Interim Report – FGDC CAP Grant Category 7

(Demonstration of Geospatial Data Partnerships across Local, State, Tribal, and Federal Government)

Date: October 20, 2010

Agreement Number: G10AC00235

Project Title: Taking It to the Next Level: NCStreetMap 2.0
                Local to State Transformational Data Exchange

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Project Narrative

This project is a collaborative effort between the Working Group for Roads and Transportation (WGRT) and the Working Group for Seamless Parcels (WGSP) to develop a spatial data translator. Both working groups are tasked with creating the necessary standards and tools to assist with the development of statewide centerline and parcel datasets. The WGRT has developed a new centerline exchange standard and a secure web application (www.ncstreetmap.com) to assist the NC Dept of Transportation in their efforts to develop and maintain a statewide centerline file. The WGSP is in the process of developing an exchange standard for cadastral and land use data.

In April 2010 the co-chairs for both working groups established an Integrated Project Leadership Team (IPLT) to manage the joint effort. The first task of the IPLT was to draft the core functionality of the translator. The IPLT met weekly through conference calls and web meetings (gotomeeting.com) and utilized an online workspace (sosius.com). Seven tasks were identified:

1. Set up a new data transformation template.
2. Apply existing transformation to fresh copy of county data.
3. Make simple edits/changes to an existing transformation template.
4. Data validation: error reporting and visualizing transformed data.
5. Create mini-metadata (or ingest full metadata) for a transformed dataset.
6. Upload transformed data and associated artifacts to central repository.
7. Convert transformed data to a different format (other than the standard state schema).

The IPLT developed a PowerPoint presentation (Attachment A) that storybooks the workflow of the translator and further explains the purpose and context of the project. This presentation was given to both working groups as well as other groups within the state GIS coordination structure. The presentation was instrumental in explaining the translation process to local government members and resolved several concerns.

In mid-May 2010 the Integrated Project Technical Team (IPTT) was formed and consists of approximately fifteen members from both working groups. The IPTT is tasked with defining the technical and functional requirements of the translator, beta testing, and training and implementation. The IPTT met biweekly through June via conference calls and web meetings to draft business rules. These business rules were created in a database within the online workspace that ensured consistency regarding their format. This consistency should prove valuable to the developer. The business rules are shown in the attached spreadsheet (Attachment B).
Following the development of the business rules the IPTT began drafting user case stories. These were developed in a separate database within the online workspace. The user case stories are shown in the attached spreadsheet (Attachment C).

Upon completion of the business rules and user case stories, the IPLT drafted a scope of work (Attachment D) and presented it to the proposed developer. Currently the IPLT is awaiting a detailed line item-based cost estimate from the proposed developer. Once the cost estimate is received, the IPLT will either revise the scope of work or begin developing their respective contracts with the developer. Since this is a collaborative effort between the two working groups with separate funding sources, the IPLT will determine which functionality will be covered by each grant. Separate contracts will be developed between the developer and each working group. Once the contracts are in place it is expected that the development process will take approximately six to eight months.

**Next Steps**

**Product Development:** Once the contracts are in place the developer will begin work on the translator using agile development methodologies. Throughout this process the developer will provide regular update presentations to the IPTT through conference calls and web meetings. The IPTT will be responsible for providing regular feedback to the developer, beta testing, and development of training materials.

**Training & Implementation:** Upon successful delivery of the translator, the IPTT will conduct a pilot project to train and transform the street centerline data for all participants. Each team member along with several Councils of Governments (COGs) will use the translator to process their local datasets. The COGs will provide training and assistance to their counties and in cases where the counties are unable to process their data the COG will complete the process on their behalf. It is anticipated that the initial training phase will result in successful implementation in approximately 30 counties or roughly one third of the state. Each participating data provider will provide quarterly updates of their centerline data to the [www.ncstreetmap.com](http://www.ncstreetmap.com) repository.

**Timeline**

Currently the project is approximately 3 months behind schedule due to administrative issues with the other working group’s grant. At this point it is assumed that a no-cost extension will be necessary but we are currently unable to estimate the extent of these delays. It is expected that these administrative issues will be resolved by the end of calendar year. We anticipate that it will be possible to determine a revised schedule by January 2011.
An Open Source SPAtial data TRansformation tool and Exchange Node Client

Created by the NC Working Group for Seamless Parcels and the NC Working Group for Roads and Transportation

Funded By the US EPA and the US FGDC
What Is SPART-NC &
What Will It Do For Me?

• A free and open source desktop application that uses the GDAL and FDO data translation libraries, and is built on top of the OpenNode2 Exchange Node Client and potentially the FDO ToolBox application.

• It’s purpose is to help make creating & sharing seamless statewide geo-data easier.

• It will allow a data steward to transform their Parcel or Street Centerline data into a new GML Simple Features (L-0 or L-1) file, or an ESRI Shapefile - using a known community data exchange schema.

• It will allow a data steward to save their data transformation “recipe” for re-use, or share it with other agencies.

• It will allow a data steward to validate their transformed data for conformance with the community data exchange schema.

• It will allow a data steward to create a “slightly lighter” metadata record for it.

• It will allow a data steward to securely share their transformed data with other Agencies using either the EPA Exchange Network (for Parcel Data) or a specified FTP site (for Street Centerline Data).
What Could It Look Like?

This is a tool to help you transform geospatial data from your own internal format and database design (schema) to a schema the "Community of Interest" (COI) for a particular type of geospatial data has decided to use as its "lingua franca", or "community data exchange schema". The goal is to allow many different datasets to be more easily merged into a consistent and "seamless" regional or statewide dataset. This tool was created specifically to help transform Parcel / Landuse and Street Centerline data in North Carolina, but is also designed to be as flexible and generic as the budget allowed, so that other COIs could adapt it for their own use. As it is open source software, it can be modified as needed.

We call this "Data Cooking" because a) it sounds a lot more fun, and b) schema transformation is not always a straightforward data field mapping exercise. Quite often there's a lot of slicing & dicing, mixing & blending, and even a little stirring needed to transform data from your schema to the community schema. When all these different processes are assembled using a specific "flow" or sequence of instructions, it resembles what you do to a lot of raw ingredients when you assemble them into a specific dish you are planning to consume. This is otherwise known as "cooking". Your data in its native format is the "raw" ingredients. All the sub-steps in the process of transforming your raw data to the desired "cooked state" (the community schema) is the recipe that you follow to cook your data.

When a chef begins to concoct a new dish, the first few iterations usually contain a bit of trial and error. A good chef knows their raw ingredients (data) well, and also knows how a final dish can change when the ingredients are cooked using a certain method or combined with other ingredients. But even the best chefs usually have to do a few trials runs, taste test the resulting dish, and get their colleagues and customers to taste test. Then they make some minor adjustments to the process based on the feedback so that the final dish looks and tastes as everyone wanted it to (e.g. it conforms to the community data exchange schema).

