

LYNX GIS Strategic Plan Update: Roadmap for the Next Decade

2013 Esri Int'l Users Conference



July 10, 2013

Presented By:



About LYNX

- ✓ Central Florida Regional Transportation Authority (LYNX) was founded in 1972 and currently has over 900 employees.
- ✓ LYNX serves an area of approximately 2,500 square miles with a population of 1.8 million people in Orange, Seminole, and Osceola counties, FL.
- ✓ LYNX operates approximately 24 hours a day on 66 fixed bus routes.
- ✓ LYNX has been using GIS for over a decade.

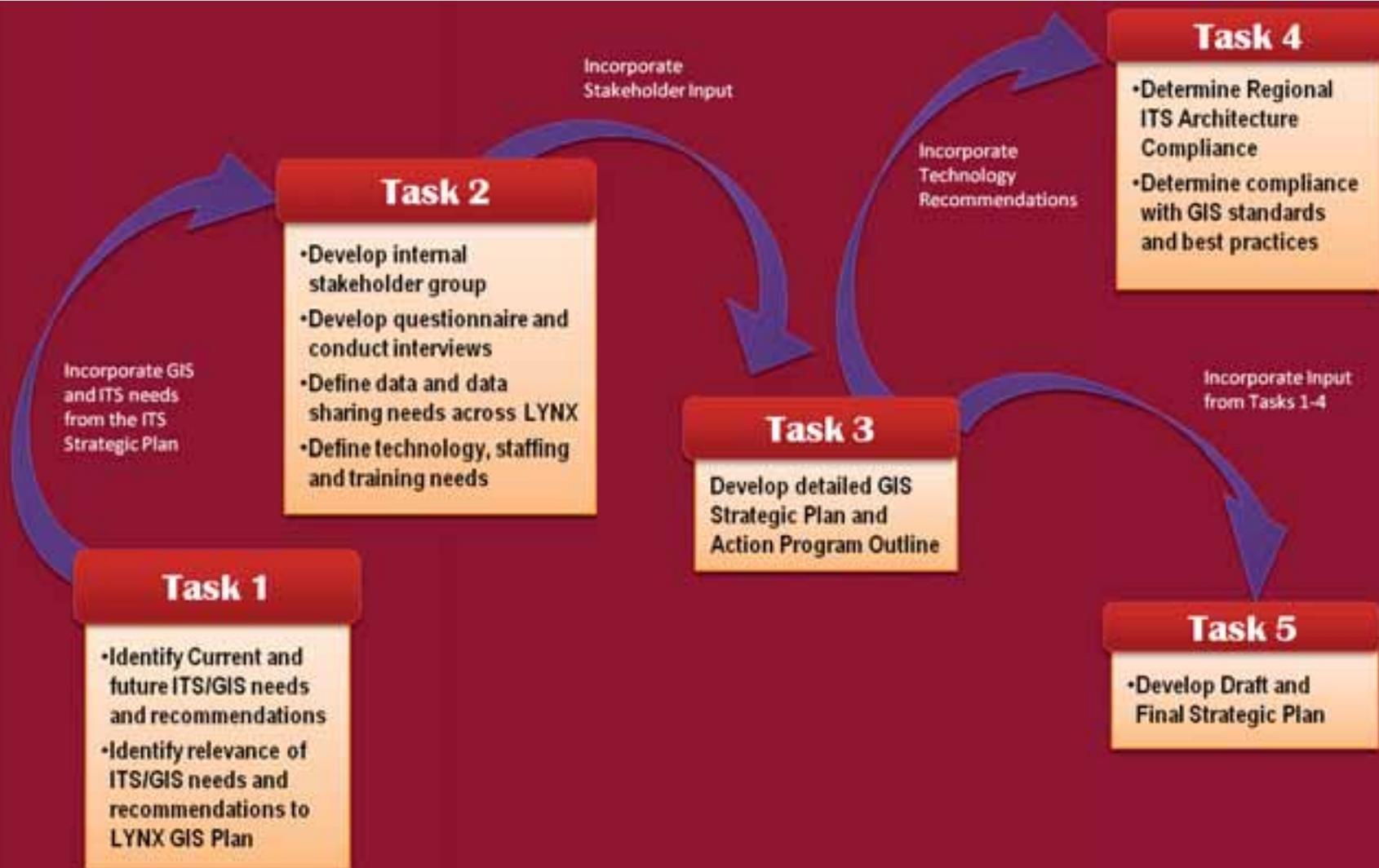
Project Overview

- ✓ Builds upon efforts from ITS Strategy Plan 2011
- ✓ Project will identify a 5-year and 10-year action program for implementation integrating GIS advances within LYNX
- ✓ Identify strategic goals to be achieved by the 10th year
- ✓ Will lend to increased customer service, increased staff and operational efficiency, and maximize GIS advances within LYNX

