

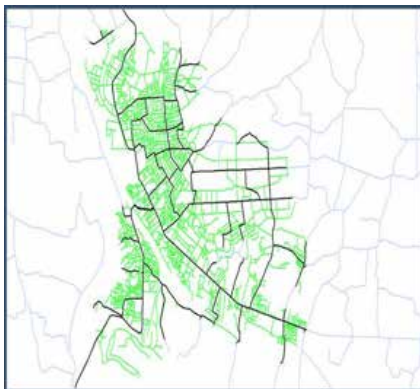
LEIDOS WILDCAT

WORLDWIDE LOGISTICAL DATA CONFLATION TOOL

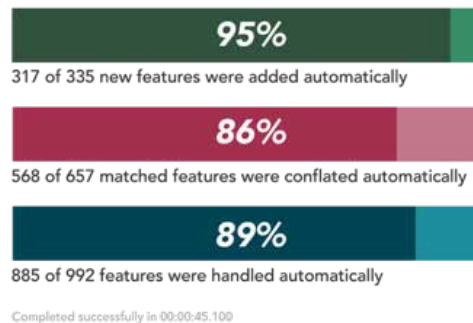
LARGE-SCALE GEODATABASE CONFLATION IN ESRI'S ARCGIS

Governments, commercial, and public sectors are faced with the challenge of ingesting ever increasing amounts of geospatial data into existing datasets. The outcome is multiple representations of topographic features with limitless attribution discrepancies. The Worldwide Logistical Data Conflation Tool (WILDCAT) provides a fast and accurate solution to topographic changes on the earth's surface by being the most effective topographic and attribute-related conflation software on the open market.

WILDCAT is the only production solution accounting for all Foundation GEOINT business rules NGA has compiled, while retaining the flexibility to adapt to the full spectrum of input data. WILDCAT has demonstrated the ability to consistently produce high-quality data with significant cost savings – allowing the NGA to complete more requirements with a more cost effective strategy.



WILDCAT NETWORK CONFLATION Automatic Network Conflation - ROADS

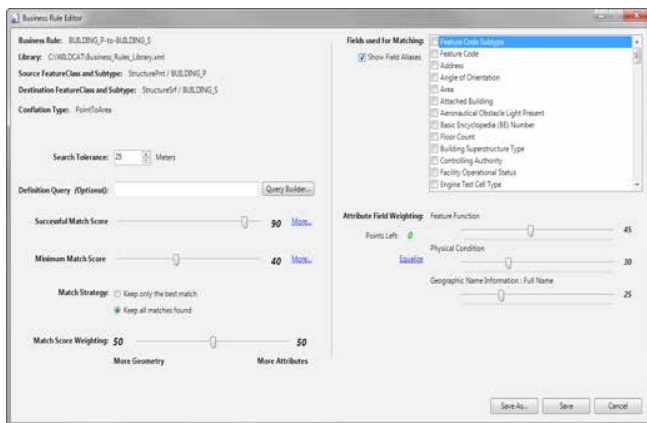


WILDCAT has been used in multiple Foundation GEOINT delivery orders. WILDCAT was providing a significant amount of automation, high level of accuracy, and minimal amount of features to be reviewed by the end-user before final delivery.

- ▶ WILDCAT is a comprehensive end-to-end solution that conflates every feature within matching customer schemas, and utilizes thousands of business rules developed side by side with NGA experts while packaged in an interface that drives the user in a logical and production-oriented process workflow.
- ▶ WILDCAT has been developed hand-in-hand with production analysts, resulting in a tool that anticipates and accommodates real-world production needs.
- ▶ WILDCAT provides an easy-to-use interface and workflow to reduce human error.
- ▶ WILDCAT increases quality and consistency throughout the Foundation GEOINT Data production and maintenance lifecycle.
- ▶ WILDCAT production cost reduced by 60% when compared to other conflation solutions in the market.

