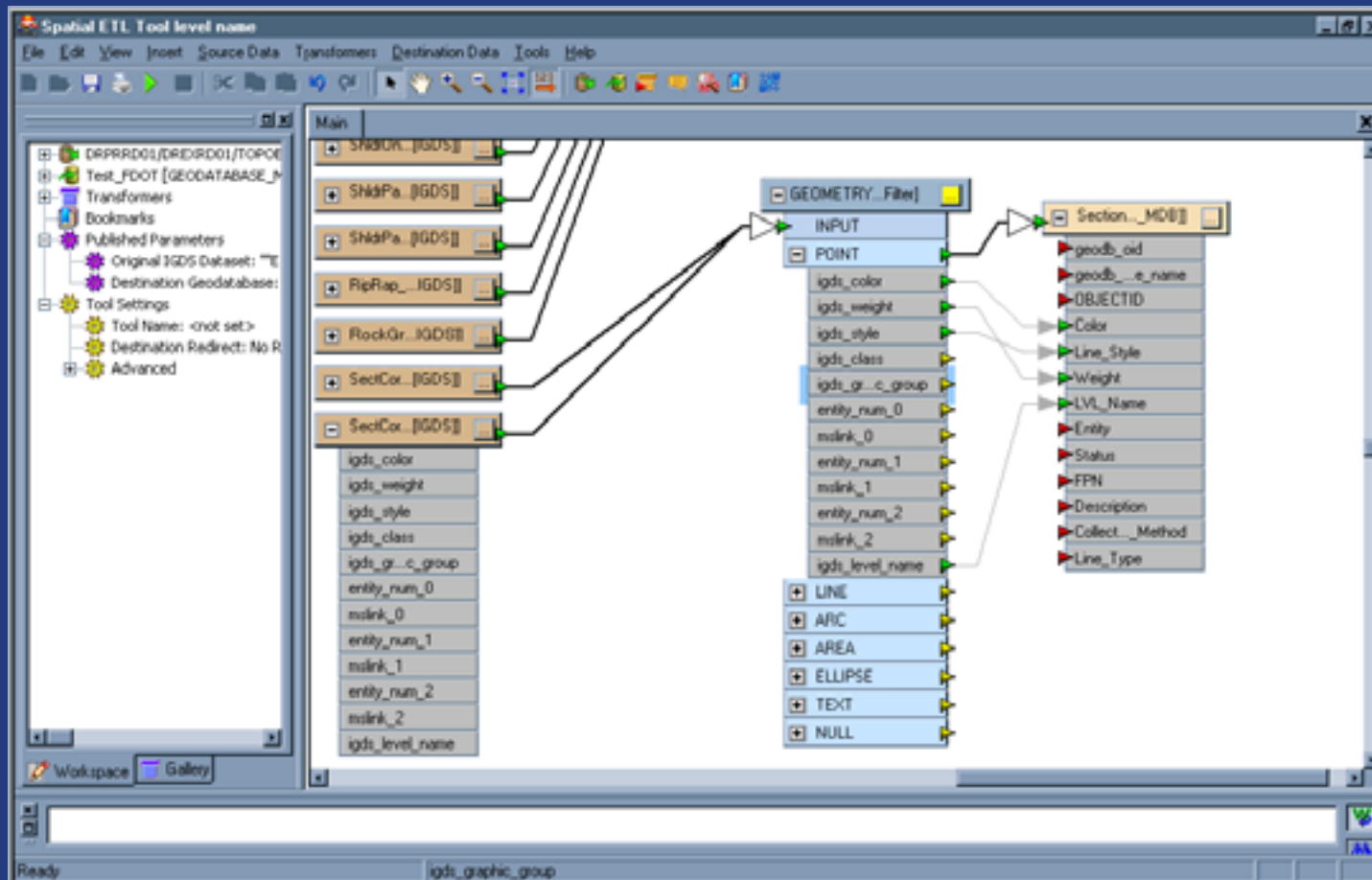
Use the correct transformation tools.

Mapping the translation to the appropriate geodatabase feature classes, geometric shapes, and attribute fields.

# Standards Based CADD Data Integration with GIS

## A Florida Department of Transportation Example

### Migration Tools and the “How To” of Migration





# Standards Based CADD Data Integration with GIS

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### Automation

How the CADD Interoperability Application “CIA” was born.

The CIA is comprised of

- The Scheduler

- The ETL model

- The Error Check

- The Feature Attribute Updater

- and The Mailer

All code was written in C# with ArcObjects.

Requires ESRI ArcInfo and a License of ESRI Data Interoperability.

The Enterprise Geodatabase is Oracle 10g and uses SDE 9.2.

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### Automation

The CIA proceeds through its workflow at scheduled off peak hours.  
Checks the designated folder for contents.



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The CIA proceeds through its workflow at scheduled off peak hours.

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If a Financial Project Number “FPN” folder is found in the designated folder the CIA runs.

# Standards Based CADD Data Integration with GIS

## A Florida Department of Transportation Example

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The CIA proceeds through its workflow at scheduled off peak hours.

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The CIA runs the ETL model on the FPN folder contents.

# Standards Based CADD Data Integration with GIS

## A Florida Department of Transportation Example

Automation



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## A Florida Department of Transportation Example

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The CIA runs the ETL model on the FPN folder contents.

The CIA then posts the results to the Personal Geodatabase “PGDB”.

# Standards Based CADD Data Integration with GIS

## A Florida Department of Transportation Example

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**The CIA then examines and updates the contents of the PGDB.**

# Standards Based CADD Data Integration with GIS

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The CIA then examines and updates the contents of the PGDB.