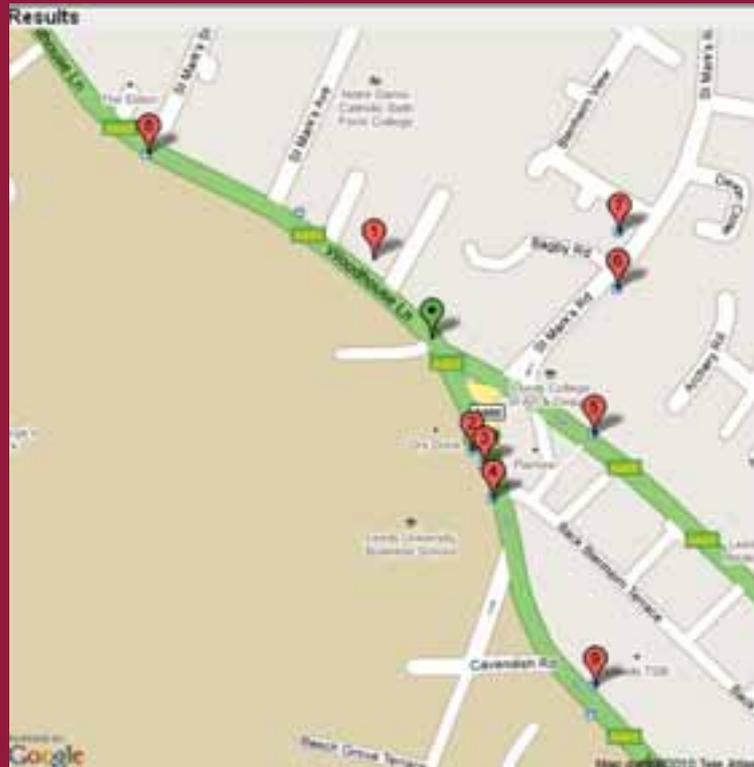
The GIS Strategic Plan Evaluated...

- ✓ Technologies currently in use at LYNX and desired improvements; also looked at current and emerging technology trends
- ✓ Existing data flows for information exchange between the Planning department (particularly, GIS staff), and internal and external stakeholders;
- ✓ The Steps required to streamline the existing workflows;
- ✓ Existing technical and human resources, and the need for improvements; and
- ✓ Strengths and weaknesses of the existing GIS technology infrastructure, and requirements for improvements.

Project Tasks



Task 1: Review of ITS Strategic Plan



Year	Plan	Design	Implement
1	<ul style="list-style-type: none"> ✓ TSP corridors ✓ TCIP interfaces ✓ Internal system integration/upgrades ✓ Advanced traffic management system 	<ul style="list-style-type: none"> ✓ Scalable information warehouse infrastructure ✓ Real-time information system ✓ Automated field data collection 	<ul style="list-style-type: none"> ✓ CAD/AVL ✓ On-board interfaces/upgrades ✓ Open data in GTFS format
2	<ul style="list-style-type: none"> ✓ Decision support tools ✓ Multimodal data integration strategy ✓ Info-mobility ✓ Advanced fare payment 	<ul style="list-style-type: none"> ✓ TCIP interfaces ✓ Central system interfaces ✓ Agency-wide GIS data sharing infrastructure ✓ Advanced traffic management system 	<ul style="list-style-type: none"> ✓ Scalable information warehouse infrastructure ✓ Real-time information ✓ Location-based services ✓ Automated field data collection
3	<ul style="list-style-type: none"> ✓ External interoperability ✓ Multi-modal integration 	<ul style="list-style-type: none"> ✓ Decision support tools ✓ Expansion of TSP ✓ Multi-modal data integration strategy ✓ Info-mobility ✓ Advanced fare payment 	<ul style="list-style-type: none"> ✓ TSP pilot ✓ TCIP interfaces ✓ Improvements in customer information dissemination ✓ Improvements in GIS data infrastructure
4	<ul style="list-style-type: none"> ✓ Datamarts and analysis tools ✓ Virtualization and cloud computing ✓ "Connected vehicle" 	<ul style="list-style-type: none"> ✓ External interoperability ✓ Datamarts and analysis tools ✓ Multi-modal integration 	<ul style="list-style-type: none"> ✓ Expansion of TSP ✓ TCIP interfaces ✓ Decision support tools ✓ Improvements in information warehouse ✓ Info-mobility ✓ Advanced fare payment
5	<ul style="list-style-type: none"> ✓ Regional integration ✓ Improved wireless communication (Super Wi-Fi) 	<ul style="list-style-type: none"> ✓ Datamarts and analysis tools ✓ Virtualization and cloud computing ✓ "Connected vehicle" 	<ul style="list-style-type: none"> ✓ Operational improvements ✓ Multi-modal integration ✓ Datamarts and analysis tools ✓ Decision support tools ✓ Info-mobility