Once the chef gets the mix of ingredients and cooking processes just right, it has to be carefully documented so that cooking a particular dish can be repeated and it will taste and look the same way each time. A recipe is how this new dish is documented, and contains both a list of all the source ingredients, their quantities, any peculiarities they might have, as well as the cooking instructions. In this application, the ingredient list is the geospatial content metadata of the raw source data and the final cooked data (formal FGDC format if you have it, or a "slightly lighter" format if you don't). The data transformation process configuration file that you build is what the software uses to convert your source data to the final output format (the community schema) and this represents the cooking instructions part of your recipe.

Once you have perfected the recipe for your new data dish, you want to start sharing it with your friends and neighbors. This is the Exchange Node Client aspect of the software. The National Environmental Information Exchange Network is a system of XML web service platforms and commonly agreed upon data exchange schema developed jointly by the US EPA, the Environmental Council of States and Tribes to automate the secure sharing of many kinds of environmental data across the nation in a "vendor neutral" XML or GML format. If the geodata you want to transform and share is not a data flow supported by the Exchange Network, this tool also allows sharing data via ordinary FTP protocol to sites where you have write privileges.

Consuming this cooked / transformed data is what more specialized GIS applications are meant to do, once the data is in a format they understand.
What Could It Look Like?

What Kind of Data "Cooking" (Transformation) Do You Want To Do Today?

- I Want to Create a Spatial Data Transformation "Recipe" (Processing and Configuration File)
- I Want to "Cook" Some Spatial Data by Applying a Transformation "Recipe" To It
- I Want to "Taste Test" My "Cooked" Data by Viewing, Validating and Running Error Reports On It
- The "Taste Test" Was Not Quite What I Expected - I Want to Modify My "Recipe" a Bit More
- The "Taste Test" Was Just Right - I Want to Save and Finalize My "Recipe" by Documenting It With Metadata
- I Want To Share My Recipe and Perfectly Cooked Data with Colleagues and Partners

Start Cooking
Creating a New Transformation “Recipe”

Step 1: Select the general category of source geodata you want to create a transformation recipe for: A “file-based” spatial data format

Step 2: Identify the specific format of your source geospatial data

- Supported “file-based” geospatial data formats
  - ESRI Shapefile
  - ESRI Shapefile + related table(s) DBF/CSV.
  - ESRI ArcINFO Coverage
  - ESRI ArcINFO Coverage + related table(s) INFO/DBF/CSV.
  - (maybe) ESRI File GDB “simple” feature class
  - (maybe) ESRI File GDB “simple” feature class + related table(s)
  - MapInfo file
  - MapInfo file + related table(s) in DBF or CSV format
  - AutoDesk SDF File
  - GML 3.x Simple Features - LEVEL 0 or LEVEL 1

- Supported spatial relational databases
  - PostgreSQL/PostGIS Spatial layer
  - PostgreSQL/PostGIS Spatial layer + related table(s)
  - MySQL Spatial layer
  - MySQL Spatial layer + related table(s)
  - Oracle Spatial layer
  - Oracle Spatial layer + related table(s)
  - SQL Server 2008 Spatial layer
  - SQL Server 2008 Spatial layer + related table(s)
  - ESRI ArcSDE GDB “simple” feature class (no networks or topologies)
  - ESRI ArcSDE GDB “simple” feature class + related table(s)

Note: There will be only one “Pick List” for Step 2 - the contents reflecting what was selected in the Step 1 “Pick List”

Step 3: Browse to File / Specify DB Connection

Step 4: GO → Start Building Transformation Recipe
Map the schema of your source data to the target output schema, using python scripting functions and flow of control logic statements to perform any "slicing and dicing" that may be necessary to get the source data field contents into a valid format for the output data field in the target schema.

**Business Rule:** The schema mapping process must enable the user to use a graphical interface with the ability to drag and drop widgets.

**Business Rule:** The schema mapping process must have an option to use scripting to concatenate or disconnect data into mapped fields.

**Business Rule:** The schema mapping process must have an option to map attributes to standard domains.
Creating the Business Rules
Transforming ("Cooking") the Data

Step 1: Browse to Source / Input File - or - Specify DB Connection
Browse to File or Enter DB Connection Parameters

Step 2: Select Target Output Schema Type
- Standard - NC InCLude (Parcels) in Exchange Network G0
- Standard - NC InCLude (Parcels) in Shapefile
- Standard - NC WGRT Street Centerlines in GML
- Standard - NC WGRT Street Centerlines in Shapefile
- Custom - Some Other Target Schema I have Created

Step 3: Browse to Saved Schema Transformation Recipe File
Browse to File or Enter DB Connection Parameters

Step 4: Select a directory location and enter an appropriate file name for your output file
Browse to Location & Enter Filename Widget

Step 5: Cook My Data! (Run the Transformation Recipe)

(Optional) Step 6: Set up a Windows Task to Cook My Data on a Schedule, Using All of the Parameters I have Specified Here
Define New Task Name
Define Task Schedule
Define Account for Task to Run Under
Set Email Address For Task Failure Notification
Create Task

Note: You should not try to automate a data transformation task unless the input data file and location, the transformation file, and the output file and location are ALWAYS the same. It will fail if all of these items are not the same or if one or more of the files is on an inaccessible network drive.
Validating ("Taste Testing") the Transformed ("Cooked") Data
Modifying a Data Transformation “Recipe”

**Step 1:** Browse to Saved Recipe (Transformation Configuration) File on Your Computer

**Saved XML Recipe File Location On Disk:**

**Step 2:** Do You Want to Change the Format of the Source GeoData?

- YES
- NO

**A New Source Data Format Pick List:**

**Step 3:** Browse to Source File / Specify DB Connection

**Source File Location On Disk or DB Connection:**

**Step 4:** Do You Want to Change the Format of the Target GeoData?

- YES
- NO

**A New Target Data Format Pick List:**

**Step 5:** Define New Target File Location & Name On Disk

**Target File Location On Disk or DB Connection:**

**Step 6a:** Do You Want To Change Target CRS to a Common EPSG Code?

- YES
- NO

**An EPSG Code Pick List w/ Std Code List:**

**Step 6b:** Do You Want To Specify a More Exotic EPSG Coord Sys Code?

- YES
- NO

**If YES - Type Valid EPSG Code**

**Step 7:** GO → Start Modifying Transformation Recipe
Modifying a Data Transformation “Recipe”
Ingesting Existing Source Data FGDC Metadata

**Step 1:** Does your spatial dataset (before you transformed it) already have an FGDC metadata record?
- Yes
- No

(The screen the user will see next depends on whether they choose Yes or No)

**Step 2 - If YES**
Browse to the metadata record (must be in XML format) on your computer.

**Step 2 - If NO**
Well then, now's your chance to create a "slightly lighter" metadata record. You should probably gather the pertinent information before you get started on this task. Below are the basic items you will need to know:

- dataset originator, title, publication date, abstract, purpose, supplemental info, native data format, currentness, completeness, maintenance frequency, ISO Theme Topic Category, other keywords (if applicable), place name keyword, access constraints, use constraints, primary organization contact, primary contact mailing address, primary contact voice phone number, primary contact email address, attribute data dictionary (field names and meanings before and after transformation), date of transformation, dataset distributor, distribution liability, date was compiled, url to public data access website (if there is one) or url to protected (requires a login) data access website.