IMMERSIVE BUSINESS RULE LIBRARY

- ▶ WILDCAT effectively conflates in all schemas that contain feature subtypes for a wide range of guidelines set out by the end-user with a friendly and easy-to-use start up interface
- ▶ WILDCAT is the only conflation software on the market that can conflate Automatically cross-geometries;
- ▶ Points vs Surfaces, Curves vs Surfaces, etc.
- ▶ WILDCAT Business Rules require minimal maintenance to update and are housed in an easily accessible .XML format



APPLYING LEIDOS' 10+ YEARS IN DIRECT SUPPORT OF GLOBAL CONFLATION

Leidos has been developing conflation solutions since 2010 with the start of IR&D comparisons for data conflation vs traditional feature data extraction; studies confirmed large cost savings for global coverage. Leidos was a key player from 2012-2014 providing conflation expertise for the NGA's baseline Map of the World containing 40 unique data sources. Leidos continues to provide continual maintenance for the NGA's baseline Map of the World, refining automation with reduction of LOE by as much as 70% by 2021. Leidos has translated our years of expertise into the fastest and most accurate conflation software on the open market, WILDCAT.

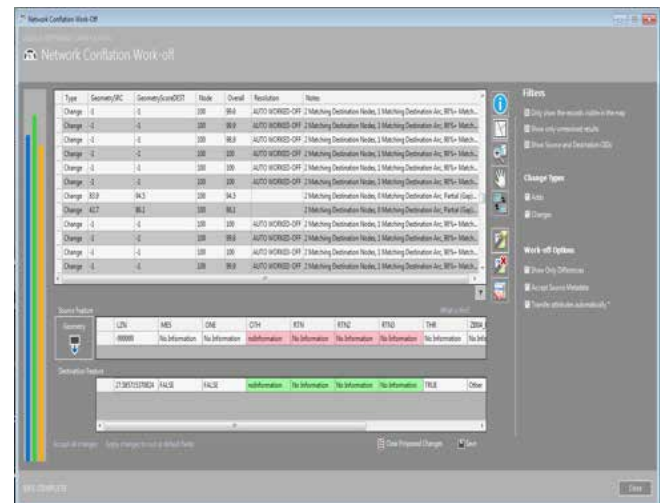
WILDCAT SYSTEM INFORMATION:

- ▶ Microsoft Windows 10 Operating System
- ▶ Microsoft .NET 4.5 framework
- ▶ Spatialite
- ▶ ArcGIS Desktop 10.8.x license required
- ▶ WILDCAT consists of two ArcMap extensions: Feature Data Conflation and Network Conflation
- ▶ Requires 18MB of hard drive space to install
- ▶ WILDCAT functionality requires thick client base

UTILIZING WILDCAT'S UNIQUE WORK-OFF INTERFACE

WILDCAT provides semi-automated conflation while also directing the end-user to conflation conflicts which require specific manual review due to topographic or attribution differences not within weighted tolerances. What makes WILDCAT unique from other conflation solutions is WILDCAT's interface provides a wide variety of unique components including but not limited to:

- ▶ The ability to zoom to each conflict location
- ▶ A detailed resolution table for each feature and its associated conflict
- ▶ An attribution table which shows specific attribution differences highlighted green and red
- ▶ The ability to choose which geometry source to retain in the database
- ▶ A wide variety of filters that enhance the end-users review capabilities



ABOUT LEIDOS

Leidos is a Fortune 500® technology, engineering, and science solutions and services leader working to solve the world's toughest challenges in the defense, intelligence, civil, and health markets. The company's 43,000 employees support vital missions for government and commercial customers. Headquartered in Reston, Virginia, Leidos reported annual revenues of approximately \$12.30 billion for the fiscal year ended January 1, 2021. For more information, visit www.Leidos.com.