Year	Plan	Design	Implement
6	<ul style="list-style-type: none"> ✓ Flexible/on-demand bus networks ✓ DSRC sensors on vehicles (V2V and V2I communications) ✓ RFID-based field data 	<ul style="list-style-type: none"> ✓ Improved wireless communication (Super-Wi-Fi) ✓ Regional integration ✓ Improved (NFC-based) fare payment 	<ul style="list-style-type: none"> ✓ Virtualization and cloud computing ✓ Datamarts and analysis tools ✓ "Connected vehicle" ✓ Commuter rail integration
7	<ul style="list-style-type: none"> ✓ Adoption of new technologies (e.g., natural language, surface computing) ✓ High-speed rail/airport integration 	<ul style="list-style-type: none"> ✓ Flexible/on-demand bus networks ✓ DSRC sensors on vehicles ✓ RFID-based field data 	<ul style="list-style-type: none"> ✓ Improved wireless communication (Super-Wi-Fi) ✓ Regional integration ✓ Improved fare payment ✓ "Connected vehicle"
8	<ul style="list-style-type: none"> ✓ High-speed rail/airport integration 	<ul style="list-style-type: none"> ✓ Adoption of new technologies (e.g., natural language, surface computing) 	<ul style="list-style-type: none"> ✓ DSRC sensors on vehicles ✓ RFID-based field data
9	<ul style="list-style-type: none"> ✓ Adoption of advanced transit technologies (e.g., auto-pilot vehicles) 	<ul style="list-style-type: none"> ✓ High-speed rail/airport integration ✓ Adoption of new technologies (e.g., natural language, surface computing) 	<ul style="list-style-type: none"> ✓ DSRC sensors on vehicles ✓ RFID-based field data ✓ Adoption of new technologies (e.g., natural language, surface computing)
10	<ul style="list-style-type: none"> ✓ Adoption of next generation transit technologies 	<ul style="list-style-type: none"> ✓ Advanced transit technologies (e.g., auto-pilot vehicles) 	<ul style="list-style-type: none"> ✓ Adoption of new technologies (e.g., natural language, surface computing)

Task 2: Assessment of IT and GIS Resources

- ✓ Developed needs assessment Surveys
 - Survey 1 – Department Director focused
 - Survey 2 – Department technical staff focused
- ✓ Surveys focused on identifying existing/planned use of data and user requirements of location-based data
- ✓ Compiled the results of the surveys for identifying data sharing needs and defining the Internal Stakeholder Group

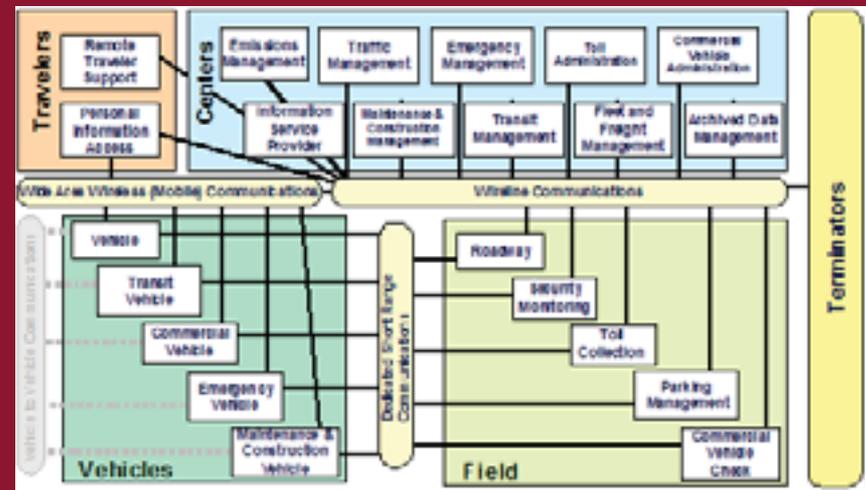
Task 3: GIS Strategic Plan and Action Program