Or enter a valid url to the metadata file (must be in XML format) on the web:

- File Picker
- url entry box

Ingest Metadata

Write Metadata
Creating New “Slightly Lighter” Metadata if FGDC Metadata is Not Available

<table>
<thead>
<tr>
<th>Dataset Originator (?)</th>
<th>Example: Henderson County NC Government, IT Department, GIS Division</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dataset Title (?)</td>
<td>Example: Parcel Boundaries, Property Information, and Land Use Classifications for Henderson County, North Carolina</td>
</tr>
<tr>
<td>Publication Date (?)</td>
<td>Example: 20100101 (YYYYMMDD format)</td>
</tr>
<tr>
<td>Abstract (?)</td>
<td>Example: This dataset contains property boundaries, associated ownership structure, and valuation information from the Tax Assessor's Computer Aided Mass Appraisal (CAMA) database, and basic Land Use classifications for each parcel.</td>
</tr>
<tr>
<td>Purpose (?)</td>
<td>Example: To inventory and track land ownership in Henderson County, NC for the purpose of property taxation and to support and assist government agencies and other partners in emergency response or other resource management decisions.</td>
</tr>
</tbody>
</table>
Creating New “Slightly Lighter” Metadata if FGDC Metadata is Not Available

Please enter the following information as accurately and in as much detail as possible. If you do not understand what should be entered for a metadata element, click on the blue question mark next to the element name for pop-up help that will explain what is required in more depth.

Supplemental Info (?):

Example: This dataset has been compiled from recorded deeds, plats, and other public records and data. Users of this data are hereby notified that the aforementioned public primary information sources should be consulted for variation of the information contained in this data. This dataset has been transformed from the County's native database and GIS data formats into the common North Carolina Cadastral and Land Use Data Exchange (InCLUE) format using SPART-NC Spatial Data Transformation Exchange Node Client.

Native Format (?):

Example: The property boundary GIS data is maintained in an ESRI SDE database, running on top of Oracle®. The Tax Assessor’s CAMA database with related information is maintained in an instance of the NCACC Collaborative Property Tax

Currentness (?):

Example: This transformed version of the data represents its state in both the GIS SDE database and the CAMA database as of the extraction & transformation date.
Creating New “Slightly Lighter” Metadata if FGDC Metadata is Not Available

| SPART-NC - An Open Source Spatial Data Transformation Tool and Exchange Node Client |
|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| Star                            | New Recipe                      | Create Rules                   | Cook Data                       | Taste Test                      | Modify Recipe                   | FGDC & meta                   | Note                           | Help                            |

### Document A Little Information About Who Designed This Data Transformation Recipe, In Case Someone Has Questions

<table>
<thead>
<tr>
<th>Who Designed the Data Transformation Recipe For This Target Dataset?</th>
<th>Enter Full Name Here</th>
</tr>
</thead>
<tbody>
<tr>
<td>What Organization Do They Work For?</td>
<td>Enter Full Organization Name Here</td>
</tr>
<tr>
<td>What Is Their Email Address?</td>
<td>Enter Email Address Here</td>
</tr>
<tr>
<td>What Is Their Phone Number?</td>
<td>Enter Phone Number With Area Code, and Extension If There Is One</td>
</tr>
</tbody>
</table>

### Document A Little Information About Who Ran This Data Transformation Recipe, In Case Someone Has Questions

<table>
<thead>
<tr>
<th>Who Ran the Data Transformation Recipe On This Target Dataset?</th>
<th>Enter Full Name Here</th>
</tr>
</thead>
<tbody>
<tr>
<td>What Organization Do They Work For?</td>
<td>Enter Full Organization Name Here</td>
</tr>
<tr>
<td>What Is Their Email Address?</td>
<td>Enter Email Address Here</td>
</tr>
<tr>
<td>What Is Their Phone Number?</td>
<td>Enter Phone Number With Area Code, and Extension If There Is One</td>
</tr>
</tbody>
</table>

What Date Was This Transformation Run? (in YYYYMMDD Format)  Enter Transformation Date Here
Submitting Transformed Data to an Exchange Node

[Image: A screenshot of the SPART-NC tool interface showing options for submitting transformed data to an exchange node, including fields for selecting the type of data, the node, and account information.]
Submitting Transformed Data to an FTP Site

**SPART-NC - An Open Source Spatial Data Transformation Tool and Exchange Node Client**

- **Do You Want to Submit Transformed GML or Shapefile Data to An FTP Site?**
  - Yes
  - No

- **Browse To Data File You Want To Upload**
  - Browse To Transformed GML Data

- **Browse To Transformation Recipe File Used To Transform The Data**
  - Browse To XML Transform File

- **Browse To FGDC or Mini Metadata File For the Transformed Data File**
  - Browse To XML Metadata File

- **What FTP Server IP Address Are You Uploading Data To?**
  - Enter FTP Server Address

- **What FTP Directory Do You Want To Upload Data To?**
  - Browse To Once Logged In

**Zip and Submit Package To FTP Site**

**Please Enter Your FTP Account Info**

- **User Name:**
- **Password:**

- **Remember Me**

**Optional - If The Data Structure, Transformation File, Metadata File and Location Don’t Change Except For Currency, I Want to Set Up a Scheduled Task to Periodically Upload Zipfile to the FTP Site.**

- **Define New Task Name**
- **Define Task Schedule**
- **Define Account for Task to Run Under**
- **Set Email Address For Task Failure Notification**

**Note:** If you check “Remember Me” this will save your login and password in a registry entry. Don’t do this on a shared computer.
Online Help System