BDE

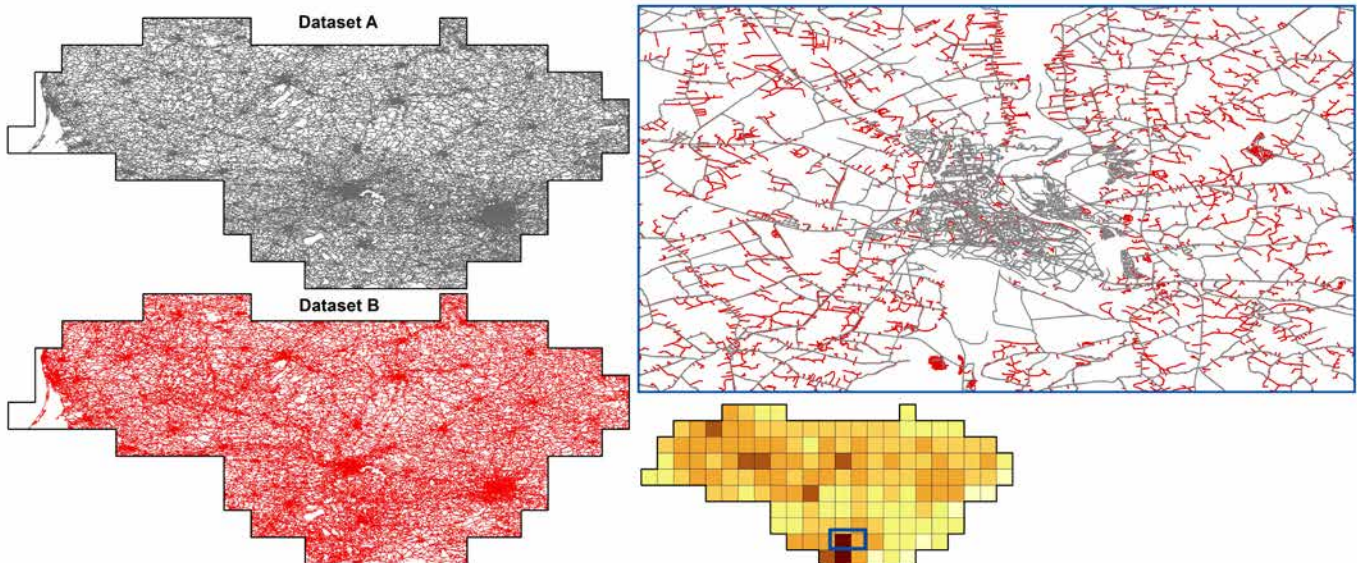
BIG DATA INSIGHT POWERED BY PROVEN WILDCAT SOLUTION

The continual proliferation of geospatial data can make it difficult and time-consuming to determine where real value lies in new or updated datasets. Manual analysis of data such as panning and scanning, data sampling, and attribution queries can be inefficient, subjective, and misleading. The Big Data Evaluator (BDE) is a data analysis service that assesses and quantitatively reports added feature and attribute content within new data sources and provides straightforward recommendation reports for targeted conflation and integration.

Through the use of clear, metrics-based recommendations, graphics, and heat maps, the BDE delivers the cost-benefit analysis of proceeding with acquisition and integration of new data. By pinpointing areas of high-value conflation and excluding areas that offer a low return on investment, the BDE maximizes value and eliminates redundancy.

At a glance, Datasets A and B appear to have very similar road data coverage. After BDE analysis, the resulting heat map identifies a selection of tiles where Dataset B provides added value, as shown below.