- ✓ Determine and prioritize stakeholder needs
- ✓ Review GIS and ITS inventory
- ✓ Identify goals and objectives
- ✓ Assess internal and external resources
- ✓ Develop ITS/GIS integration approach
- ✓ Develop internal and external interfaces
- ✓ Determine funding needs and deployment phasing/schedule
- ✓ Develop draft and final plans



Task 4: Regional ITS Architecture Compliance

- ✓ Review FDOT District 5 Regional ITS Architecture
- ✓ Ensure that:
 - LYNX GIS elements are included
 - Data flows between LYNX GIS components/ systems and appropriate regional systems
- ✓ Recommend changes to Regional ITS Architecture



Task 4: Compliance with Industry GIS Standards and Practices

- ✓ Full FGDC Compliant Metadata
- ✓ Data Access Constraints Identified
- ✓ Standards in Connection with CFGIS Users Group and FDOT District 5
- ✓ Ensure Compliance with LYNX Data Accuracy
- ✓ Identify Thin vs. Thick Clients



Task 5: GIS Strategic Plan Development (Focus Areas)

✓ Technology Advancements

- Multi-modal applications
- GIS/ITS data analytics
- Social media and emerging technology
- Ubiquitous information access

✓ Internal and external interoperability

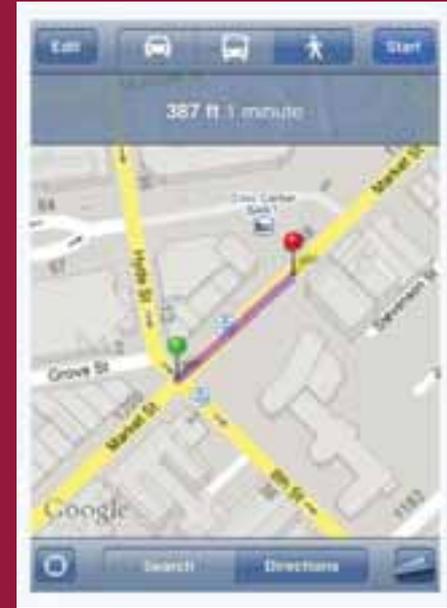
✓ Investment and funding strategies

✓ Total cost of ownership vs. benefits

✓ Customer satisfaction

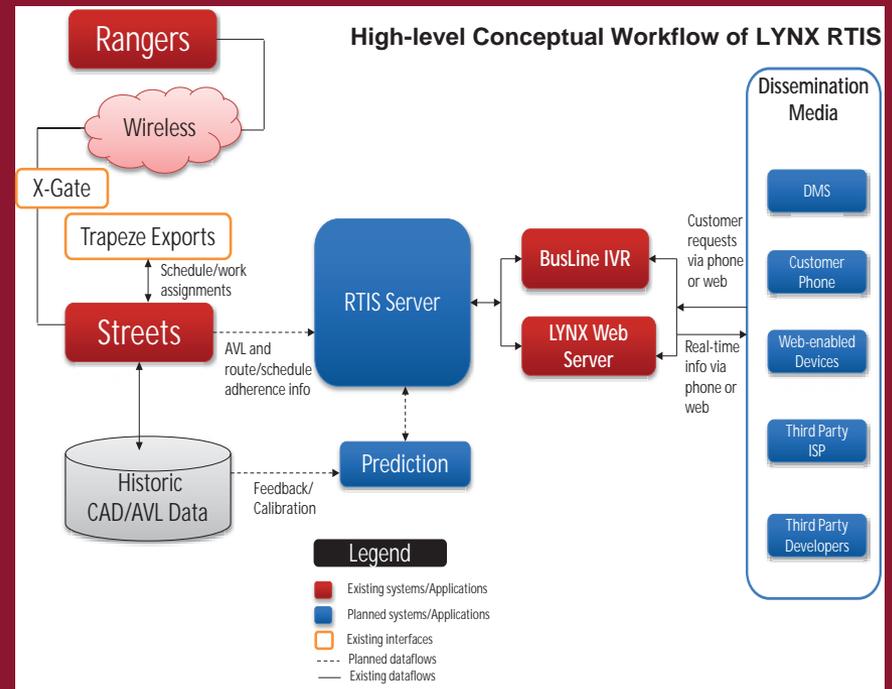
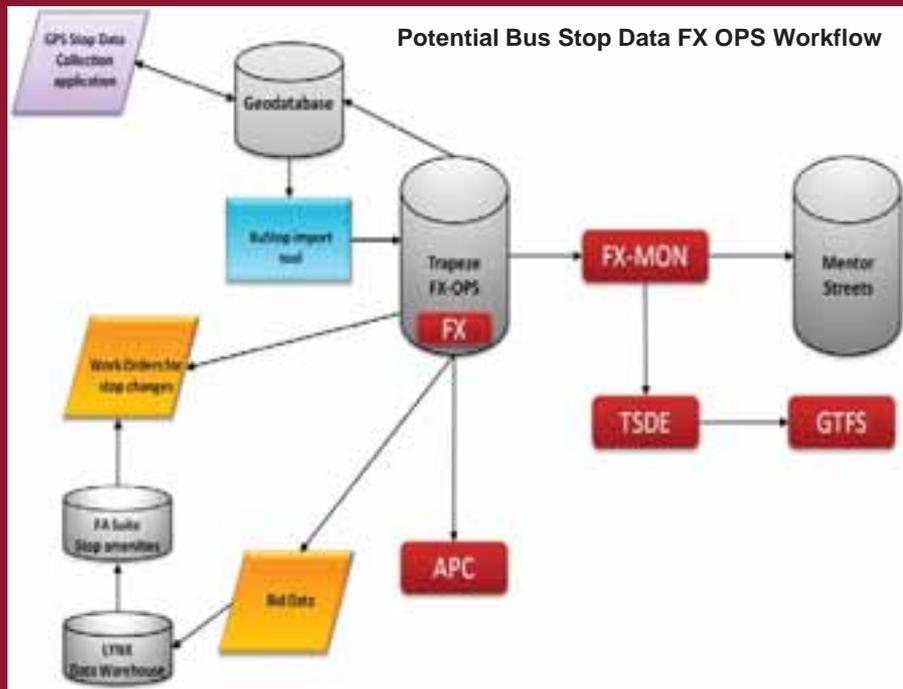
✓ Organizational productivity and efficiency