Oops - I Burned It! - Help Me Figure Out The Right Cooking Process

Content of Individual Help Topics and Examples Related to the Selected Topic in the Help Table Of Contents Appears Here
<table>
<thead>
<tr>
<th>Rule ID</th>
<th>Rule Name</th>
<th>Rule Category</th>
<th>Rule Proposer</th>
<th>Rule Details</th>
<th>This Depends On?</th>
<th>Dependent on This?</th>
<th>Rule Conflicts With?</th>
<th>Rule Priority</th>
<th>Associated File (optional)</th>
<th>IPT Approved?</th>
<th>Other Notes</th>
<th>IPT Questions/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Import Existing FGDC Metadata</td>
<td>Task 5: Import or Create Metadata</td>
<td>31299</td>
<td>If an FGDC-compliant metadata record already exists for the input/source dataset that is to be transformed into the common state schema (whether parcels or streets), the user will import it into the SPART-NC tool and certain metadata elements will be auto</td>
<td>The existence of an FGDC-compliant metadata record for the input/source dataset.</td>
<td>Flow of control for all subsequent operations in the metadata preparation task.</td>
<td>None known</td>
<td>Critical Feature</td>
<td>Yes</td>
<td>This is listed as Medium Priority only because we do intend that the XML Schema Transformation Recipe/Configuration File will accompany the transformed dataset and its metadata in the binary file attachment package (.zip) that is submitted to the central</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Metadata Generator will read Schema Transformation Recipe</td>
<td>Task 6: Import or Create Metadata</td>
<td>31299</td>
<td>The SPART-NC tool will read the schema transformation configuration/recipe file as indicated by the user that was used to transform the data to the Common NC Exchange Format. It will read and use this information to create a simple, human-readable &quot;pro</td>
<td>The ability of the SPARTA-NC tool's metadata module to parse the Schema Transformation Configuration File/Recipe and concatenate a text string containing the data fields and properties as the schema mapping rules define them.</td>
<td>Subsequent steps in the metadata generation module to assemble a final &quot;mini-metadada&quot; record for the transformed dataset.</td>
<td>None known</td>
<td>Medium Priority</td>
<td>Under Consideration</td>
<td>This feature will add value/benefit for local government participation.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Multiple Transformations</td>
<td>Task 3: Edit Rules in Saved Transformation Recipe</td>
<td>31325</td>
<td>An agency should be able to have multiple transformation templates for centerlines. An agency will need a transformation template in order to export their centerline data in the format consistent with the state centerline exchange standard/schema. The</td>
<td>Ability to load additional schema definitions (xsd) into the translator program.</td>
<td>None Known</td>
<td>Medium Priority</td>
<td>Under Consideration</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Multiple editors/users</td>
<td>Task 3: Edit Rules in Saved Transformation Recipe</td>
<td>31325</td>
<td>The transformation template file will be a standalone xml file that can be stored wherever the use wishes. The xml file can be moved and reused. Installation/configuration: An agency can have multiple user or editors for the translation process.</td>
<td>Ability to store translation templates as separate files (possibly xml) that can be accessed by several users.</td>
<td>None Known</td>
<td>High Priority</td>
<td>Under Consideration</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Domain Matching - reclassify</td>
<td>Task 1: Design New Schema Transformation Recipe</td>
<td>31325</td>
<td>User needs to be able to reclassify field values to conform to the schema. Example 1: Craven County has fourteen agriculture values in their Land Use field. Those 14 specific agriculture values need to be reclassified to the general &quot;Agriculture&quot; value. Tools ability to query attribute fields and generate a list of unique values.</td>
<td>None Known</td>
<td>High Priority</td>
<td>Under Consideration</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Task ID</td>
<td>Task Description</td>
<td>Recipe ID</td>
<td>Description and Resources</td>
<td>Scripting to Concatenate/Disconnect</td>
<td>Known Issues</td>
<td>Priority</td>
<td>Under Consideration</td>
<td></td>
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<tr>
<td>6</td>
<td>Schema Mapping Interface</td>
<td>31328</td>
<td>Graphical Interface for the schema mapping should enable user to view the Source Data and Target data together on one screen with the ability to drag and drop mapped connections. Resources available to develop the interface.</td>
<td>None Known</td>
<td>High Priority</td>
<td>Under Consideration</td>
<td></td>
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<tr>
<td>7</td>
<td>Scripting to Concatenate/Disconnect</td>
<td>31328</td>
<td>With the data mapping process, flexibility to run scripting on select data attributes in the Source data to concatenate or disconnect data to populate the target data attributes.</td>
<td>None Known</td>
<td>High Priority</td>
<td>Under Consideration</td>
<td></td>
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<td>8</td>
<td>Standardize text based attributes</td>
<td>31325</td>
<td>Tool should allow the user to define criteria and use simple scripting language to manipulate string patterns in the input data to achieve a consistent output format. Example: Craven County has several variations of &quot;US 70 HWY&quot; in the Road Name field.</td>
<td>Python scripting ability in tool and user's ability</td>
<td>None Known</td>
<td>High Priority</td>
<td>Under Consideration</td>
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<tr>
<td>9</td>
<td>Submit transformed parcel data to Exchange Node</td>
<td>20945</td>
<td>When a fresh set of parcel data has been transformed to the common schema and validated, the user will initiate a process to submit the data to the NC InCLUE Exchange Node using the Exchange Network web services. A login prompt will appear so that the Exchange Network Node supporting the InCLUE data flow is accessible and the user has a valid NAAS account that allows data submission to the NC InCLUE Node.</td>
<td>Publishing the transformed parcel data to the secure Exchange Node web publishing portal and potentially to the public NC OneMap site (if the data steward approves public release)</td>
<td>None Known</td>
<td>Critical Feature</td>
<td>Under Consideration</td>
<td></td>
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<td>10</td>
<td>Submit transformed centerline data to NCStreetMap</td>
<td>31325</td>
<td>When a fresh set of centerline data has been transformed to the common schema and validated, the user will initiate a process to submit the data to the NCStreetMap FTP site. A browser window should open to the NCStreetMap login page. Note: should warn.</td>
<td>None Known</td>
<td>High Priority</td>
<td>Under Consideration</td>
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<td>11</td>
<td>Validate line geometry</td>
<td>31326</td>
<td>Make sure that the data loaded is line data for street centerlines. Don't want polygons or point features loaded into this dataset.</td>
<td>Definition of the source file</td>
<td>None Known</td>
<td>High Priority</td>
<td>Under Consideration</td>
<td></td>
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<tr>
<td>12</td>
<td>Validate polygon geometry</td>
<td>31236</td>
<td>None Known High Priority Under Consideration</td>
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<td>13</td>
<td>Identify geometry errors</td>
<td>31236</td>
<td>None Known High Priority Under Consideration</td>
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<td>Schema Mapping Interface - attributes</td>
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<td>Re-projection of Data</td>
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<td>Capture Datum for Metadata</td>
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<td>17</td>
<td>Multiple Schemas</td>
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<td>File Naming Convention</td>
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<td>Schedule Updates</td>
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<td>Truncate Source Data</td>
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<td>Shape Files</td>
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<td>Upload Multiple targets</td>
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<td>User-defined Directories</td>
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<td>Explode Multi-part line features?</td>
<td>31326</td>
<td>None Known</td>
<td>Critical Feature</td>
<td>Under Consideration</td>
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<td>Explode multi part polygon feature?</td>
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<td>Critical Feature</td>
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<td>Show multi part features</td>
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<td>31</td>
<td>Change (Add/Delete/Modify) business rules</td>
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<td>Low Priority</td>
<td>Under Consideration</td>
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<td>Remove invalid geometry</td>
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<td>Under Consideration</td>
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<td>33</td>
<td>Remove non-conforming attribute</td>
<td>31326</td>
<td>None Known</td>
<td>High Priority</td>
<td>Under Consideration</td>
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<tr>
<td>34</td>
<td>Create Error Report (tabular)</td>
<td>31328</td>
<td>Task 4: Validate Transform, View Data, Error Rpt</td>
<td>31328</td>