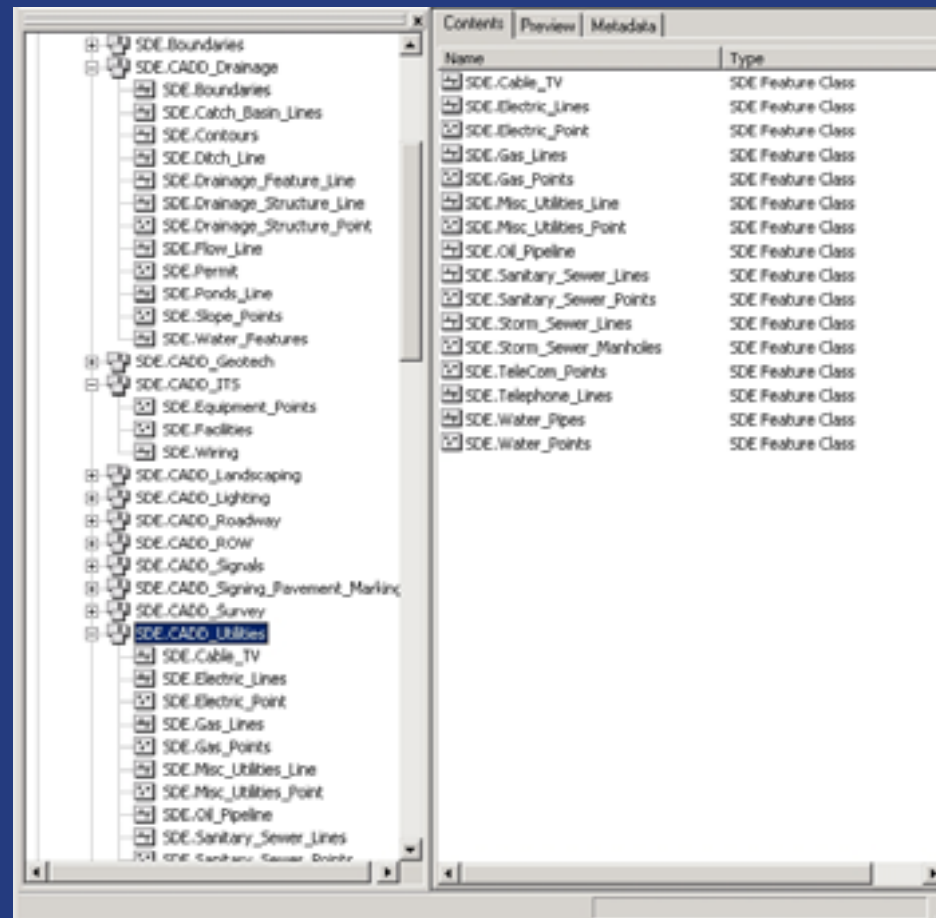
Finally the CIA posts the PGDB into a versioned instance of the Enterprise Geodatabase.



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### Automation



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### Post Process Information

The ETL model and error checking model both log data about their process.

# Standards Based CADD Data Integration with GIS

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This queried information is then inserted into a stock email.

# Standards Based CADD Data Integration with GIS

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### Post Process Information

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This queried information is then inserted into a stock email.

Emails are sent daily to the DBA, the GIS Lead, and a GIS Analyst confirming a successful or unsuccessful run.

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### Post Process Information

**From:** d7.webserver@dot.state.fl.us [mailto:d7.webserver@dot.state.fl.us]  
**Sent:** Wednesday, March 05, 2008 5:42 AM  
**To:** Kelly, Tom; Brosinski, Thomas  
**Subject:** CIA Operation Report: 3/5/2008 5:00:09 AM

Started	Ended	FPN	Processed	Datasets	FeatureClasses	Features Read	Features Written
3/5/2008 5:00:09 AM	3/5/2008 5:00:09 AM	2558331	False	0	0	0	0
3/5/2008 5:00:09 AM	3/5/2008 5:00:28 AM	4082792	False	0	0	0	0
3/5/2008 5:00:28 AM	3/5/2008 5:18:06 AM	4133991	True	162	36	93711	15213
3/5/2008 5:18:06 AM	3/5/2008 5:23:51 AM	4134051	True	88	21	17597	2704
3/5/2008 5:23:51 AM	3/5/2008 5:29:43 AM	4134121	True	129	25	25389	2827
3/5/2008 5:29:43 AM	3/5/2008 5:30:19 AM	4153331	True	4	1	702	67
3/5/2008 5:30:19 AM	3/5/2008 5:34:02 AM	4168331	True	43	14	4723	1482
3/5/2008 5:34:02 AM	3/5/2008 5:34:09 AM	4174661	False	0	0	0	0
3/5/2008 5:34:09 AM	3/5/2008 5:34:31 AM	4188031	False	8	0	779	0
3/5/2008 5:34:31 AM	3/5/2008 5:34:38 AM	4191501	False	0	0	0	0
3/5/2008 5:34:38 AM	3/5/2008 5:34:45 AM	4206661	False	0	0	0	0
3/5/2008 5:34:45 AM	3/5/2008 5:42:12 AM	4213581	True	88	22	20170	2632

Done

# Standards Based CADD Data Integration with GIS

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### Future Considerations

Suite of tools for managing the CIA Application from a DBA perspective.

# Standards Based CADD Data Integration with GIS

## A Florida Department of Transportation Example

### Future Considerations

Suite of tools for managing the CIA Application from a DBA perspective.

Version Updates.



# Standards Based CADD Data Integration with GIS

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# SERUG 2009

Questions and Comments

Thank You for Coming