✓ Change and risk management



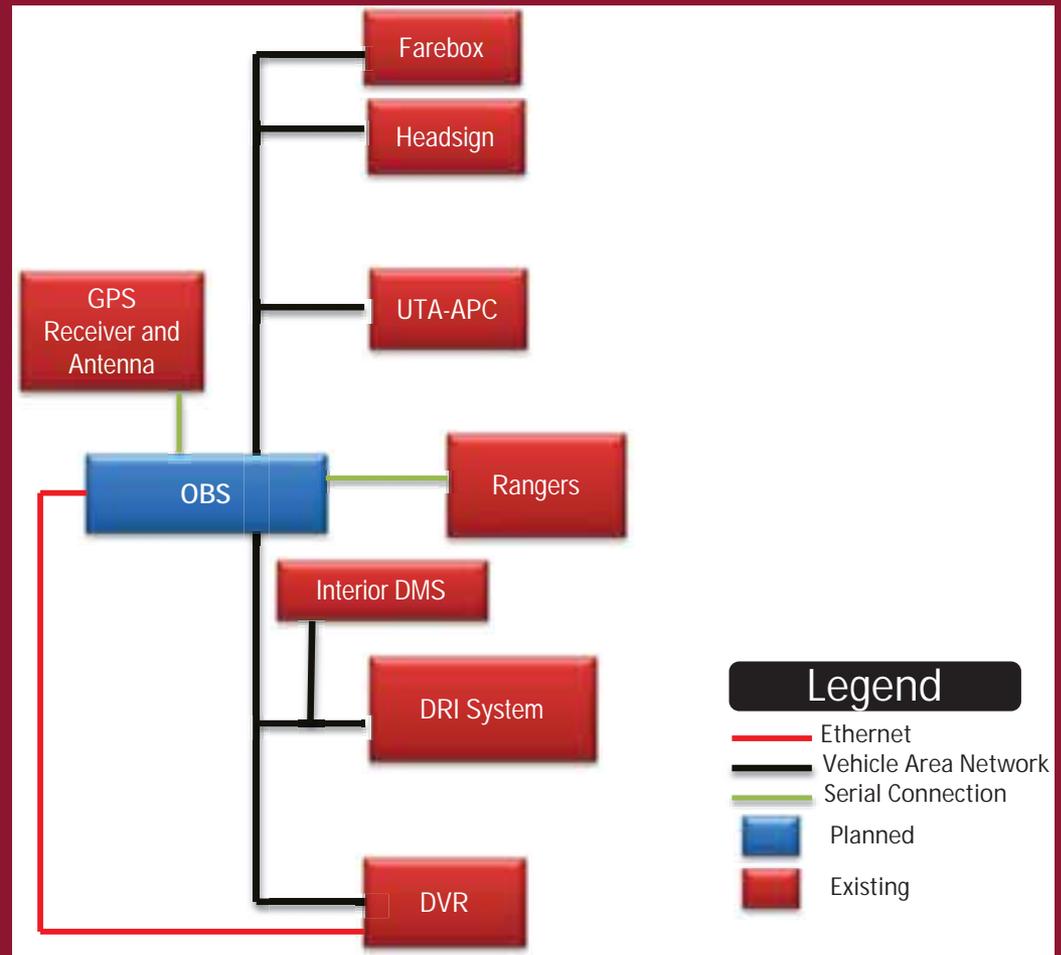
Goals and Objectives Identified: Goal 1

- ✓ **Goal 1:** Automate data collection and processing capabilities for location-based data, and identify unique enterprise-wide sources for each location-based data to streamline the associated workflow.