- ▶ Reduce conflation hours by up to 90%
- ▶ BDE quickly determines best-value datasets while eliminating low/no-value production effort
- ▶ Focuses limited integration resources toward value-add in each AOI
- ▶ Provides recommendation reports for targeted conflation and future requirements planning
- ▶ Realize significant conflation and integration efficiencies by leveraging BDE in conjunction with WILDCAT conflation solution



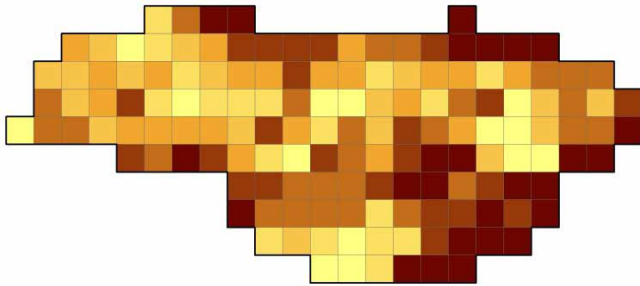
ROBUST RECOMMENDATION REPORTS

Complete conflation recommendations are provided for both network and feature data solutions in clear language supported by relevant metrics and graphics. These recommendations focus conflation and integration efforts to areas of significant added value, while suggesting lower-effort integration techniques or ghost data removal where applicable.

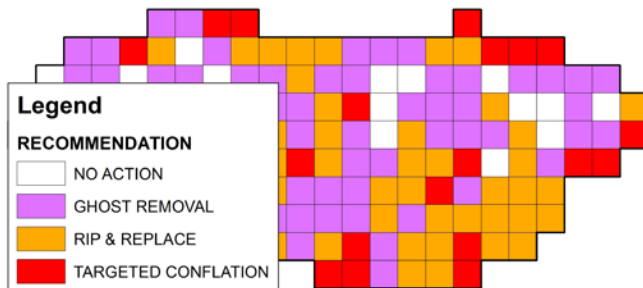
- ▶ Tables provide feature and attribution counts, line lengths, and pre- and post-conflation statistics.

Subtype	Destination	Source	Geometry		Attribution	
			Total Post Conflation	Total Added Features	Total Attribution Updates	Attribute (Count)
Amusement Park	2	2	4	2	0	
Annotated Location	0	1,254	1,254	1,254	0	
Bridge	3,274	539	3,638	364	0	
Building	186,105	193,886	213,869	27,764	162,329	Z1006_MEM (162,152); Z1005_FNA (4); CAA (92); ADR (75); FFN (11); HGT (5,238)

- ▶ Source and Destination data coverage graphics provide big-picture comparisons at a glance.
- ▶ Heat maps display added geometry and attribution by percentage increase or total feature count.



- ▶ Trans and non-trans feature data recommendation grids classified by recommended conflation or integration approach.



- ▶ BDE also reports areas that can be ignored, significantly reducing LOE where no effort is required. Criteria can be tailored to any set of requirements.

LEVERAGE THE COMBINED POWER OF BDE AND WILDCAT

Unleash the full potential of the BDE by leveraging it in conjunction with the WILDCAT conflation solution. When combined, the resulting recommendation report provides accurate, easy-to-read statistics that facilitate informed decision making:

- ▶ Simple, informative side-by-side comparisons
- ▶ Percent changes show potential value-add
- ▶ Auto-conflation rates help identify areas with strong return on investment
- ▶ Hours estimates based on real-world metrics aid in project planning
- ▶ Streamline conflation workflow, from data preparation and analysis through quality control.

Conflation Type	Dataset A (KM)	Dataset B (KM)	Total Length (KM)	Estimated Hours	Percent Geometry Increase	Percent Conflate
Full Conflation	103,276	114,019	217,295	890	36%	65%
Targeted Conflation	13,944	15,450	29,394	92	93%	83%

APPLYING LEIDOS' EXPERIENCE IN DIRECT SUPPORT OF GLOBAL CONFLATION

Leidos began developing conflation solutions based on the results of IR&D comparisons for data conflation vs traditional feature data extraction; studies confirmed large cost savings for global coverage. Leidos was a key player in providing conflation expertise for the NGA's baseline Map of the World containing 40 unique data sources. Leidos continues to provide continual maintenance for the NGA's baseline Map of the World, continually refining automation and reducing level of effort. Leidos translated these years of expertise into the fastest and most accurate conflation software on the open market, WILDCAT. Leidos has leveraged this expertise to develop the BDE data analysis and comparison service.

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