<td>Create a tabular error report that identifies (by unique id) the features in a data source that do not conform to business rules (geometry or attribute). The report should be broken into sections with the rule broken would be in a header, and then unique rules expressed in xml format. None Known None Known Critical Feature Under Consideration</td>
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<td>35</td>
<td>Create Error Report (visual - geometry)</td>
<td>31328</td>
<td>Task 4: Validate Transform, View Data, Error Rpt</td>
<td>31328</td>
<td>Create an error report that identifies (by unique id) the features in a data source that do not conform to business rules (geometry or attribute). The report format is visual, and should be broken into sections with the rule broken would be in a header, having software capable of displaying information spatially. None Known None Known Critical Feature Under Consideration</td>
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<td>36</td>
<td>Report Address range errors (linear features only)</td>
<td>31328</td>
<td>Task 4: Validate Transform, View Data, Error Rpt</td>
<td>31328</td>
<td>Perform general analysis of high-low address ranges and report (using unique id in the data source) which ones have overlapping ranges, or underlapping (gap) ranges. Address transformation of left/right to high-low and comparison. GICC requested functionality back to local governments for their use. None Known Low Priority Under Consideration</td>
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<td>37</td>
<td>Identify multiple networks in one dataset (linear features only)</td>
<td>31326</td>
<td>Task 4: Validate Transform, View Data, Error Rpt</td>
<td>31326</td>
<td>For linear features only, indicate that there are more than one linear networks (groups of connected features) and enable the user to inspect that information visually. This is only in case there are more than one network, in some cases, having more the ability of the tool to check connectivity of features. Data quality of output dataset None Known Medium Priority Under Consideration</td>
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<tr>
<td>38</td>
<td>Simple Installation</td>
<td>33102</td>
<td>Task 9: Other Technical Rule</td>
<td>33102</td>
<td>Any software that needs to be installed needs to be simple and any dependencies automatically installed. It should be able to be installed by someone with no programming/operating system skills. None Known High Priority Under Consideration Julie - perhaps it would be helpful if we listed similar tasks that were acceptable. For example, if the user was able to install ArcGIS, Adobe Reader, iTunes, etc... I'm thinking Admin priviledges may still be required. We might also consider that</td>
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<td>39</td>
<td>Create Mini-Metadata</td>
<td>31299</td>
<td>Task 5: Import or Create Metadata</td>
<td>31299</td>
<td>The user will indicate whether an FGDC metadata file already exists for their source dataset. If not, the user will be presented a series of data input screens that allow them to enter a subset of the most important metadata items. This subset is known in The absence of formal FGDC metadata and the user knowing and entering the details of their source dataset. The metadata file submitted with the transformed data None Known Critical Feature Yes</td>
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<td>40</td>
<td>Convert data to new format without transformation</td>
<td>Task 7: Convert Un-Transformed Data to New Format</td>
<td>31259</td>
<td>Allow the user to convert existing source data to a select list of spatial data formats without any data content transformation. Example - convert an existing ESRI shapefile to a MapInfo file. This would use the standard functionality of Ogr2Ogr. The only GDAL/OGR and its built in Proj4 libraries</td>
<td>None Known</td>
<td>Medium Priority</td>
<td>Under Consideration</td>
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<td>User Story Title</td>
<td>Narrative</td>
<td>Acceptance Criteria - Scenario 1 (required)</td>
<td>Acceptance Criteria - Scenario 2 (optional)</td>
<td>Acceptance Criteria - Scenario 3 (optional)</td>
<td>Any other explanatory notes</td>
<td>IPT Questions/Comments</td>
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<tr>
<td>1</td>
<td>arickard</td>
<td>Module 3 - Edit Existing Transformation</td>
<td>Target Schema Changes</td>
<td>Given that I have ingested a metadata record that has an entity and attribute section and that each attribute in the source data has a definition, during the data transformation process, I want the transformed output dataset to include the new field names to the entity and attribute section of the FGDC metadata, referencing the original field name in its definition.</td>
<td>Given the existing transformation template performs correctly. When the SPART-NC tool ingests new revisions to the centerline exchange standard, then the end-user should be able to edit the transformation template to account for those changes. This may include the following types of revisions: adding new fields to the target schema (such as Polyline ID field) - new format of existing field in target schema that may require existing transformation logic in python script - example: existing format for listing highway names in the lower name field in &quot;us 25 highway&quot; - HYDROW changes standard and the new format is &quot;US 25&quot; - Existing end user needs to be able to edit the python scripting associated with this field.</td>
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<td>2</td>
<td>arickard</td>
<td>Module 3 - Edit Existing Transformation</td>
<td>Source Data Changes</td>
<td>As a county GIS manager I want to be able to edit an existing transformation template by copying the existing transformation template and renaming it to &quot;Save As&quot; so that I do not have to manually recreate the entire transformation template.</td>
<td>Given the existing transformation template functions correctly. When the county alters the input centerline data by adding or removing fields used in the transformation template, then the end-user should be able to edit the transformation template to account for those changes. This could include the following types of modifications: the input data county renames existing fields (e.g., field becomes &quot;lower name field&quot;) - county changes field type (house number field changes from string field to float field) - county adds new field that is used in the transformation template (county state wide number in centerline data)</td>
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<td>3</td>
<td>arickard</td>
<td>Module 3 - Edit Existing Transformation</td>
<td>Copy Transformation Template</td>
<td>As a county GIS manager I want to create a new transformation template of an existing template by copying the existing transformation template and renaming it to &quot;Save As&quot; so that I do not have to manually recreate the entire transformation template.</td>
<td>Given the existing transformation template functions correctly. If a user wants to create a new transformation template that is very similar to an existing template then the user should be able to copy the existing template and save it as a new template that makes the necessary revisions to the copy.</td>
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<td>4</td>
<td>arickard</td>
<td>Module 1 - New Transformation</td>
<td>Copy scripting from existing template</td>
<td>As a county GIS manager I want to be able to copy python scripting used in an existing template and paste it into a new transformation template so that I do not have to manually enter the scripting.</td>
<td>Given the existing transformation template functions correctly. If a user wants to create a new transformation template that is very similar to an existing template then the user should be able to copy the existing template and save it as a new template that makes the necessary revisions to the copy.</td>
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<td>5</td>
<td>Janet Lowe</td>
<td>Module 2 - Apply Existing Transformation</td>
<td>Save Input format in transformation recipe</td>
<td>As a user of the transformation tool I want to export my data in the same format as last month so that I don't have to re-enter it every month.</td>
<td>Scenario 1:  I have the same input format as last month When I run the transformation The tool will indicate that the input file is the same format as last month And I will be sent to the part of the tool where I can redefine the input format.</td>
<td>Scenario 2:  I have a new input format from last month Given the input file is now different from last month When I run the transformation The tool will indicate that the input file is now different from last month And I will be sent to the part of the tool where I can redefine the input format.</td>
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<td>6</td>
<td>Janet Lowe</td>
<td>Module 2 - Apply Existing Transformation</td>
<td>Export my data</td>
<td>As an owner of the transformation tool I want to export my data in the same format as last month so that I can provide updated exchange data to my customers.</td>
<td>Scenario 1:  I want to export the data in the same format as last time Given I have a transformation already defined And I have updated exchange data And I have a new input data format Then I use the transformation tool to provide updated data in the same export format as last time.</td>
<td>Scenario 2:  I want to export the data in a different format from last time Given I have a transformation already defined And I have updated exchange data And I have a new input data format Then I use the transformation tool to provide updated data in the new format.</td>
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**Attachment C - User Case Stories**