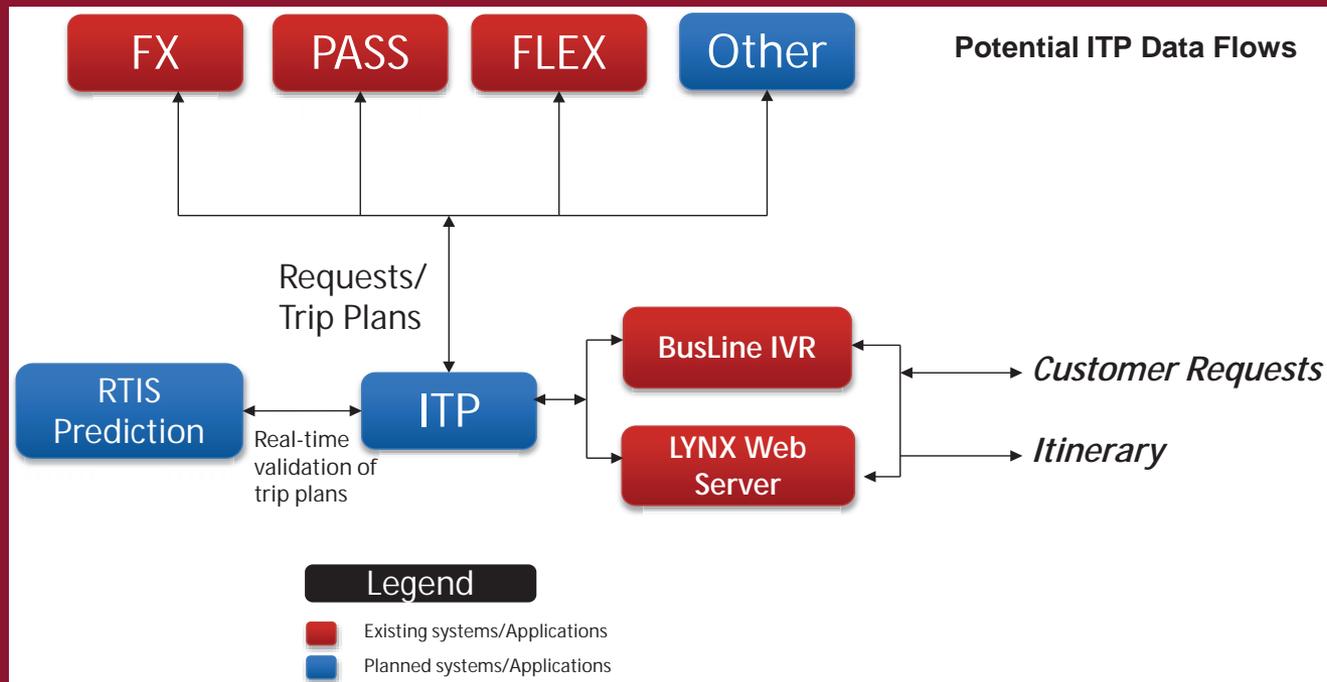
Goals and Objectives Identified: Goal 2

✓ **Goal 2:** Maximize the utilization of location-based information by internal staff to support their business functions by creating interactive tools that enhance data accessibility via a variety of devices and platforms.



