

# GEOSEMANTICS EXCHANGE (GSX) V.01

#### RESEARCHERS & DEVELOPERS

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## **VISION**

# Enabling semantic querying within ArcGIS Enterprise Platform



#### **PROBLEM**

Multiple Datasets:

There is a disconnect between geospatial datasets.

 This makes it difficult and time consuming to perform complex geospatial queries. GeoFoundation Exchange (GFX) Data

35+ Datasets

_			<u> </u>				- 1							
	Point of Interest													
		Neighbourhood Municipal												
#	Data & Associated		Neighbourhood_iviunicipal											
1	Objectid													
2	Shape	#			Keep	4	GFX Ontology		Note					
3		No. 1												
4							Road Segment							
5	Poir													
	Da	Data & Associated Fields			-	SFX	(	Ontology	Note					
6	Poir	Objectid			s									
7		Shape		Ye		Yes		Yes						
8			eature ID	Ye No	-									
9		Feature Hash			0									
10		National Unique ID Address Range NID			)									
		Danel Installation				Yes		No	Look at in future versions					
11	Né													
12	Na Ro	oute	Name English 1	Ye	S	No		No	Esri Canada [lack of information]					
13			Name English 2	No	0									
14		oute Name English 3		No	0									
- 1	Ro	oute	Name English 4	No	0									



## **OBJECTIVES**

Investigate a solution that uses

the iCity Ontology to integrate the datasets

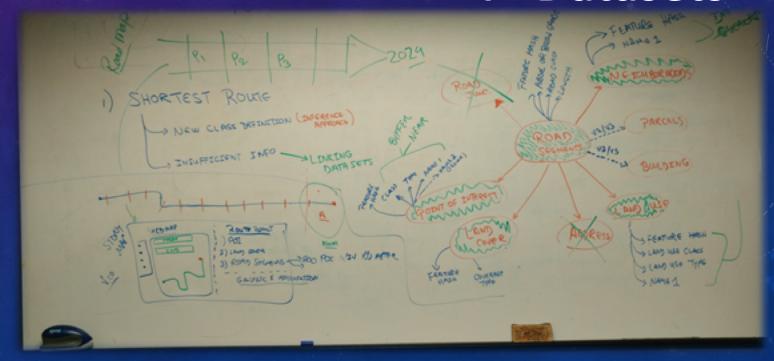
and enable **semantic** querying.



#### **SOLUTION & CASE STUDY**

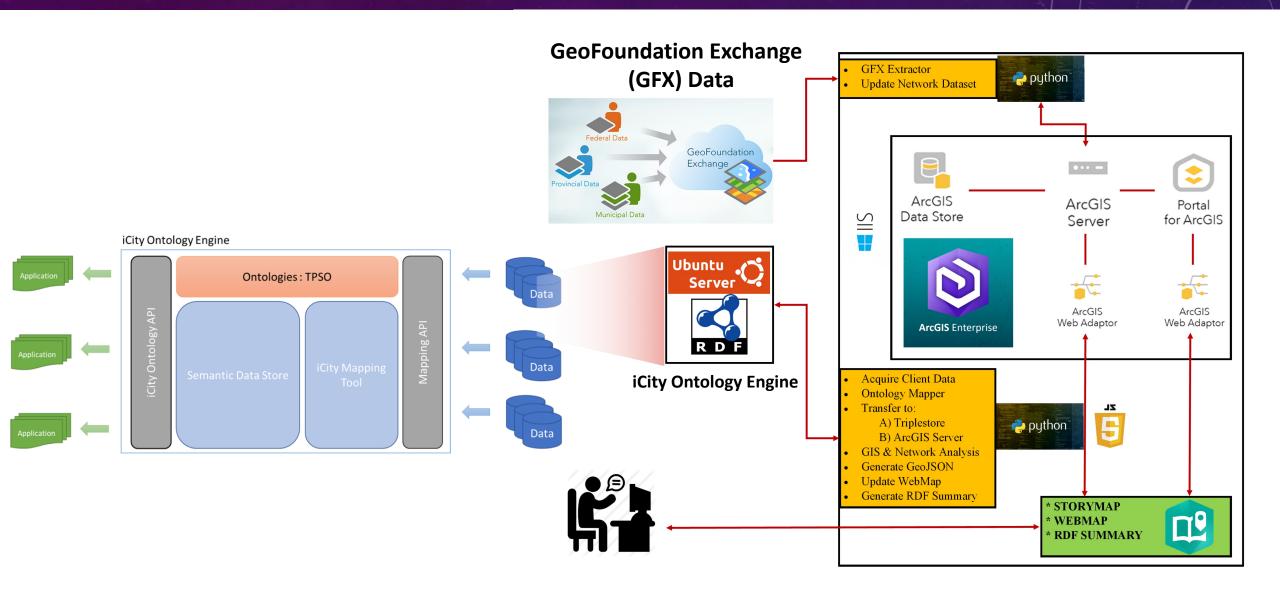
- In-Depth Context of Shortest Route Tool
- Feature Classes in Scope:
  - Point-of-Interest (POI)
  - Neighbourhoods
  - Land Use
  - Road Segments
  - Other

#### **4+ Datasets**



## **ARCHITECTURE**







#### **CURRENT STATUS**

- First use case identified
- Project plan defined
- Initial architecture design completed
  - Tools reviewed and selected
- Started implementation
- Projected prototype completion date: February 2020



# PROJECT PLAN ESTIMATED COMPLETION: FEBRUARY 2020

#### **GSX Project Plan**

Select a period to highlight on the right. A legend describing the graph follows.					Period to highlight:	6 🥳 Plan duration 🥻 Actual Start 🔳 % complete 🌠 Actual (past due)
TASK	PLANNED START	PLANNED DURATION	ACTUAL START	ACTUAL DURATION	PERCENT COMPLETE	Week 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 2
Define use case (Complete)	. 1	2	1	2	100%	
Identify required data (Complete)	2	1	2	1	100%	
Define mapping of data into ontology (In Progress)	3	8			20%	
Survey available tools (Complete)	3	1	3	1	100%	
Initial tool selection based on use case requirements and scope limitations	4	1	4	1	100%	
Initial architecture design based on tools selected	5	2	5	2	100%	
Implement route analysis (integrate with user interface)	6	8			10%	
Deploy & integrate OBDA solution for materialization of spatial data into RDF triples	8	4			0%	
Deploy & integrate RDF triple store solution with OWL reasoner	12	4			0%	
Integrate routing engine output with ontology query generation	14	2			0%	
Integrate ontology output with user interface	16	2			0%	
Develop user interface (webmap embedded in storymap)	18	2			0%	



#### **FUTURE WORK**

#### **Applications:**

- This case study is one of many possible uses of semantic querying in the Esri toolset
- Future possible applications include:
  - Dataset verification (e.g. with respect to the GFX)
  - Extended support for NextGen-911
  - Incorporation of external data
- Investigate connections with other UTTRI projects

#### **Functionality:**

- Automatically update data through GFX (GeoFoundation Exchange)
- Export and map data from ArcGIS on-demand
- Expand scope and scale (outside of Toronto)
- Support for user interaction (attribute selection, filtering)
- Compute multiple routes and use constraints to filter routes