- **Scenario 1:** I want to export the data in the same format as last time. Given I have a transformation already defined, the input format is updated, and I have updated exchange data. Then I use the tool to provide updated data in the same export format as last time.
- **Scenario 2:** I want to export the data in a different format from last time. Given I have a transformation already defined, the input format is updated, and I have updated exchange data. Then I use the tool to provide updated data in the new format.
<table>
<thead>
<tr>
<th>8</th>
<th>Janet Lowe</th>
<th>Module 4 - Validation / Error Reports</th>
<th>Detect Schema Errors as Good as Possible</th>
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<tbody>
<tr>
<td></td>
<td>As a user of the transformation tool I want to be made aware of my errors so that I will get a good transformation.</td>
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<td>Scenario 1: I've incorrectly identified the datum, projection, units Given that I have a known dataset When I indicate the datum/projection/units I'm selecting from known dataset/projection And not entering my own data by hand (user error) and the tool should indicate to me that there's no such datum/projection/unit (error).</td>
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<td>Scenario 2: I've specified an output location that doesn't exist</td>
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<thead>
<tr>
<th>9</th>
<th>Julita</th>
<th>Module 5 - Metadata</th>
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<tr>
<td></td>
<td>As a local government data steward who has already gone to the trouble of writing FGDC-compliant metadata for my data layers I would like to be able to ingest my existing XML metadata file rather than enter in the information all over again.</td>
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<td>Given that I have a known dataset When I indicate the datum/projection/units I'm selecting from known dataset/projection And not entering my own data by hand (user error) and the tool should indicate to me that there's no such datum/projection/unit (nicely).</td>
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<td>Given that I've specified an output location that doesn't exist given that my XML metadata file can successfully be validated by the public FGDC metadata validator web service given that I know all of the other business and processing related information about my dataset and have keyed it in the correct coordinate system, units, datum, spatial extent bounding coordinates values, etc. and populate the metadata elements for these (semi-automatically).</td>
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<tr>
<th>10</th>
<th>Julita</th>
<th>Module 5 - Metadata</th>
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<td>As a local government data steward who just has not gotten around to writing formal, FGDC-compliant metadata for my data layer yet I want the tool to automatically create a metadata record using the DENN &quot;slightly lighter&quot; metadata profile, which will still validate as a compliant FGDC metadata record.</td>
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<td>Given that I know all of the other business and processing related information about my dataset and have keyed it in the correct coordinate system, units, datum, spatial extent bounding coordinates values, etc. and populate the metadata elements for these (semi-automatically).</td>
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<tr>
<th>11</th>
<th>Katie Templeton</th>
<th>Module 6 - Upload</th>
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<td>As a City GIS Analyst I would like to have an automated process that takes my uploaded transformed data to NC StreetMap and automatically updates the database.</td>
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</tr>
<tr>
<td></td>
<td>Given that my data has not been updated since the previous transformation.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>12</th>
<th>Scott Barnwell</th>
<th>Module 6 - Upload</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>As a county GIS manager I want to be notified to upload data via my defined transformation template on a defined periodic basis (e.g. monthly, quarterly) so that the data stays current and I can avoid infrequent/unnecessary updates.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Given a defined data update frequency (e.g. monthly, quarterly) and that my agency has a saved transformation template from an earlier transformation, and that my data has not been updated since the previous transformation.</td>
<td></td>
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<td></td>
<td>Then an email is sent to me indicating that it is time to upload current data with a link to the transformation tool and my saved template.</td>
<td></td>
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<td></td>
<td>Given that my data has not been updated since the previous transformation.</td>
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</tbody>
</table>
As a local GIS data manager, I want the SPART-NC transformation tool to save my transformation whether it is partial or complete so that I can return to finish the transformation at a later time. This will allow me to save my transformation and not lose any data, particularly with metadata.

Given that the transformation tool requires FGDC metadata and will provide an interface to enter a mini-metadata record in situations where a metadata file has not already been created. When I am entering the mini-metadata and need to stop for some reason (e.g. need to research metadata elements or not enough time to complete a single session), Then the transformation tool will allow me to save my unfinished work to be completed at a later date.

Given that I have previously transformed my data using the SPART-NC tool and given that I have previously completed a required mini-metadata record, When I go to transform my data again at a later date, Then the SPART-NC tool will give me the option to use the mini-metadata record from the previous transformation so that I do not need to enter it again. Of course, this preferred workflow would be for me to apply the mini-metadata record to my local data so that the next time I upload data with transformation tool, it already includes FGDC metadata.