Goals and Objectives Identified: Goal 3

- ✓ **Goal 3:** Enhance the capabilities of the location-based systems to deliver timely, reliable, and accurate customer information via a variety of dissemination media at pre-trip and en-route stages of the customer chain.



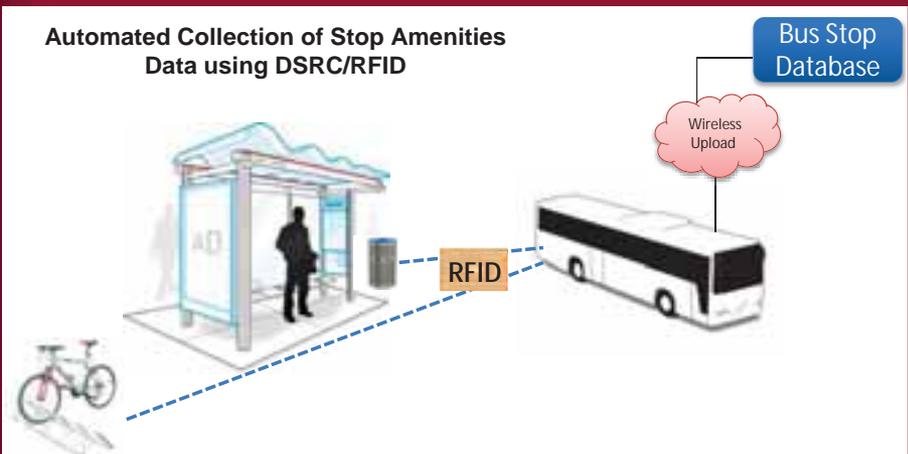
Goals and Objectives Identified: Goal 4

- ✓ **Goal 4:** Enhance the interoperability of existing location-based systems to increase data sharing across regional partners and with future systems/subsystems.

Esri Single-user vs. Multiuser Geodatabase Structure Environment



Automated Collection of Stop Amenities Data using DSRC/RFID



Recommendation – Improve GIS Data Structure and Access

HIGHLIGHTS:

✓ Three workflow options to choose from:

Option A: Migrate from single-user geodatabase to multiuser geodatabase system, continue web server GIS outsourcing.

Option B: Migrate from single-user geodatabase to multiuser geodatabase system, web server GIS configured in-house

Option C: Migrate from single-user geodatabase to multiuser geodatabase system, serve data to internal/external users via Cloud GIS (ArcGIS Online subscription)

Option B Sample (continued)

OTHER HIGHLIGHTS:

✓ Implementation Schedule processes:

- Near-term implementation (0-2 years)
- Short-term implementation (3-5 years)
- Long-term implementation (6-10 years)

✓ Dependencies

- Continue to invest in Esri GIS solutions and technology

✓ Potential Costs and Benefits

- Cost breakdown for next three fiscal years.

✓ Anticipated Impact on Business

- Increased efficiency from data sharing through ArcSDE

✓ Staffing and Training Requirements

- Training will be needed for potential new DBA, other GIS staff

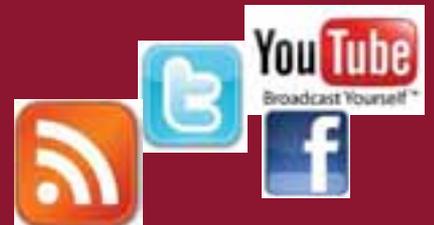


Five Year Action Program (2013-2017)

Year	Plan	Design	Implement
2013	<ul style="list-style-type: none"> Internal system integration/upgrades RTIS enhancement Bus stop inventory GIS data structure enhancement 	<ul style="list-style-type: none"> RTIS Automated field data collection On-board integration Bus stop inventory Streamline basemap update process 	<ul style="list-style-type: none"> CAD/AVL Create catalog of location -based systems
2014	<ul style="list-style-type: none"> Multimodal data integration Intermodal trip planner LYNX datawarehouse enhancements 	<ul style="list-style-type: none"> GIS data structure enhancement Systemwide location -based data access RTIS enhancement 	<ul style="list-style-type: none"> RTIS Bus stop inventory Automated field data collection On-board integration Streamline basemap update process
2015	<ul style="list-style-type: none"> Regional data sharing External interoperability 	<ul style="list-style-type: none"> Multi-modal data integration Intermodal trip planner LYNX datawarehouse enhancements 	<ul style="list-style-type: none"> RTIS Enhancement GIS data structure enhancement Systemwide location -based data access
2016	<ul style="list-style-type: none"> Flexible services Automated fare payment and distance -based fares 	<ul style="list-style-type: none"> Regional data sharing External interoperability Datamarts , reporting and analysis tools Automated fare payment and distance -based fares 	<ul style="list-style-type: none"> Intermodal trip planner LYNX datawarehouse enhancements
2017	<ul style="list-style-type: none"> "Connected vehicle" 	<ul style="list-style-type: none"> Flexible services 	<ul style="list-style-type: none"> Intermodal trip planner Datamarts , reporting and analysis tools Automated fare payment and distance -based fares

Ten Year Action Program (2018-2022)

- ✓ Plan, design and implement technologies available as part of the USDOT Connected Vehicle Program (CVP).
- ✓ LYNX should adopt technologies that enhance the customers' trip experience. For example, technologies such as indoor mapping and augmented reality, HTML5 and natural language processing.
- ✓ LYNX should adopt technologies that will assist with multi-modal integration and regional coordination. Some of these technologies include: Super WiFi, multimodal transfer connection protection and intermodal CAD/AVL.
- ✓ Update GIS Strategic Plan in five years.



GIS Strategic Plan Document - Deliverables



LYNX Needs Assessment and Implementation Plan Survey
LYNX GIS Strategic Plan Update

** Location based data sets refer to a broad range of spatial information that may have location elements associated with it. Some of this information includes but is not limited to the program; stop point database, route-trip, directions for customers, landmarks/park of interest locations, transfer points, "where's my bus" questions, customer pick-up/drop off address, and neighborhood details. Architectural and political boundaries are another example of location based data.*

Date: April 11, 2012
Name: Bill Hurdman
LYNX Department: Passenger Operations

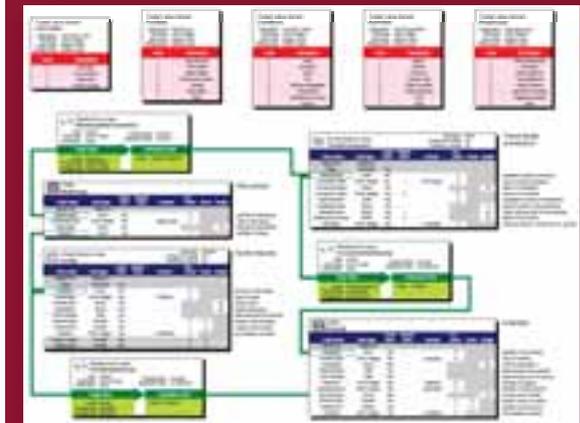
1. Please describe your department's role within LYNX. Please include at least the following in the description, as applicable (be as descriptive as possible, add space as applicable):

- Daily duties performed
- Number of staff members
- Technologies in use
- Data needs
- Interaction with other departments
- Direct interaction with LYNX customers

Please type below:

- Daily duties performed - Oversight and compliance of passenger and fare services, contractor, customer eligibility, data and federal compliance monitoring of coordination agencies, funding source filing, and state and federal reporting
- Number of staff members - 11. 10 based at South Street, 1 based within Customer Service at LSC.
- Technologies in use - Scheduling and dispatch software (Trigress PMS), mobile data terminals, automatic vehicle location, call-center recording and reporting, onboard cameras, online reservations and customer service module, Interactive Voice Response (open to go fare), ACCESS, and Capital Transit.
- Data needs - Location based information, customer service networks and maps, Census data, political jurisdiction boundaries, neighborhood census areas (shape files), ACA service area (shape file).
- Interaction with other departments - interaction with all other departments within the agency.
- Direct interaction with LYNX customers - Eligibility decisions and status, customer and

March 2012 - Survey 2 Page 1 of 2



Since the GIS Strategic Plan...



Lessons Learned

- ✓ Performance measures of a successful GIS Strategic Plan should include projects that are planned to be implemented within 6 months of plan adoption
- ✓ Planned Improvements within 6-months:
 - Improve the GIS data structure and access
 - Real-Time Information Systems Implementation Strategy (RTIS)
 - Bus Stop Inventory development



Keys for Success

- ✓ Select the best, most qualified team.
- ✓ Maintain open communication and collaboration between client and consultant project manager
- ✓ Find and engage all stakeholders
- ✓ Promote what has already been created



Teamwork, effective communication, and collaboration, plus adequate advertising of the project to the right people can go a long way.



Thank You!

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