I'd like to have the group delineate the extent of attribute QC this tool will do for parcels and for centerlines. From Julia's posts it sounds as if spatial extent and projectivity will be tested. My understanding is that all other attribute domains (and validity and optional accuracy) are the responsibility of the end user, at least for the parcels. My impression from other posts is that the attribute domain QC for the centerlines might be more thorough. Will the tool incorporate existing attribute domains for GC? My understanding from past data is to delineate no projectivity for attribute domains. The end user wants to know that the data submitters understand and agree with frequency of nulls length string encoding on each field, that the end user can generate an output report. This is to avoid a situation where data submitters think they have submitted all data, only to realize later that it did not come through, and the data user thought all along that the submitters knew there were null values for a bunch of records. So the separate webpage, ‘accept’ checkbox, the ability to have the tool run a SQL query to count all records where value is null, will be important. The stats, file size and timedate are recorded onto a .txt file that is sent with data transmission.

Pre Step 1. Data submitters have the option to supply contact information for content responsible staff. Contact data submitters supply the following to the application according to their contact preferences. Name (mandatory), Phone (optional), email (optional), Dept/Office as contact (optional), and time of day to contact (optional), and vendor/beneficiary contact (optional)...In the case of counties that do not understand these appear in the CCSRDB...however many counties don’t fill that out. The data submitters need the ability to change their profile whenever they want. The application incorporates tools as necessary to collect profile information on data submitters.

Data Submitter has the option to write a short free describing/knowing problems with the dataset. For the benefit of the user. They can write one narrative for each dataset they submit. The note is to be verified for positional accuracy, until next year, we are doing a data conversion later this year and when we do that, problems B, A and C will be fixed.

A hyperlink entitled ‘Please Tell Us about Known Problems with These Data’. Click on the hyperlink, and they get to type a narrative. No doubt some users will use this to type in complaints they have with the virtual server tool. Maybe that’s not all bad...how else would we get that feedback?

Let me have any questions about GIS/HLI analysis or the data required to do it, please contact me: Andrew.Bailey@ncdenr.gov. I have been trained and may take a few assignments this summer conducting AAVIT analysis. If you have any questions about GIS/HLI analysis or the data required to do it, please contact me: Andrew.Bailey@ncdenr.gov.
As a GIS mapper, I may not have a lot of expertise in operating systems and as a GIS mapper for a small local government, I do not have access to an IT department. I can install my ArcGIS software, Adobe Acrobat and other software that I need. I only need software that is being asked to use, to be compatible in its installation, and not require me to download software from other sites and make any connections between them. The benefit is that I want to be able to do as much of this on my own and not have to have someone more knowledgeable come in and mess with my system.

Program is delivered via CD/email/download. I click install. I answer some questions about my hardware/software. The program works.

As the data provider to my 911 dispatch center, I need the ability to transform data from the surrounding counties to match my data schema which is not the state schema. The benefit is that I want to be able to do as much of this on my own and not have to have someone more knowledgeable come in and mess with my system.

Module 7 - Convert Transformed Data

Converting data to other transformations

As a local or county GIS data manager, I want the upload tool to "pre-navigate" to my most recent transformation output. So that I do not have to hunt throughout my computer or network to find the transformed data that I want to upload. This should reduce the frequency of "accidental" uploads of older transformations or untransformed datasets.

Scenario 1: There is valid transformed data to send. Given that the user has performed a transformation for either centerline or parcel data And the transformation is valid (completed without errors, only warnings). When the user clicks a button to browse for the transformed data. The file browser window should open. And the window should be open to the location of the last output. And the most recent output should be selected (highlighted) by the program. And selecting "OK" or "Submit" should open the files that are to be uploaded. If the user wishes to upload another output file, they should be free to browse and locate one.

Scenario 2: There is no valid transformed data to send. Given that the program has no record of output for the selected output type (centerline or parcel data). When the user clicks a button to browse for the transformed data. The file browser window should open. And the window should be open to the default output folder. And a warning message should appear to the user stating "No valid output found. Please verify your file and select an upload file. Or, for example, it was created on another system."
**Functional Requirements**

**Development Component 1: The “SPART-NC” Desktop Application**

The “SPART-NC” application will provide spatial data stewards with a wizard-driven graphical user interface they will use to map / crosswalk selected data elements from their native data formats and transform them to an output format in a specified community GML schema or another commonly used spatial data format. The application will allow the local government data stewards to retain complete control of the data transformation process, which is critical for the long-term success of a data sharing arrangement with State, Tribal and Federal Agencies. After transformation, the data will be securely shared with the Exchange Network using the InCLUDEd data flow. “SPART-NC” will also allow users to contact an Exchange Node that supports the InCLUDEd data flow and request InCLUDEd data for a specific county, or for a user-defined area inside a set of bounding box coordinates (within reasonable extents), provided the user has the appropriate credentials to access data from that Node and the original data steward has set the access security levels on their InCLUDEd data to allow this.

The tool will provide data stewards with the ability to edit and save all configuration parameters needed to produce a reusable data transformation “recipe” that can be reapplied to source data at a later date, or shared with others. For the parcel and land use data, the default output format will be the InCLUDEd GML schema. For the WGRT-funded functionality, the default output format will be a State of NC road centerline data content standard based largely upon the FGDC’s framework transportation data schema. For WGRT users, the ability to submit transformed data to a spatial data repository will use the FTP protocol.

The interface design goal for “SPART-NC” is a simple, uncluttered user interface that adheres to human computer interface design best practices and provides intuitive workflow patterns for the user; while using the minimum specialized software components possible to deliver the required functionality. The application will provide an interactive online help manual with sections for each module and functions that include a discussion of proper usage and relevant examples for both parcel data and road centerline data.

The “SPART-NC” application will have an installation wizard requiring the end user to make a minimal number of decisions for a default installation. The software and installer must run successfully on the following operating systems: Windows XP and Windows 7. Installation complexities and potential conflicts with the user’s existing computer configuration must be minimized, as professional software support for this software application will not exist. If the installation requirements are complex and the installer cannot be easily used in a locked-down environment, many local government staff may not be able to use the application. The ultimate design goal for the installer is an application that installs without incident for even the most non-technical users, and does not require Administrator privileges.

“SPART-NC” Module 1 – Create New Transformation “Recipe”

This module will allow the user to design a new schema transformation “recipe” / data mapping to transform their source data to the desired community output schema or format. The transformation “recipe” produced by this module will be persisted on disk in the form of a portable and self-contained instructions file the user can share with others. The user will be able to develop and save a library of reusable transformation “recipes”. The “SPART-NC“
application will use the saved files to re-create a specific data transformation process on future versions of the same source data. The two types of transformation “recipes” are:

- Output conforms to a pre-defined GML “community schema”, using an existing GML Schema document (XSD). This feature is mandatory.
- Output is an ad-hoc GML defined interactively by the user. The tool will generate an XSD file for the ad-hoc schema at the end of the design process. This feature is mandatory.

The user will have a visual interface to construct the recipe for transformation to the target schema. The user will be able to “map” or “crosswalk” features and attributes in the source file to appropriate features in the destination file by dragging and dropping from the source list of elements to the destination list of elements for simple one-to-one mappings. For data mappings that are not simple one-to-one; or the source data values require a bit of adjustment, the user will have the ability to apply basic data manipulation functions and conditional processing logic to input data elements during the transformation in order to make the data conform to the required form in the output schema. The means to apply the manipulation functions and processing logic should be a built-in, commonly known scripting language. The two most widely known scripting languages in the local government GIS community are VBA and Python. VBA is a proprietary Microsoft scripting language, and Python is open source, so Python is the most logical choice.

The data mapping interface will allow the user to include a related tabular dataset and/or lookup code table with their source spatial data as input, because County Tax Assessor’s databases are managed separately from the parcel boundary GIS datasets. The data steward should have the ability add additional user-defined business rules for the transformation “recipe” that are more complex than those which can be validated by using only GML schema. Users will typically not have programming backgrounds and the rule-building process will need to be simple enough that a moderately sophisticated business user can do it. This feature is quite desirable, but not mandatory if the development costs and complexity to implement are very high.

The user should be able to set up specific “topology rules” to test that the geometry features in their source data are valid and adhere to specific user-defined conditions that they deem appropriate for their particular output dataset. Examples of user-defined geometry conditions:

- The boundary of a parcel polygon must not cross itself.
- The ends of line segments forming the intersection of two or more streets must all be snapped to the same point.

"SPART-NC” Module 2 - Edit Existing Transformation “Recipe”

The user will have the ability select an existing schema transformation “recipe” / data mappings configuration file and (optionally) any associated business or topology rules from their library of “recipes” and edit it.
“SPART-NC” Module 3 – Run Transformation “Recipe” on Source Data

The user will be able to apply a newly created or previously saved transformation “recipe” and (optionally) business rules to their source dataset to transform it into the desired output format.

“SPART-NC” Module 4 – Create or Edit Metadata

The user will be able to produce an FGDC XML metadata file for their transformed dataset by two methods:

   a) Ingesting an existing FGDC metadata XML file and enhancing it with additional data transformation information elements.

   b) Allowing the user to enter required metadata information manually and save it to an abbreviated profile of the FGDC content standard for digital geospatial metadata.

“SPART-NC” Module 5 – Validate Transformed Data

The user will be able to run a validation function on the transformed dataset. Validation will consist of checking for schema conformance, topology of geometry features, and (optionally) other business rules included in the transformation recipe. If errors are encountered during the validation process, the application will generate an error report.

The error report will list what the error for each feature is. If applicable, the error report will include a suggestion for how to fix each error. The user will be able to print the error report or save it as a persistent file on their computer. Each record in the error report will be viewable in the built-in map viewer for detailed inspection.

“SPART-NC” Module 6 – Submit Transformed Data to InCLUDEx Node or FTP site

For the InCLUDEx data flow, the “SPART-NC” Node Client user will be able to submit validated, transformed data and associated metadata files, transformation templates, and (optionally) business/topology rules as a single package to any Node that implements the InCLUDEx data flow, contingent upon possession of the required credentials. The data provider will designate a data access level that should be applied to their transformed data package once it reaches the State InCLUDEx Node. The access level will be applied dynamically to the relevant property in the InCLUDEx schema, and should match what is in the metadata.

Users of the “SPART-NC” Node Client will be able to contact a State or Tribal InCLUDEx Node and request parcel data for any area, using the query types identified in Development Components 3 and 6 below, provided they have appropriate access credentials. Local property and land use data stewards at the county level will have the option to use login credentials other than a NAAS account for submitting InCLUDEx data to or requesting InCLUDEx data from their State’s InCLUDEx Node. The State of NC maintains an identity management service called “NCID” and it is desired that local county data providers in North Carolina be able to use their NCID account with the NC InCLUDEx Node.
For transformed data not affiliated with the Exchange Network, the user will be able to submit the transformed data and attachments package to any other established spatial data repository via FTP, upon possession of the required credentials to that specific FTP site.

“SPART-NC” Module 7 – Convert Data to another Format without Schema Transformation

The user will be able to convert a source data file to another popular spatial data format without applying any specialized schema transformation to it. The final list of supported file formats will be short and will be determined during project the design phase, as this will depend on which open source format translation libraries are used in the project. The only modification other than file format that will be offered to the user is the ability to re-project the output dataset to a different coordinate reference system.

Interoperability Requirements

The “SPART-NC” tool will not be hard-wired to transform spatial data using only the InCLUDE community schema. It will be open and extensible, conform to Open Geospatial Consortium (OGC) standards where applicable, and will allow spatial data stewards to map and transform virtually any GML Simple Features compatible spatial dataset from its native state (in supported formats) to:

a) OGC GML Simple Features (Level 0 or Level 1) as specified by a valid GML schema document provided by the user and transformation rules the user manually constructs using the tool.

b) Other very common spatial data file formats (ex: ESRI shapefile) based on transformation rules the user manually constructs using the tool.

The SMAC Working Group for Roads and Transportation (WGRT), a sister committee to the WGSP, has additional funding from an FGDC CAP grant. The WGRT proposes to apply this funding to the development of specific features for the “SPART-NC” application that are focused on transforming and sharing linear spatial data (road centerlines) in much the same way as the parcel and land use data will be transformed and shared using the InCLUDE data exchange. The primary difference between the goals of the WGSP and the WGRT is the WGRT does not propose to develop an Exchange Network data flow for the road centerline data.

The WGRT requirement is for the “SPART-NC” desktop tool to be flexible enough for local governments to transform, validate and share their spatial data, primarily transportation data, in a common format without using the Exchange Network. Instead of submitting transformed road centerline data to an Exchange Network Node using a Node Client, “SPART-NC” users will have the ability to submit transformed data packages to any centrally located spatial data repository via FTP, in a number of common spatial data formats that the software supports. The ultimate intent is that this application will be flexible enough to be used in transforming many other types of local government spatial data in the future (fire district boundaries, schools, etc.) to a community agreed-upon schema and shared with State or Federal level spatial data repositories for the purpose of building seamless statewide or national datasets. Exchange Network data flows may be developed for other environmentally related datasets in the future, but use of the Exchange Network to share data transformed by the “SPART-NC” tool will not be required.